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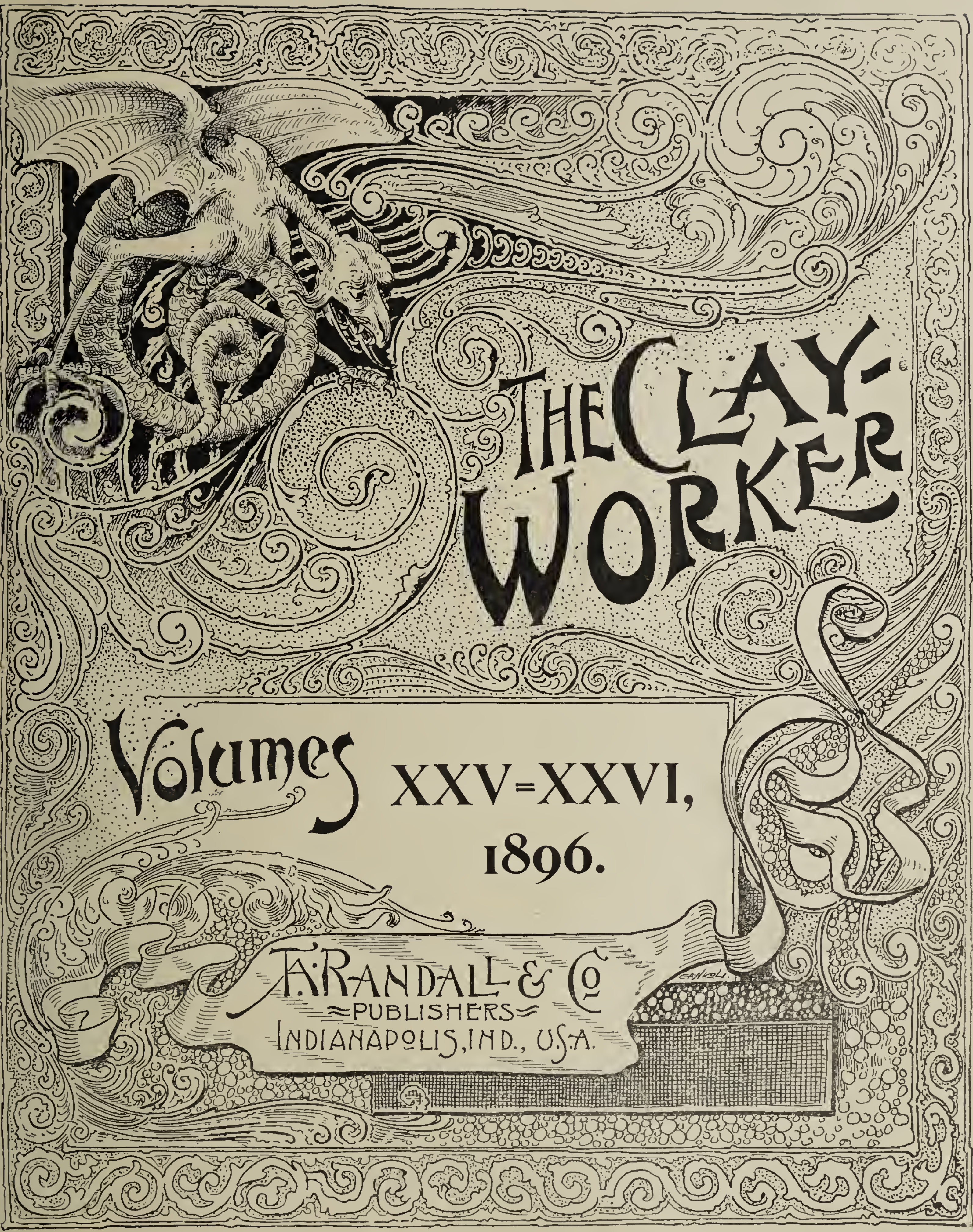

THE CLAY-WORKER

Volumes XXV=XXVI,
1896.

T. A. RANDALL & Co
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REMOTE STORAGE

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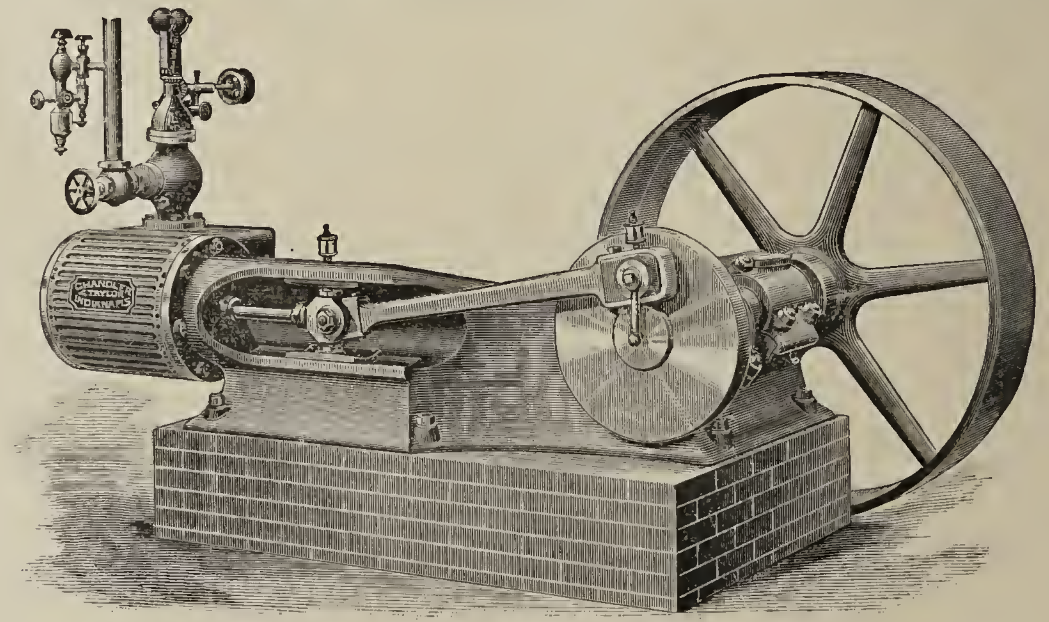

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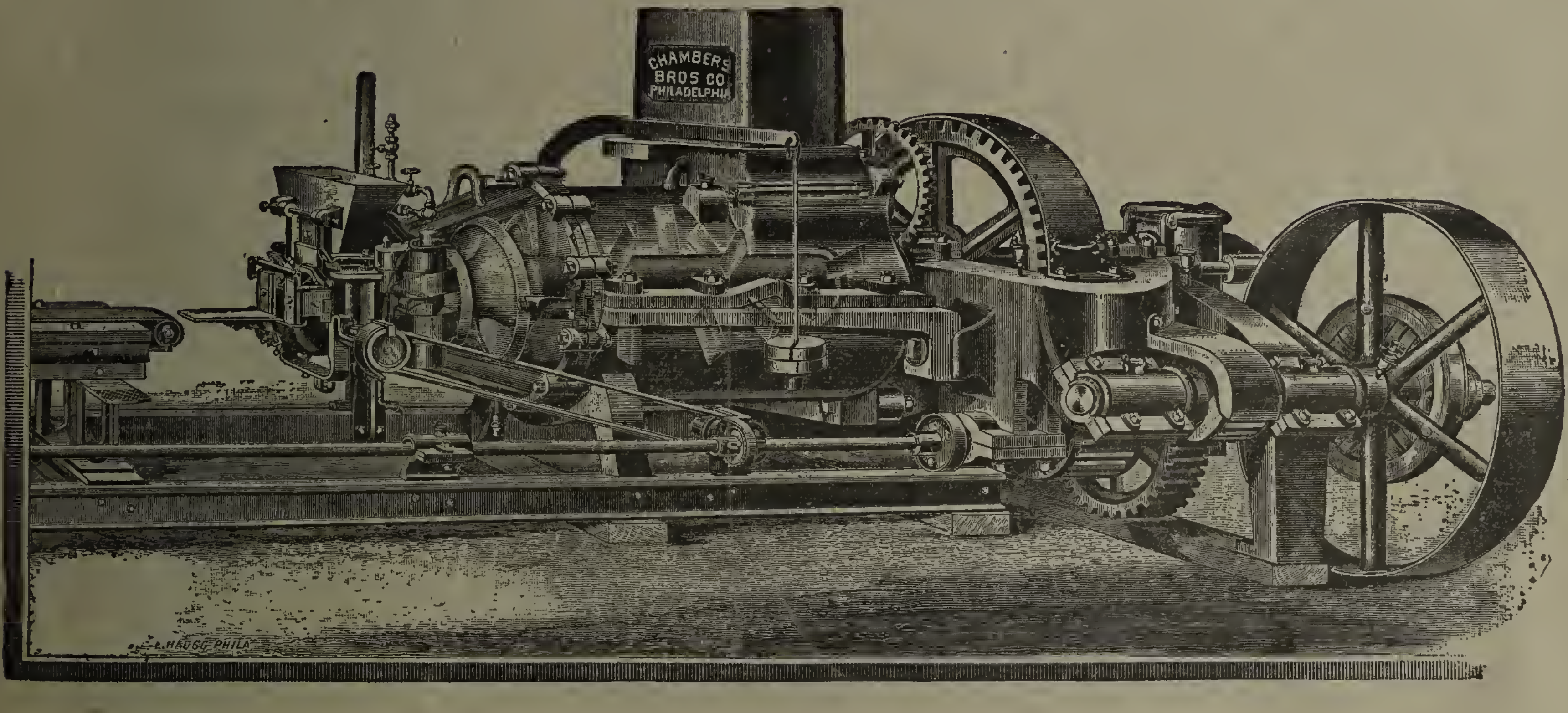

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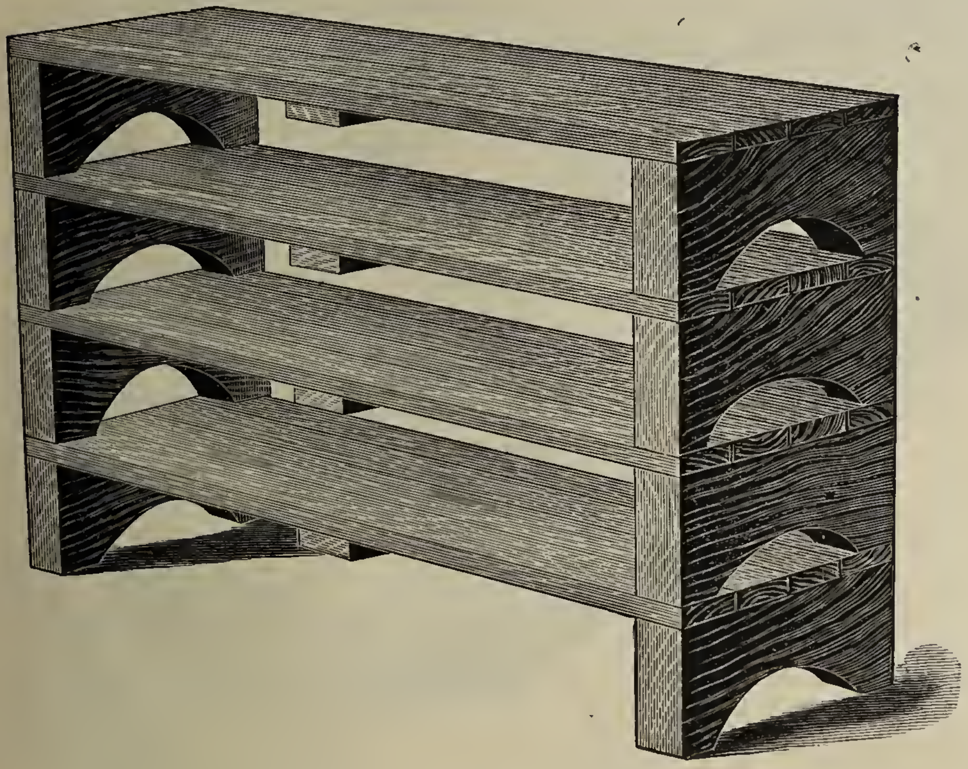

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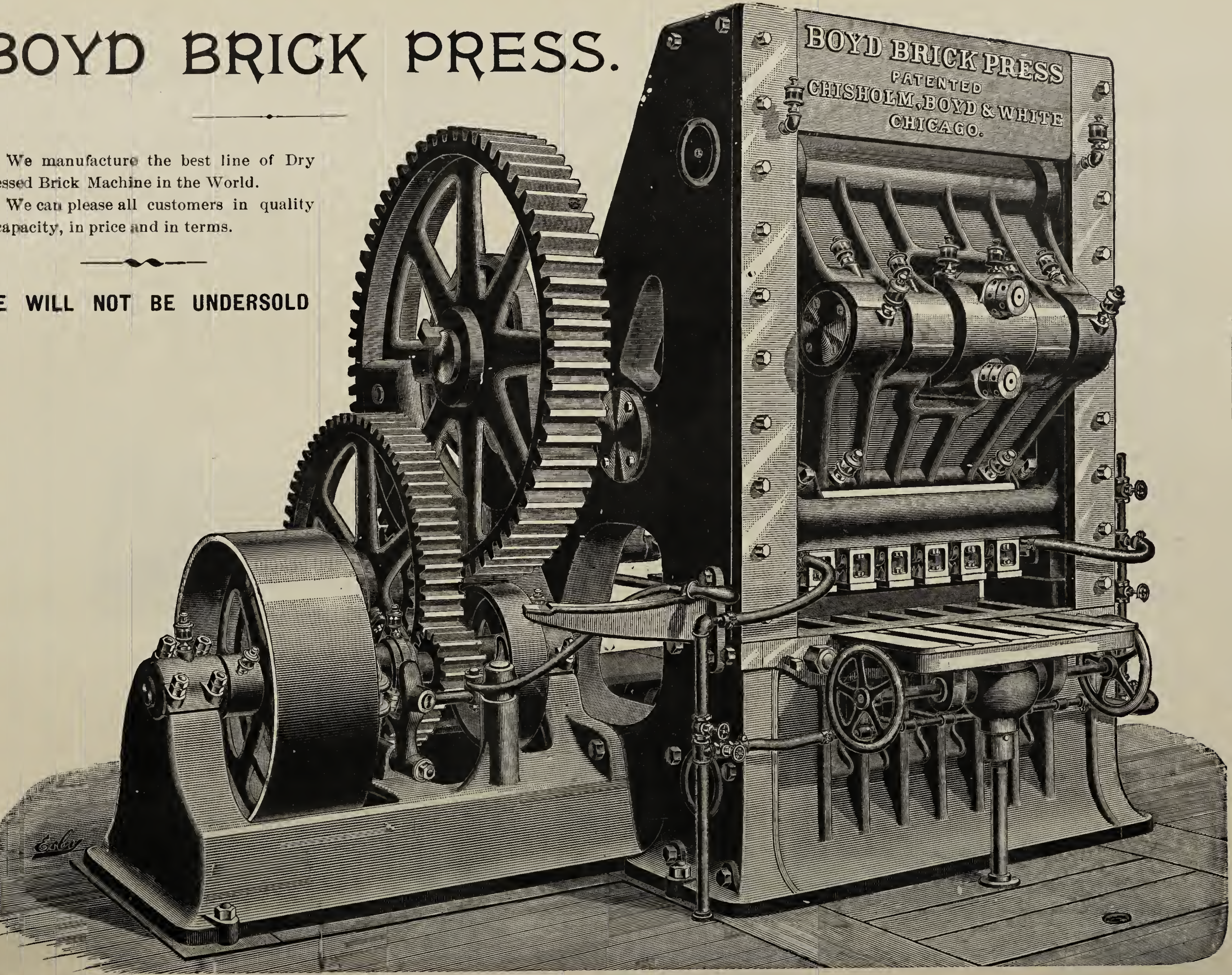

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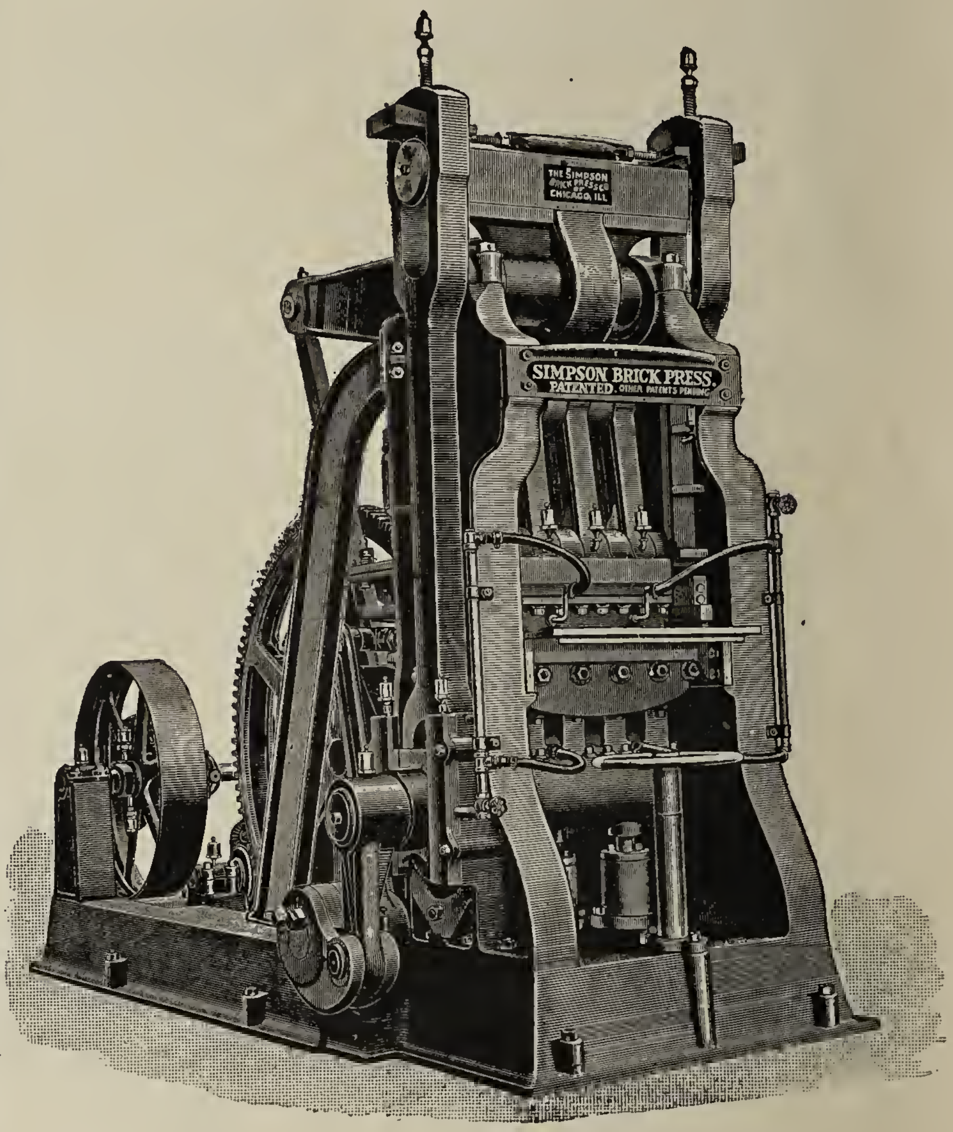
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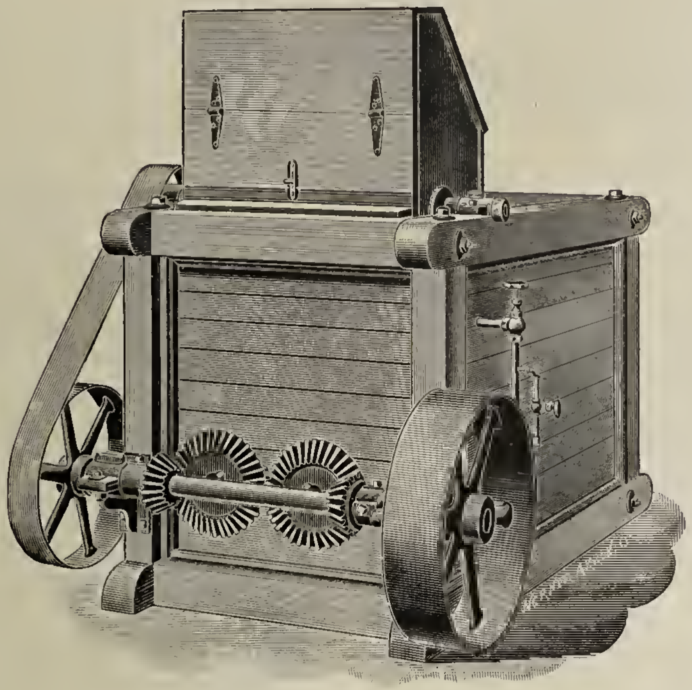
Are You using a Dry Press Brick Machine? If so, you need the Arnold Clay Steamer.



The Arnold Clay Steamer

IS THE Original Steamer designed to be used in connection with the patented process of preparing clay, by the use of steam, for the Dry Press Machine.

We manufacture a new

Shaking Screen . . . . .

Which requires less space, does more and better work than any other screen, and is fitted with reciprocal springs which take all jar off building.

The Dryer Cars . . . . .

Of our manufacture are strong, durable and light. Made of steel and wrought iron with superior **anti-friction** rolls-bearings. A boy can easily handle 5,000 pounds on one of these cars.

For descriptive circular and terms, address

Arnold Manufacturing Co.,

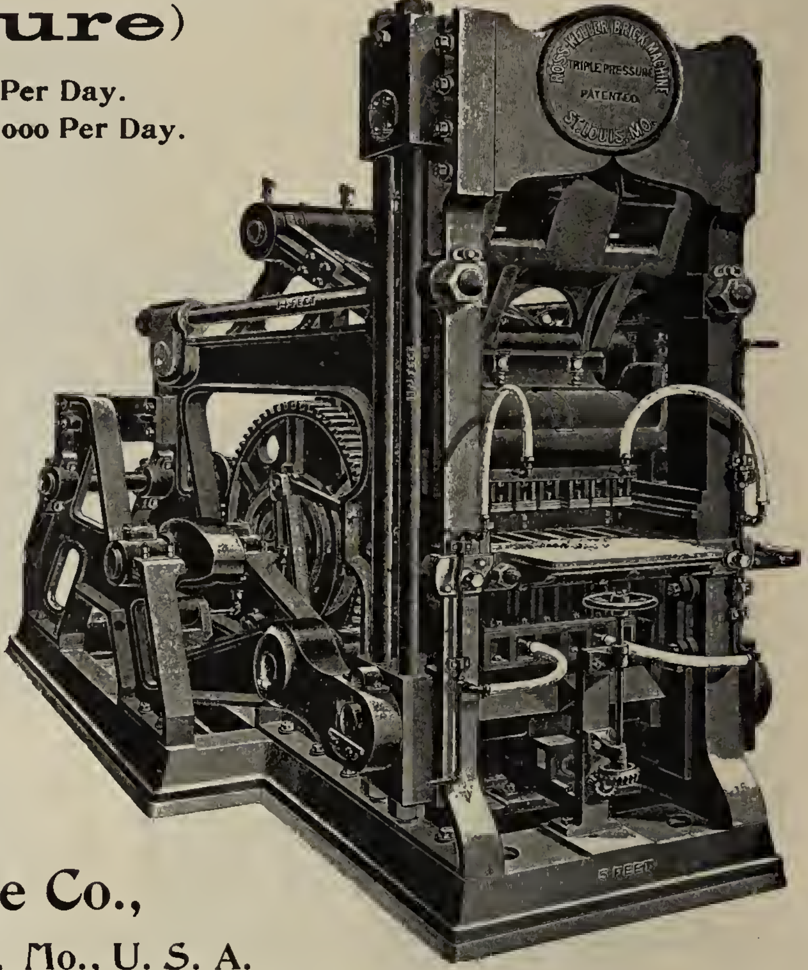
CANAL DOVER, OHIO.

We have for sale, Canadian Patents No. 35,719, dated 8th January, 1891, Invention entitled "Improvement in Brick Driers," and No. 43,884, dated 10th August 1893, Invention entitled "Process of Preparing Clay."

The Ross-Keller Brick Machine.

(Triple Pressure)

Weight of 4-Mold Press 50,000 Pounds, Capacity 24,000 Per Day.
Weight of 6-Mold Press 75,000 Pounds, Capacity 36,000 Per Day.



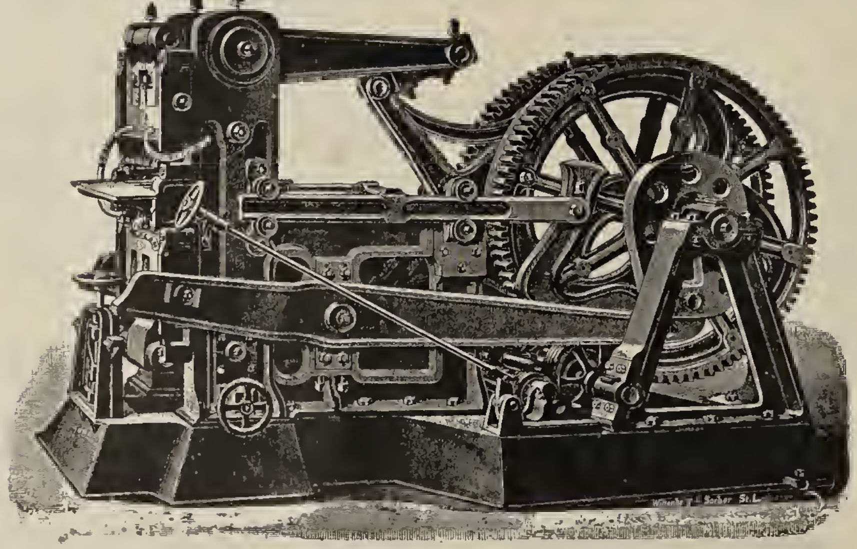
THIS PRESS is made in two sizes, four and six mold, and has **three separate and distinct pressures.** It is noiseless in its movements, and is the most simple and powerful machine ever built in the United States. It works dry or semi-dry clay, and is especially adapted for working shale and other similar materials. It presses the brick equally on both sides, and removes all granulation from faces of same. It will make any shape brick desired, also Edge and Roman brick. It has wide bearings bushed with bronze, and all pins and shafts are made of five, six and seven-inch forged steel.

Correspondence Solicited.

☞For Circulars, prices and other particulars, address

Ross-Keller Brick Machine Co.,
Room 201 Laclede Building, St. Louis, Mo., U. S. A.

The Progress Brick Press.



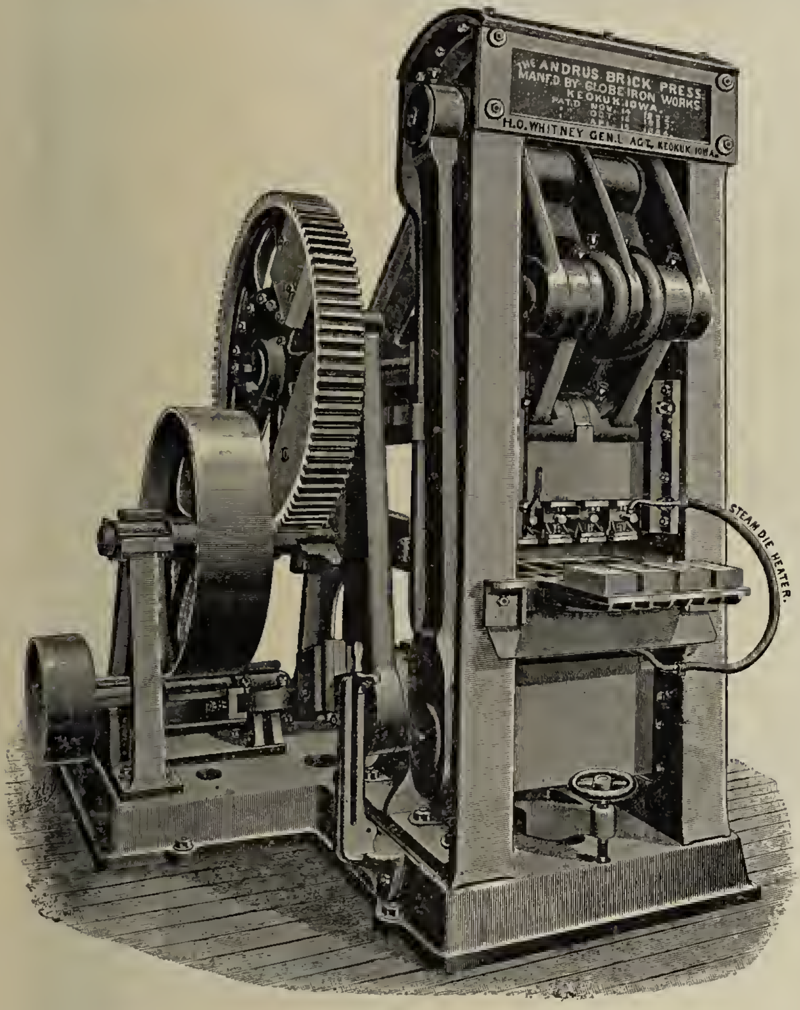
* * *

DESCRIPTIVE pamphlet sent on application treating on the selection of Brick Machinery and its requisites.

* * *

Progress Press Brick and Machine Co.,
King's Highway and Oak Hill R. R. ST. LOUIS, MO.

THE ANDRUS DOUBLE PRESSURE BRICK PRESS.



We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

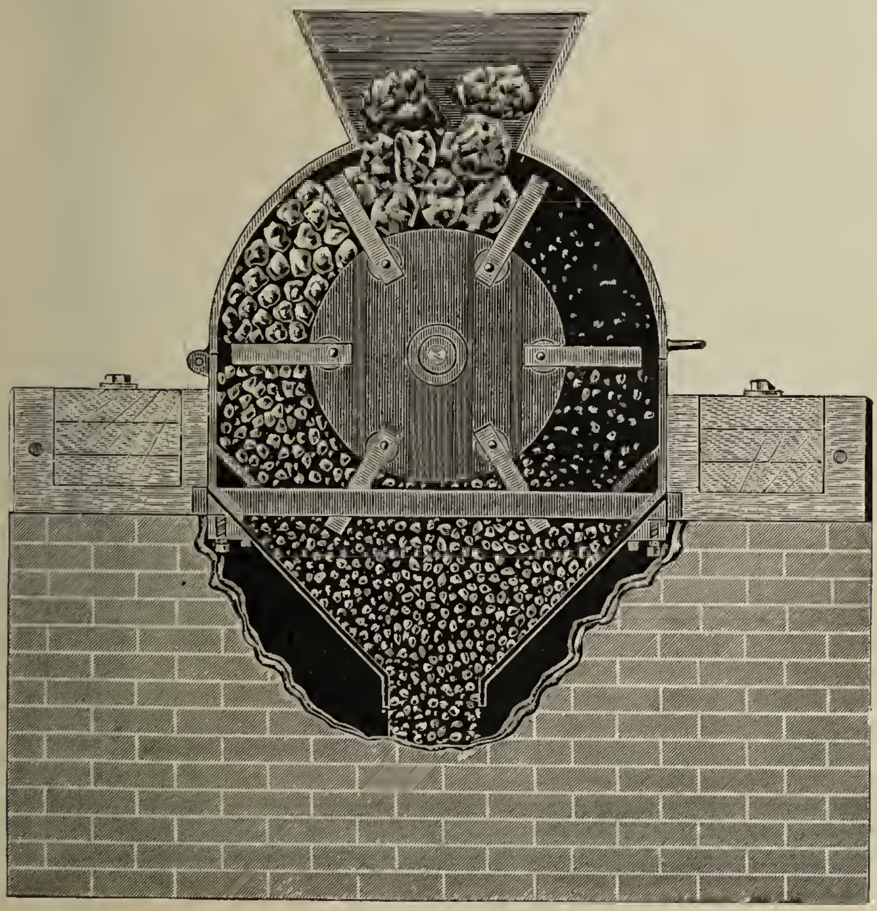
They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . .

Send for descriptive Catalogue, address

H. O. Whitney,
General Agent,
KEOKUK, IOWA.

WILLIAMS'S COMBINED SHALE CRUSHER and CLAY PULVERIZER



This machine is a marvel and surprise to all who have seen it in operation. It does the work of two machines and prepares the Clay or Shale in a most thorough manner. It cannot choke with ordinary damp clay; it will do more and better work, with one-half the power, than any other kind of Pulverizer; the cost for repairs will be less than one-half, and the cost for oil will also be less than one-half.

We will furnish these machines upon 30 days' trial, to responsible parties.

FOR FURTHER
INFORMATION,
ADDRESS

MILTON F. WILLIAMS & CO.,
2705 North Broadway, ST. LOUIS, MO.,

Builders and Contractors of Complete
Dry-Press Brick Plants. . . . .

Any Draft So Its Up-Draft.

WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost.

Manufacturers of Building Brick can get nothing better.

For all information desired address

R. B. MORRISON & CO.,
P. O. Box 335,
Rome, Ga., U. S. A.

PROPRIETORS
Morrison's Latest Improved Kilns.

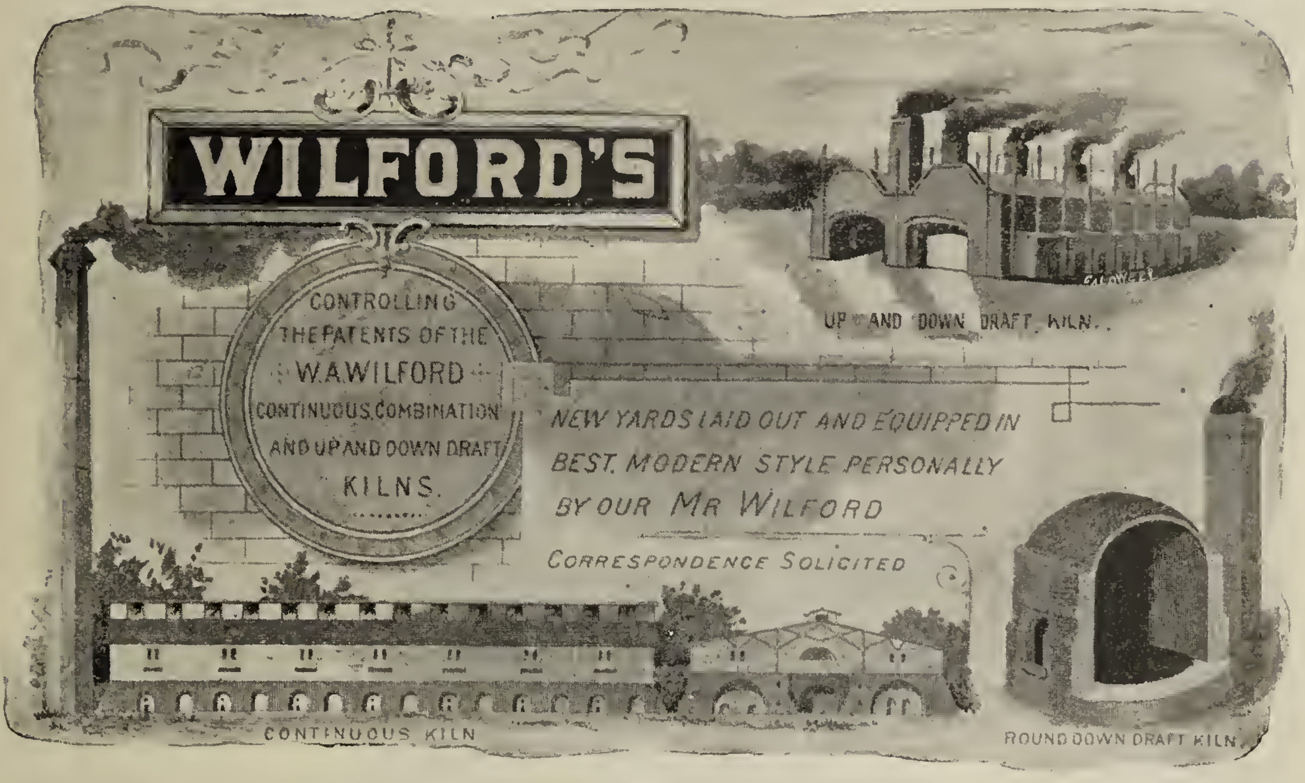
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A. WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

HON. A. DESJARDINS, President. JOS. BARSALON, Vice-Pres. HUBERT DESJARDIN, Man. Director. N. T GAGNON, Secretary.

MONTREAL TERRA COTTA LUMBER CO.
LIMITED.
Maisonneuve, P. Q.
Office, 86 St. Peter Street, Montreal.

MONTREAL, July 12th, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—In answer to yours of the 1st inst., we are thoroughly satisfied with the kiln you built for us. We find we have better burnt material than we ever had before. Your system of kilns we consider as near perfect as one can expect. Our ware is all burnt alike from top to bottom. We have burnt it many times round, and the more we use it the better we like it. Shall be glad to answer any enquiry from anyone interested in your kilns, as you deserve success. Your very truly,

N T GAGNON, *Secretary.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 Adelaide Street East, Toronto.

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 Adelaide Street East, Toronto.

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 Clinton Street and 2 Builders Exchange.

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago. The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

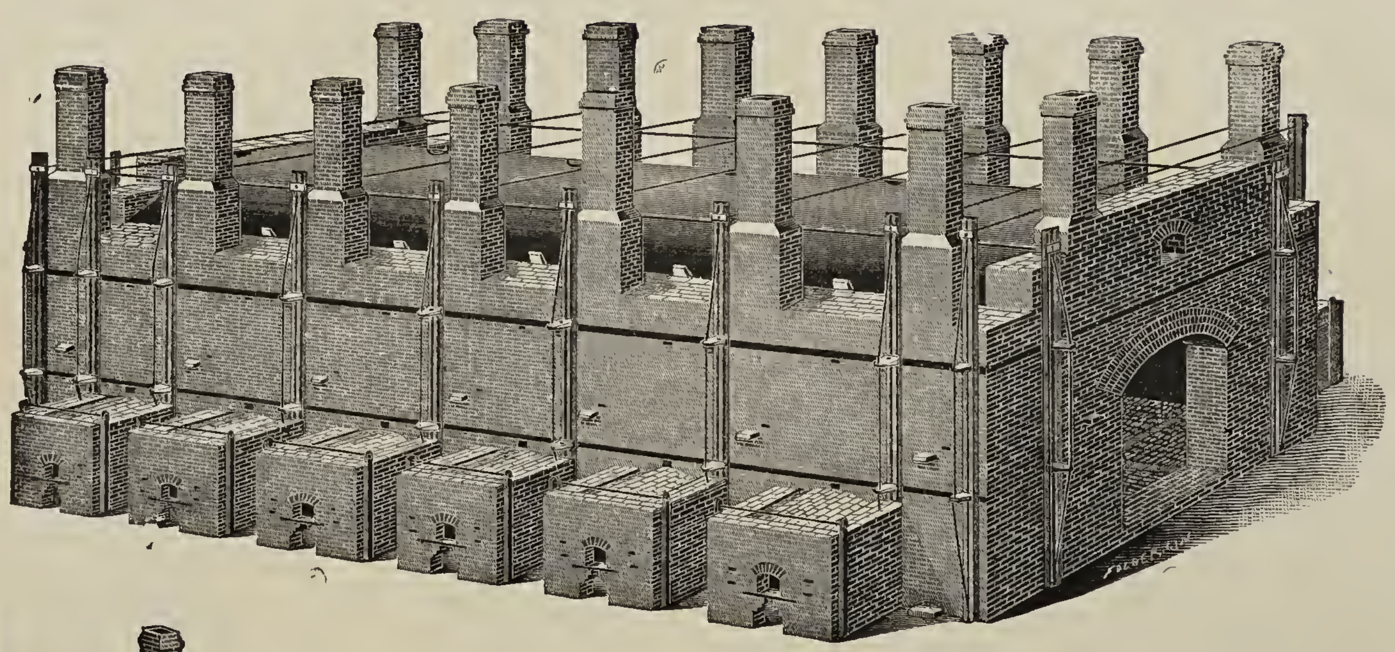
Let us give you full Particulars.

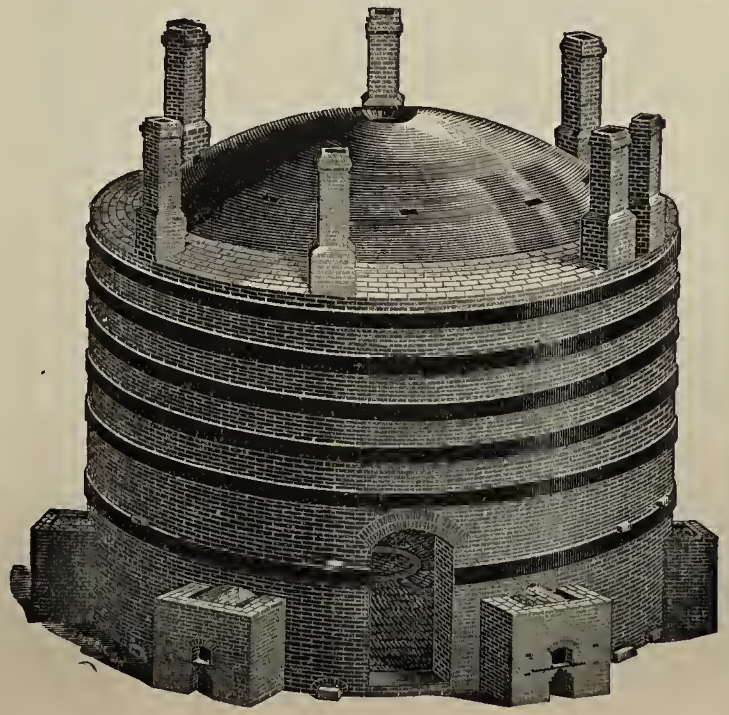
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ELMIRA, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy in cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, **Cincinnati, Ohio.**

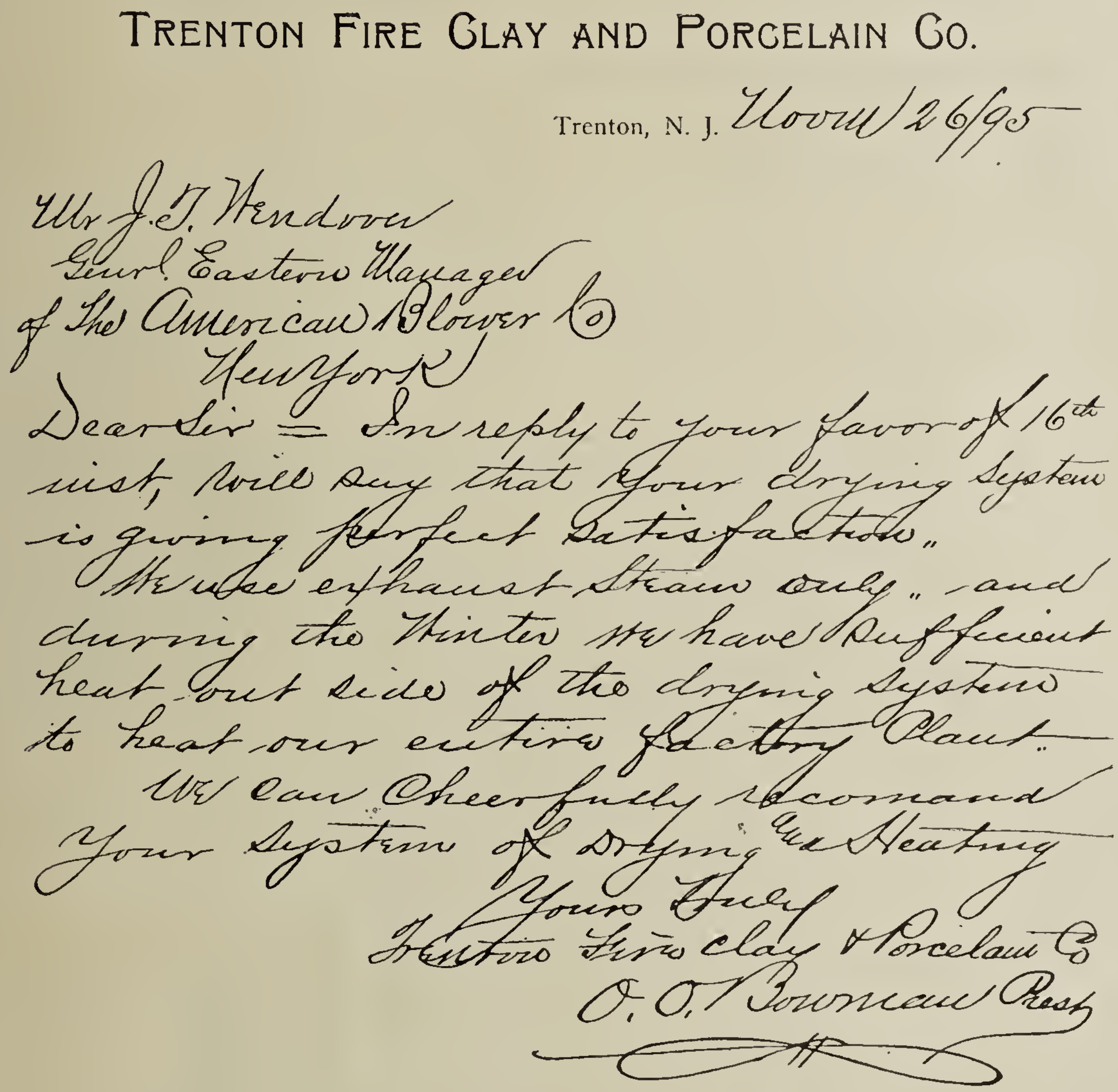
"Perfect Satisfaction"

"With Exhaust Steam Only."

That is What We can Guarantee if You Put in Our

Improved Hot Blast Brick Dryer.

READ THIS TESTIMONIAL:



TRENTON FIRE CLAY AND PORCELAIN CO.

Trenton, N. J. Novm 26/95

Mr J. T. Wendover
Genl. Eastern Manager
of The American Blower Co
New York

Dear Sir = In reply to your favor of 16th inst, will say that your drying System is giving perfect Satisfaction"

We use exhaust Steam only" and during the Winter we have Sufficient heat out side of the drying System to heat our entire factory Plant.

We can Cheerfully recomand Your System of Drying and Heating

Yours Truly
Trenton Fire Clay & Porcelain Co
O. O. Bowman Prest

Brick Cars,
Transfer Cars,
Tee Rail.

AMERICAN BLOWER COMPANY

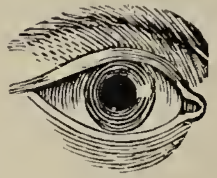
SUCCESSOR TO THE HUYETT & SMITH MFG CO.

Send for . . . .
Catalogue,
References,
Prices.

Main Office and Works, DETROIT, MICH.

CHICAGO, 31 South Canal St. NEW YORK, 26 Cortlandt St. LONDON, ENG., 70 Gracechurch St.

Now That We Have Your



MR. BRICKMAKER, permit us to remind you that the season for making those much needed improvements is approaching, and to say to you further that when the subject of whether "to dry or not to dry" by modern means is up for discussion, do not forget that

The Standard Improved Brick and Tile Drier

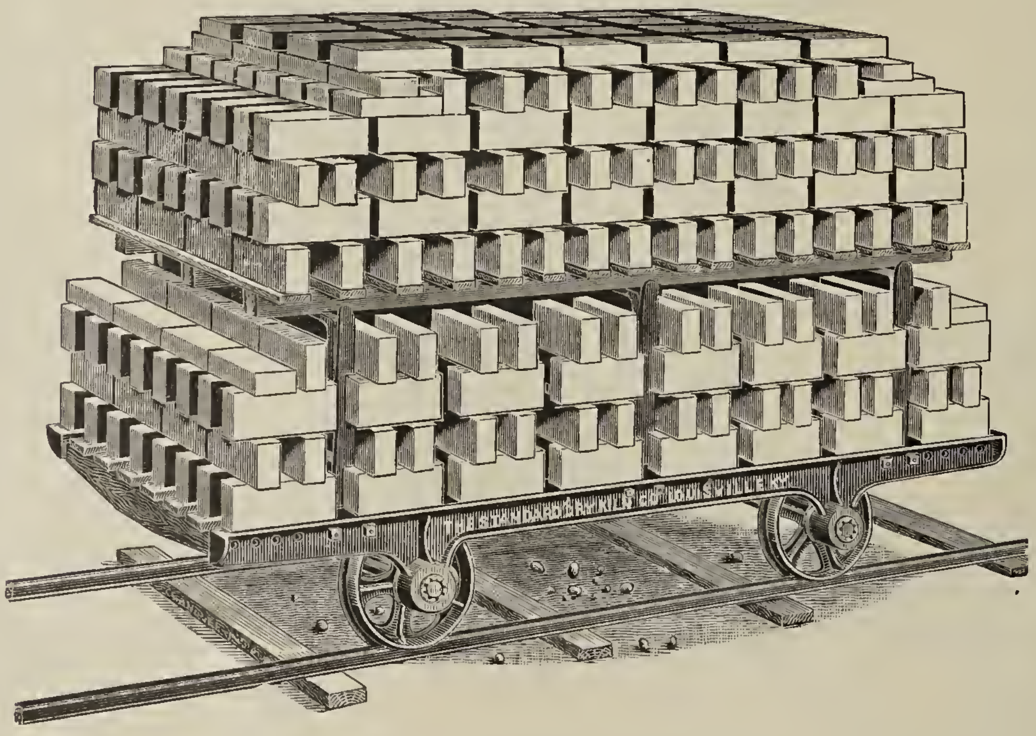
REPRESENTS "up-to-date" ideas and possesses features that recommed it strongly to every practical brickmaker. . . . .

Don't lose sight of the fact either, that in this age of brisk competition and low prices, approved methods and appliances that reduce the cost of production are essential elements to success. . . . .

Our Drier is in no sense an experiment but a successful success. Give us the opportunity and we will prove to you that such a Drier will pay larger returns than any other investment you can make. . . . .

OR IF YOU **just need some cars, Transfers or equipment of any kind,** remember that we have 'em and the price is low and terms right. . . .

Our Catalogue you can have for the asking.


THE STANDARD DRY KILN CO LOUISVILLE KY

• • •

The Standard Dry Kiln Company,

**Main Office and Warerooms,
184 So. Meridian St.**

**INDIANAPOLIS,
INDIANA.**

THE CLAY-WORKER

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

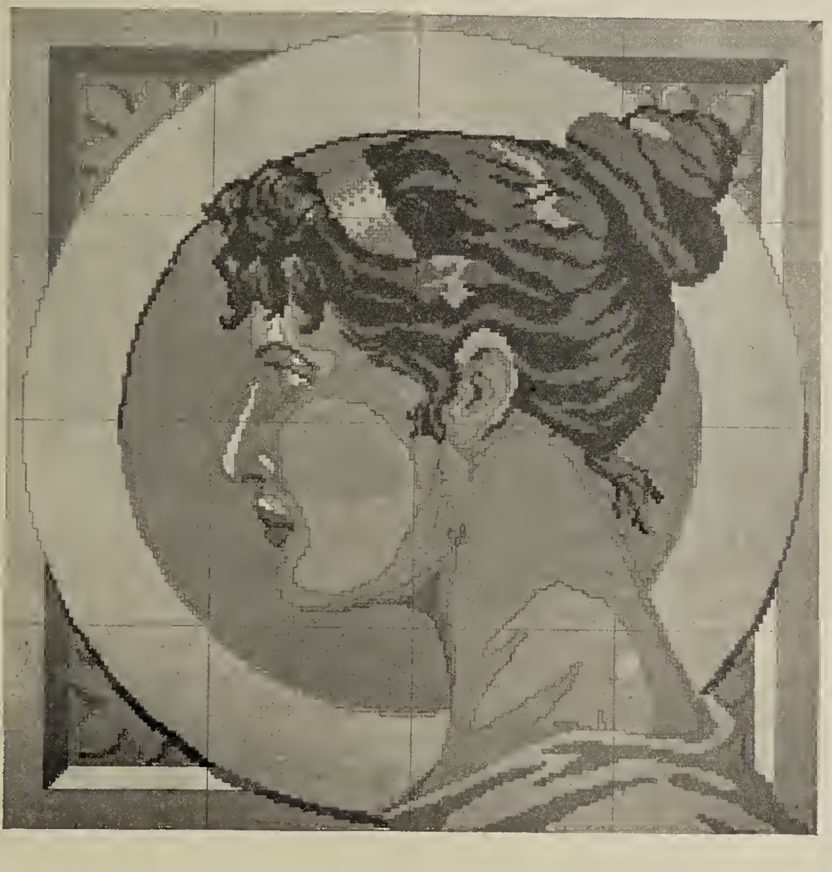
Vol. XXV. INDIANAPOLIS, IND., JANUARY, 1896. No. 1.

Written for the CLAY-WORKER.

A NEW STYLE OF MOSAIC TILING.

BY EDWIN ATLEE BARBER.

FOR CENTURIES tesselated pavements formed an important detail in the interior decoration of many of the more pretentious structures of Eastern countries, and in mediaeval and more recent times mosaic floorings have been extensively used in various parts of Europe. At first they consisted of separate little blocks or tesserae of square or irregular form, laid in cement and colored in various designs, but at a later date this costly method of paving was superseded by the introduction of encaustic tiling, in which colored clays were inlaid or pressed in rude imitation of the real mosaic work. With the requirements of modern civilization the archaic style of flooring entirely disappeared, and, at the sacrifice of elegance and artistic feeling, the geometrical encaustic floor tiles of the present day, for the sake of greater durability, were introduced in all their severity and ugliness. In this practical age we have been content to walk and gaze upon the crude and unsightly devices which our tile factories have produced for us, in all their glaring and incongruous coloring, but the influences of the Chicago exposition have permeated every branch of domestic art, and the exhibits of other countries there gathered together served to open our eyes to our own deficiencies in many directions, and we have been forced to acknowledge that, while we have advanced greatly in the mechanical arts, we have fallen far behind in the ornamental. And thus we have come to realize that, while the composition of our inlaid floor tiling has perhaps not been surpassed, we are far behind other countries in the application of decorative treatment.



Grecian Head. Mosaic Tile Co.

A new departure has been recently made in the manufacture of ceramic flooring by the Mosaic Tile Co., of Zanesville, O. By an ingenious process, which has been patented, they are now producing encaustic tiling which, in the purity and range of colors and the excellent representation in solid blocks of minute tesserae, closely imitates the finest mosaic work. The advantages claimed for this new product are, first, its artistic appearance; second, its great hardness and durability; third, its moderate cost. The surface of the tiling is inlaid to the depth of one-eighth to one-fourth of an inch with colored clays by great pressure, and imitation of mosaic work is produced by a series of depressed lines crossing each other at right angles, forming little squares or blocks, so small that 2,601 are inlaid into each six-inch tile. Unlike the ordinary floor tile, these products are so thick that they cannot be injured by the passage over them of heavy bodies, and, being only semi-vitreous, they do not readily flake or spall at the edges, while their hardness is so great that they resist the attacks of the finest steel.

Among the decorative motives already used with striking effect is the "Thunder Bird" of the Haidah Indians of the Northwest coast, which resembles somewhat a conventionalized spread eagle. This device forms the central figure of a floor design, and is surrounded by a border ornament taken from some elaborate vases of Zuni Indian workmanship. (See illustration.) The color scheme in this set is particularly satisfying, the dull, dark reds harmonizing perfectly with the black and buff. The adaptation of native American symbols to the requirements of modern art suggests an entirely new field in decorative treatment, and one that is practically inexhaustible.

These designs are thoroughly American in conception, and consequently possess a peculiar attraction for the antiquary, the ethnologist and the lover of the quaint and the novel. They combine the graceful effects of the ancient Pompeiian mosaics and certain of the native American textile fabrics, which reached their highest development in the tapestries of the Incas of Peru. The motives for the border designs have been suggested not only by the latter, but by the conventionalized details of animals and geometrical combinations found on the pottery of the Zuni, Pueblo and Moqui Indians of New Mexico and Arizona. The designs, however, are not confined to American subjects. Among the miscellaneous patterns which have been produced by this company is an excellently drawn Grecian female head, colored in contrasting tints of brown, slate, blue and buff, while for a wider application a grape-vine design, in bold proportions, in harmonious shades of olive and yellow, is especially pleasing. For suitable border patterns to use with plain tiling or floriated devices, the fleur-de-lis, the helix and the foliated scroll have been worked out with considerable elaboration. The coloring is quiet and artistic, especially where various shades of blue and brown are used against a stone-colored ground, or where dull tints of red and blue are laid against a buff or light chocolate surface. The inlaid designs are applied usually to six-inch tiles, for the sake of convenience in laying, the central figure covering a square surface composed of sixteen or twenty-five, which space can be increased to any desired dimensions by adding a margin of plain color. In addition to the ornamental effect, the incised surface possesses a practical advantage in giving to the foot a firm hold.

At the present time a series of native American motives are being worked out, as suggested by the decorative work of semi-civilized races. The pottery of the ancient Pueblos of the Western States and Territories, the figured blankets of the Navajo Indians, the basket work of various tribes, and the paintings of the Northwest coast, all furnish abundant material from which to draw. Superintending this work are Messrs. Herman C. Mueller and Karl Langenbeck, formerly modeler and chemist, respectively, of the American Encaustic Tiling Co., whose ceramic and artistic training will insure success in this new field of floor and mural decoration. The designs now in contemplation promise to surpass anything in tile work which has yet been produced in this country.

Written for the CLAY-WORKER.

THE GENERAL MANAGER.

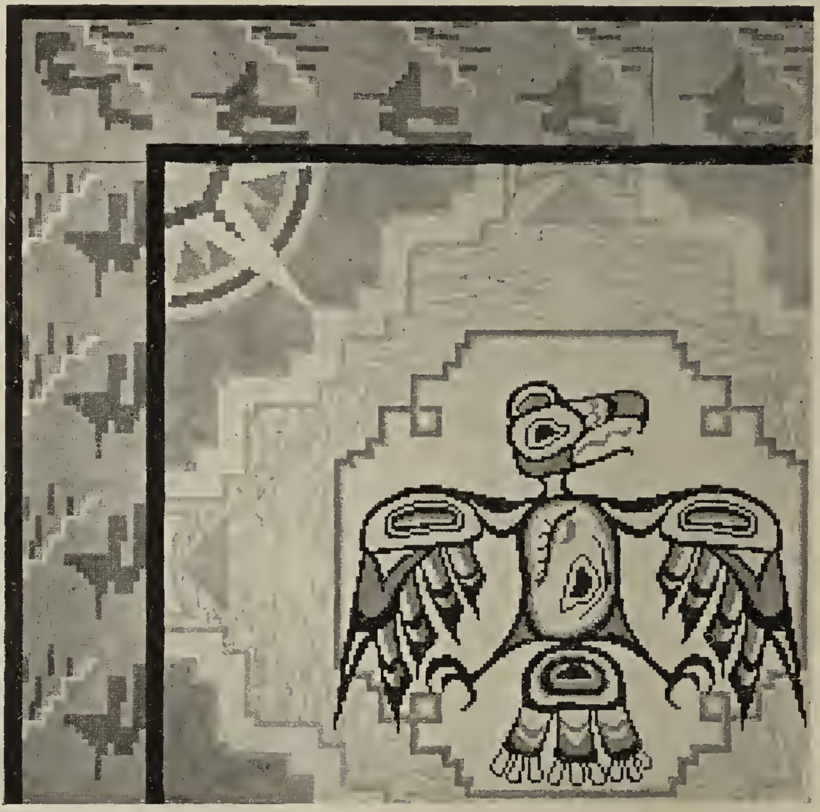
BY F. W. BUTTERWORTH.

IN THE COLUMNS of the Clay-Worker there has been a great deal of space devoted to the various processes used in the manufacture of clay products. Article has followed article bearing upon the preparation of the clay, the various machines for tempering and molding, whether soft mud, stiff clay or dry press, the drying of the molded ware, the setting, the burning, and the loading of the presumably perfect product when ready for delivery. The ground has been thoroughly covered in these lines that belong directly to the Superintendent or foreman of the works.

During the past twenty years there has been a marked inclination upon the part of capital to amalgamate, combine and form large industrial corporations. Especially is this true of the brick business. First we saw the West, notably Chicago, blowing its brazen trumpet and printing in big type upon its letter-heads an almost incredibly large annual or daily production; then the Middle States and finally the East fell into line with their large brick manufacturing plants. In the majority of instances there has been one man whose energy has formed these mammoth industries—the man has made the opportunity, not the opportunity the man. Once formed, they cannot die; in 60 per cent. of the cases the money invested could never be gotten out were the plant sold for any other purpose than that for which it was erected; the originator and controlling brain cannot last forever, and new ones must be found.

As we all know, it is not usually so very difficult to find a good foreman or Superintendent whose experience is his only education, nor is it difficult to find a clear-headed man of good business parts, but the combination is rare indeed, as several corporations have found out to the cost of the stockholders. This brings us to the General Manager—always the executive, usually the controlling member of the Board of Directors, who presents his ideas to them for their approval merely, usually to shift some responsibility; the representative of the stockholders; the controlling as well as the moving power; the man whom we can liken to the operator in a mammoth signal tower, who, by touching a lever, controls the movements of the most unimportant of his employes and the smallest bit of machinery, even though he be miles away—the master mind of the corporation—and I have thought that a few columns upon his requisite qualities, his duties, responsibilities, etc., might prove of interest to the readers of the Clay-Worker.

The business history of the world tells us that there has always been one controlling brain directing large enterprises, even the most mammoth, unless they can be split up successfully into utterly distinct and separate departments. It is impossible for two men to be associated intimately in business without one, sooner or later, proving his superiority of judgment or greater strength of will, and there is nothing more harassing or confining than to be compelled to consult with a known inferior in intellect invested with equal power. The various transactions and processes of brick manufacture are so intimately associated that by necessity they must be "one-manned." The disadvantages of this can be remedied, as will be explained later.



HAIDAH ORNAMENT APPLIED TO MOSAIC FLOORING. Mosaic Tile Co Zanesville, Ohio.

It is the purpose of this particular paper to present a general idea of the qualities of the man that go to make an ideal Manager; in those following, the various departments will be taken up separately—the works, the office, the sales, the deliveries, the expense account, advertising, and his relations and duties to the stockholders whom he represents.

Naturally, the first requisite is a practical knowledge of the minutiae of manufacture. The different kinds of clay in the bank and how they are worked and mixed to the best advantage; the digging of it and getting of it to the machine house; the preparation, tempering and molding; what effect upon the drying and burning the tempering has; the different temperatures of his dryers; the setting, the waste, the burning, the delivery. Starting from the time the raw clay leaves the bank and following it through all the smallest details until it comes out of the kiln as finished ware, he should be able to see in his mind's eye every man at his place, every bit of machinery at work, every different degree of heat carried in his kilns. As the stress of business comes upon him he gradually throws more and more of the details of manufacture upon his Superintendent; he controls it all the same as ever, but indirectly through his lever, who has become so acquainted with his ideas as not to be told of the details—he uses his own judgment, always tempered and controlled, without the necessity of words, by his imperious will. In addition to this as nearly as possible perfect knowledge of the one particular process employed at this one plant, it is important that he should be familiar with the various other methods, machines and kilns made use of by his competitors. He is then able to comprehend their weak points and make use of them to his own company's profit.

Following this in importance comes a thorough knowledge of general business methods, for, although our business may have many pecularities that stamp it as apart from other manufacturing industries, there are many general rules applicable to that as well as to others. The Manager's intercourse with the bank, his dealings with the moneyed men and with his customers, ways and means of lightening the routine of office work and correspondence, the keeping of the accounts in the shortest yet most complete way, so that at the end of the year he is able to subdivide the costs of manufacture and see which department is managed faultily and which to the best advantage—a general business education is as necessary as a general clay education.

Having disposed of these first two requisite qualities that are mainly matters of education and experience, let us see some of the general individual characteristics that an ideal manager should have. It is essential that the controlling mind of a large enterprise has confidence in itself sufficient to make the Manager firm, yet it is quite important that that be limited short of conceit and obstinacy. Having fully determined upon a move, after, if possible, giving it due thought and consideration, it is undoubtedly best to stick to that decision, especially if it affect his subordinates, even though it result in actual pecuniary loss. A man loses by vacillating not only the respect for his orders and implicit obedience in them that he expects from his employes, but he sacrifices his own self-respect, which is quite as important. Give in once, and the second time your foreman will not ask you if he can change an order.

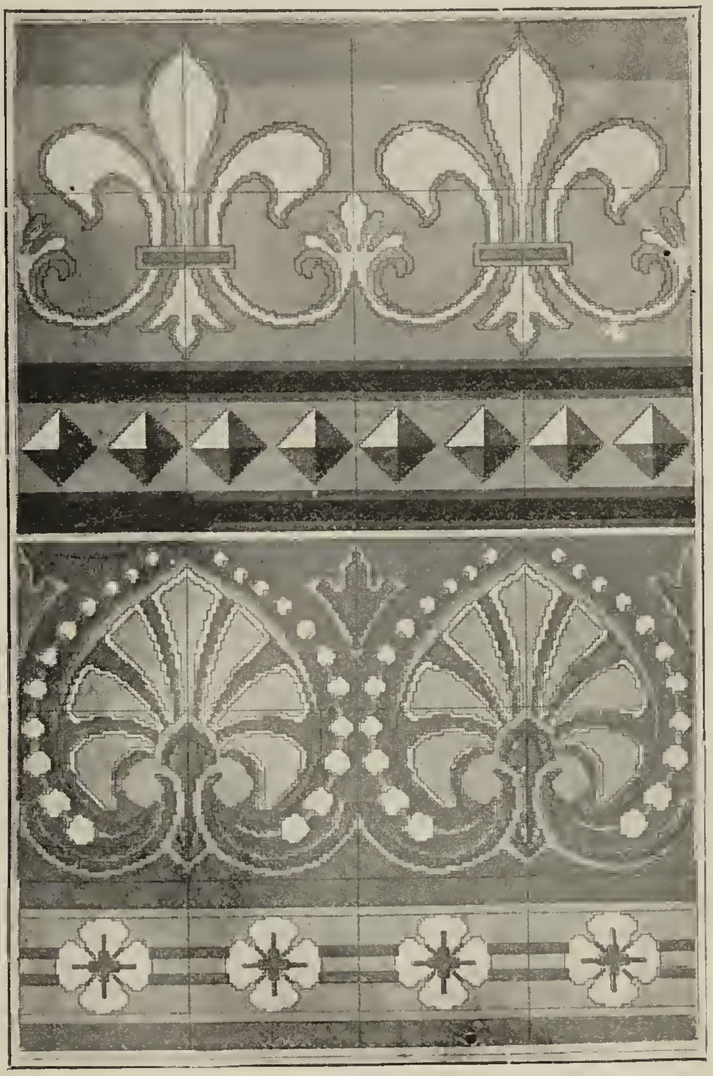
Confidence in himself helps a man to be firm and steadfast, and gives him an "at home" feeling under any circumstances. When the mind is made up that it can surely do a thing, the feat, however difficult, is already half accomplished, and obstacles are easily overcome that an element of doubt would make appear insurmountable.

Affability, without toadyism—nothing so disgusts a man, if he be right-minded, as toadyism; it insults his intelligence, because he knows it is insincere and done for a purpose—yet a little laughing, sharp-pointed, known-to-be-true flattery is one of the best means for getting a man well disposed toward you. How broad it can be must be governed by the man; and hence we see the importance of a knowledge of human nature —the capacity for reading a man at a glance and making use of that instinctive insight into his character. Closely allied with these is business tact—an instinctive knowledge of what to do and say in the various relations with other men, and in deciding upon a material move when, as often happens, there is not allowed the time for exhaustive thought and consideration.

Some of the general characteristics of any good business man are concentration, the power of bringing all his faculties to bear upon the point at issue, to the exclusion of all else; the capacity for changing quickly from one subject to another; courage enough to risk in order to gain (the risk always being proportionate to the gain, though, alas! the gain is not always to the risk); broad-mindedness—a broad, comprehensive view of people and things, tolerant of their shortcomings, and quick to see their good qualities; rapidity of thought and action; determination, and ambition for the company's well being, growth and prosperity.

Last of all these individual qualifications, let us lay great stress upon self-control, for a man of otherwise good business parts becomes utterly useless unless he has himself well in hand under any circumstances and all conditions.

Summing it all up, a man with the average amount of personal magnetism, a thorough knowledge of the business in which he is engaged in all its ramifications, with enough power of concentration to plan his moves carefully, and the requisite courage, firmness and strength of will to carry them out thoroughly, will in time always find his place in the world, and can, under any ordinary circumstances, command enough capital to accomplish his ends.



Border Design. Mosaic Tile Co.

The Niagara Falls are getting in their work generating electricity as a propelling power. It has been so successfully applied on a factory engaged in the reduction of aluminum, a mile away, that it is claimed power generated at Niagara Falls can be applied in Chicago or New York. It may even compete with natural gas before long. Then the clayworkers in the gas belt may feel more keenly still the gnawing tooth of competition.

Written for the CLAY-WORKER.

STANDARD PAVING BRICK.

WE HAVE gone through with the process of making paving brick, touching only here and there the different features encountered in the process, hoping to not be wearisome by confining ourselves too much to details, preferring, rather, at some future time to go back over the ground, noticing many things of interest untouched in the past hurried passage.

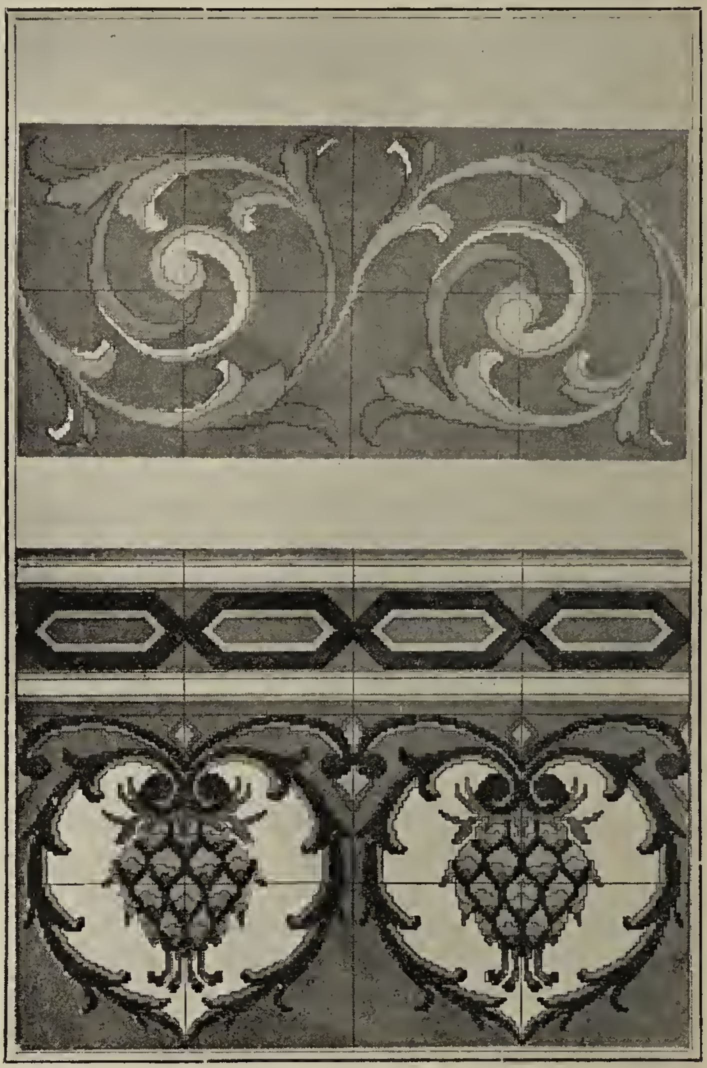
We come now to the marketing of the product. Up to this time but few persons had any interest in our business. It mattered little where we were situated, so that we had the facilities for making paving brick. But now, having the most popular product of the present time for sale, we gather around us a great body of interested people other than we had before. First among our new acquaintances are the transportation companies. It makes a vast difference now as to where we are located, not only to the transportation company, but to ourselves as well. We may find now the great mistake of the whole business is the choice of location. We may remember, now, of having read something in the Clay-Worker about the choice of location as to transportation, which at the time we regarded as of little consequence, but now, could we recall the past with the knowledge of the present in our possession, we would value it beyond the subscription price of this journal for a thousand years. One may ask, "Is it as bad as that?" Yes, often, and worse. Thousands of dollars are lost yearly to those to whom it rightfully belongs because of unfavorable location as regards transportation. This is not a bright picture, but true to life, being thrown in here for the benefit of some enthusiastic owner of "the best clay bank in the world," as shown by some tests of the clay that had been made, who would become a brickmaker, and in his eagerness to do so lost sight of one of the most important preliminaries to success—good transportation facilities. We put this matter in this shape to secure the most thoughtful attention. We could have merely said, "Don't build a factory where freight charges will eat up profits in the marketing of the product."

Resuming the subject of new acquaintances made in the marketing of brick, we find, after the transportation companies, contractors, city engineers, mayors, boards of public works, inspectors, superintendents of tests, ward politicians, boodlers, property-owners, and somewhere amid all this desirable company a set of specifications for paving with brick. But as this last shall soon have given place to "standard" specifications for paving brick, we may hope to find them (the standard specifications) no undesirable acquaintances, especially if they make it unnecessary to "see" a large part of the above-named company in order to sell brick.

The business of selling brick, like that of making them, must be in the hands of one familiar with it in detail. It does not necessarily follow that because he is a successful salesman of dry goods, groceries, windmills or farm machinery he can market paving brick successfully. Too many different people have a controlling influence in the matter. The ability of getting this influence exercised in a direction favorable to the salesman is the one to be coveted, and the one that must be possessed by him if he succeed.

We believe no manufacturing business is less advertised than that of brickmaking, the extent of the business being considered. Peruse the advertising columns of any of the journals devoted to the interests of contractors and engineers, and we find but few brickmakers' "ads." A few, however, do use printer's ink to become known. We remember of once having seen an "ad." like this: "We want to call attention to the superior quality of our paving brick, but at present do not want any orders, as we have all we can do for six months to come; but while we are getting these orders off we want to make new acquaintances. Therefore, samples will be sent on application." The fact that a company has orders ahead makes it desirable on the part of would-be purchasers to become its patrons. The first step for new companies in securing orders is to become favorably known. Here quality cuts some figure. Later on reputation does the work. A company is very sure of failing to secure an order in a city where it is unknown to all interested in the letting of the contract. Go where you will, and the names of certain brick are familiar—not on account of being superior to others not so universally known, but that every means has been and is employed to advance their reputation.

Referring again to transportation companies in connection with the sale of pavers, it may be said truly that no class of people do more than these to assist in the matter, provided the location is such as to cause strong competition between lines, and even when location is such that the railroad company has it very much its own way, it will do very much towards securing business for the enterprise, although exacting a larger share of the profits than appears just. As nearly the entire product of the paving brick factories is transported by rail, varying in distance from five miles to three hundred, it is an important matter with the companies operating the railroads, and no less important that the brick companies "stand in" with them for the interests of both. Some recognize this and profit by it; others do not, being at loggerheads with those with whom it would be to their interest to be on the best of terms. On account of the difference of a few cents per thousand in freight charges, we knew a company to haul the brick on wagons nearly a mile to another road to fill an order, resulting in the removal of all the side tracks of the former company from the works, compelling the brick company to handle all its future product in the same way, without the benefit of compensating freight rates for the extra expense incurred.



A NEW STYLE OF MOSAIC TILING—BORDER DESIGN.
Mosaic Tile Co.

Among those having the greatest influence on city authorities in favor of the brickmaker are the contractors who put down the pavement. Of all others, with the contractor fair dealing must prevail. It will not do to get him into trouble by supplying faulty brick for his work. How often his work is delayed and great loss sustained by an overestimate on the part of the brickmaker as to his ability to supply the demand of the contractor according to contract. The brickmaker who desires a market—as all do—must first satisfy some leading contractor that he has, really and truly, a standard paver, with safety under the strongest guarantee, and of his ability to supply this class of brick, in desirable quantities, as fast as the work shall demand. Having secured the confidence of the contractor as to the quality of the brick and his ability to supply them, if he would maintain this confidence he must not be governed by enthusiasm in the making of contracts, but by actual existing conditions, living up to the letter of the contract all the way through. To do this, great care must be exercised in the loading of the brick at the kiln, having only careful men in charge of this work. Here, too, paying by the thousand for loading on cars is objectionable, for obvious reasons. As a rule, no class of persons know better the quality of brick than the contractors. They, of necessity, understand the relative merits of different brick better than even the brickmakers themselves. The brickmaker, therefore, having an unworthy class of goods to market, has a very poor ally in the person of the responsible contractor.

Coming now to the final proceeding—securing recognition for the brick in the city in which it is desired to place them—it would be a pleasure to be able to say it is necessary to consult but one person that the matter may be finally settled, and settled in a manner precluding change, unless it be by mutual consent, until the end shall have been reached, provided the brickmaker maintains the quality of the brick throughout according to his representations at the beginning—and that one person the city engineer. We are not living in that age yet. In the beginning of this article we named several others who have a voice in the matter. No general rule will suffice for the management of a certain class of individuals encountered here, so we refrain from making suggestions on this point. It is not well, however, to ignore the fact that a certain class require special management by those seeking patronage where public improvements are to be made. This is a matter of deep concern to contractors and brickmakers, and should have more attention from writers who are competent to handle the subject, until price, quality of workmanship and material shall be made to cut some figure where contracts are to be let. Recently a contract was let for some work to be done in a certain city to foreign parties for fifteen thousand dollars, whereas local contractors of such work, well equipped for the business, would have performed the same equally as well for one-third the price to be paid. Evidently, some one knew how to work the authorities. This is introduced here to show a condition which is liable to be encountered in the introduction of paving brick. We believe, as a rule, city engineers are desirous of securing the best material to be had for the construction of pavements, without resort to favoritism further than the quality of the material offered will justify. The question of quality being the legitimate basis of the good will of the engineer towards any applicant for patronage, and being settled on this basis, it would not be to the disadvantage of the brickmaker to substantially reward the engineer for recognition of the superiority of his product. T. J.

A bill is before the New York Legislature appropriating $25,000 for the purchase of a patent on a voting machine which is said to take the ballot, register and count it, without any possibility of mistake. Such a machine was on exhibition before the Indiana Legislature last winter, but the Hoosiers did not buy it, though through no fault of Jesse Adams, "Brickmaker to the President," who presided over one branch of that body, and who, like all good brickmakers, favors whatever counts for progress in every walk of life. One thing is claimed for the machine that cannot always be claimed for the party machine—it cannot be bribed nor deceived. If some of our contemporaries had such a contrivance connected with their mailing department they would talk less or go out of the business.

Written for the CLAY-WORKER.

BRICK AND PIPE MAKING IN ENGLAND.

BY A. CROSSLEY.

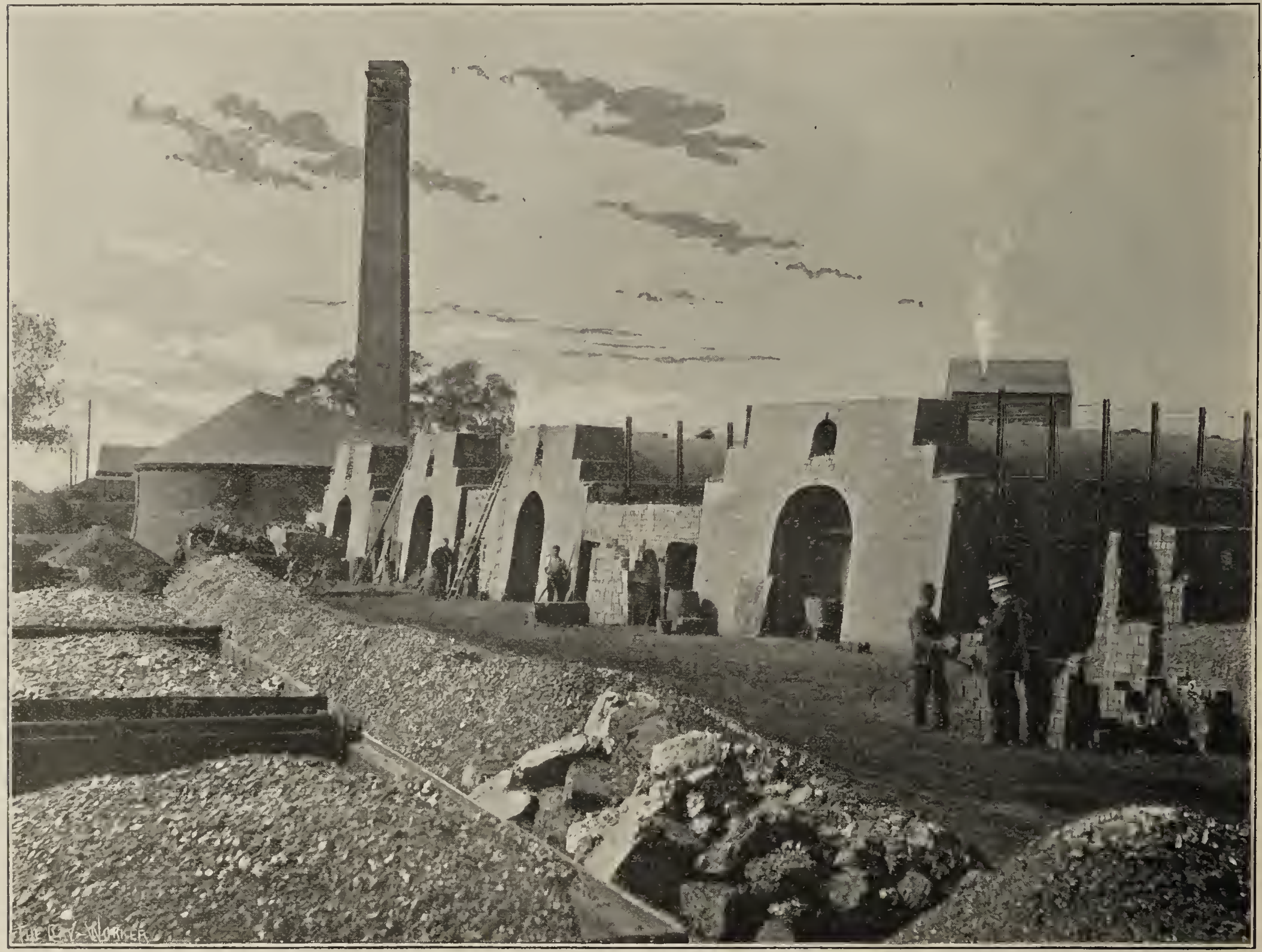
OF THE MANY brick works that I have visited in England, one of the most noteworthy is that of the Cardiff Brick Works Co., Ld., Maindy, near Cardiff, South Wales. The men at the head of this concern are "hustlers," to use a term well understood in America, who keep themselves well in touch with the most advanced ideas. The largest stockholder and Chairman of Directors is Mr. E. P. Lee, a gentleman of most indomitable will and great inventive and executive ability. I believe he was formerly an officer in the army, and his pugnacity is brought out whenever difficulties are to be surmounted. He is ably seconded by his brother, Mr. Frank Lee, who is General Manager of the works. The product of the works is common bricks exclusively, the capacity being about 60,000 English-sized bricks per day, and the company has been highly successful. For neatness, order and absence of waste this may be regarded as a model yard. This is the home of the Cardiff kiln, before described, of which Mr. E. P. Lee is the patentee. The development of this kiln was the result of a desire on Mr. Lee's part to get a kiln that should turn out a better product than the Hoffman, of which he had two in use, while at the same time retaining the undoubted fuel economy of the Hoffman. Here, also, we find another practical and useful invention of Mr. Lee—a double cutting table, this again being evolved by the necessity of a more expeditious handling of a very large daily output from one machine. While commending Mr. Lee's inventive genius, I am bound to say that he might have saved himself some brain work and found something even better in cutting apparatus ready to hand in the United States.

INCLINE FROM MARL PIT TO CLAY SHED. Maindy Brick Works, Cardiff, England.

Commencing our description with the clay pit (or marl pit, as locally termed), we find a very unpromising material not very accessibly situated. Most brickmakers would turn away here in despair, for any real clay is almost conspicuous by its absence. At the top is about ten or twelve feet to thirty feet of gravel, all of it to be stripped off. Under this is the brickmaking material, to a depth of sixty feet, which is to be still further deepened. This material is for the most part a kind of soft rock, with layers of hard rock intermixed, and a small band of fairly tough clay. The whole face is worked together, and is pulled up a remarkably steep incline to a height of probably 120 feet into the mill house. By the kindness of Mr. Lee I am enabled to give a few views of the works, and by a reference to the two showing the clay pit and the incline, a better idea of this stupendous undertaking can be obtained than words can convey. Eighteen men are employed in the clay pit, and thirteen or fourteen men, with five or six horses and carts, are employed in getting off the top gravel. At the top of the incline is a powerful winding engine, and here we find a very ingenious arrangement for holding the dump cars in position and the end door held out while the stuff is being dumped.

In the mill house we find the most massive machinery, and, indeed, no other would be of any use to this material. At the top are two pairs of ribbed rollers, and after passing through these the clay drops into a deep fixed circular pan, in which pugging and mixing arms are revolving; thence successively through two pairs of smooth rollers, and then into a very large and powerful auger machine. This machine produces regularly 50,000 per day, and has been known to put out 65,000, this being, I believe, the largest record on this side the ocean. This is equal to probably 110,000 Chicago-size bricks, and is doing very well, considering that on the ground of capacity our English machines are, as a rule, behind the American. The power is supplied by an engine that in America would be called 80 to 100 horse-power.

A plant of this size would not be complete in America without a good modern dryer, but here the old-fashioned method of drying on hot floors is pursued. They have one large dry-floor house, 160 feet long and 60 feet wide, holding 60,000 bricks. This is supplemented by the use of the tops of the two Hoffman kilns for the same purpose. By reference to the illustration it will be seen that these kilns are well housed in, thus enabling a large quantity of bricks to be dried without cost by the heat radiating through the tops of these kilns, which are paved level for the purpose. The burning is done in the two Hoffman kilns referred to, the large one holding 400,000 bricks to fill it round, and the small one 160,000, and in four square down-draft kilns holding 70,000 each, built on the continuous-burning principle, as patented by Mr. Lee, and styled the "Cardiff" kiln, as before described. Small coal or slack is burnt in all of these kilns, and considering that the waste in the latter kilns is practically nil, they consider them the most profitable. As they have only room at present for half a set, they cannot get the full advantage, as after burning through the four they have to start afresh, instead of burning round continuously. The number of men employed on the works is from eighty to ninety. From the views here given our readers will readily perceive the substantial character of the works.

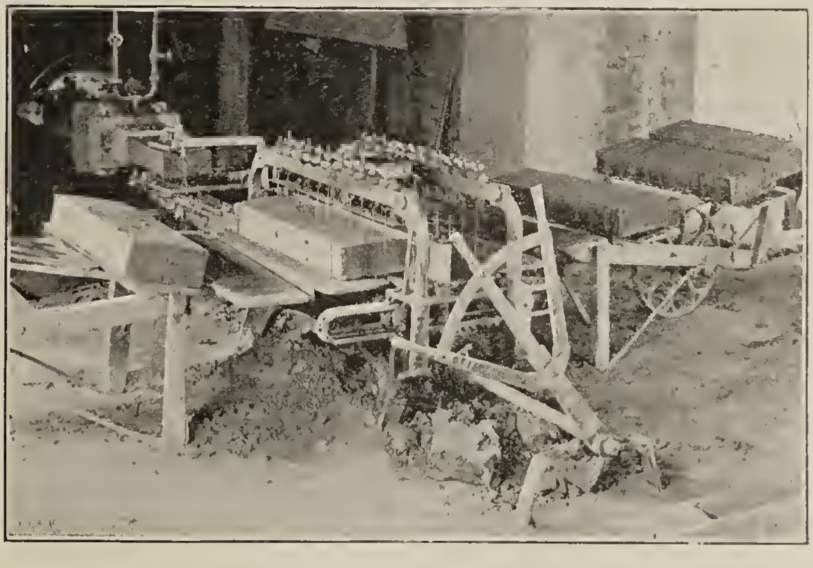


CARDIFF KILNS AND END OF SMALL HOFFMAN.

At Stoke-on-Trent, in the heart of the Staffordshire potteries, I visited the works of Messrs. Henry Warrington & Son. These people are extensive brick manufacturers, and also large colliery owners, the brick works and coal and clay mines being adjacent. The product of the works is somewhat diversified, embracing common brick, blue and red pressed bricks, fire bricks, white and colored glazed bricks, white enameled sinks and other goods. The total daily production of bricks is from 70,000 to 80,000, divided about as follows: Common bricks, 40,000; fire bricks, 10,000; blue and red pressed bricks, 10,000 or over, and white and colored glazed or enameled bricks, 12,000. The common bricks are made on Whittaker's semi-dry machines, about eight of them being used; the fire bricks are made both by hand and machine, as also the blue and red pressed. The glazed bricks are made on Fawcett's semi-plastic machine, each day's work being hacked up close to sweat and cool off, and then repressed the following day, the result being a finely finished brick. A notable feature of these works was the way in which the glazed bricks are handled from the pressing to the dipping and drying rooms. This was by a convenient form of rope transmission. Two one-inch hemp ropes on pulleys about ten or twelve inches apart were stretched from the pressing room through the various other rooms, a distance of probably 150 feet to 200 feet, being carried at intervals on idler pullies to prevent sagging. The ropes traveled with a slow, steady, but continuous motion, one, two or three bricks at a time being sent along on boards for the purpose laid across the ropes, the empty boards being sent back on the return travel of the ropes underneath. The bricks are dried by heat from steam-heated floors, the exhaust steam being used during the day. These floors are put down somewhat different from any I had seen before. Ordinary brick flues are constructed, covered with bricks or tiles; over this is run a layer of melted pitch, filling up every crevice, and making it steam-proof; on top of this again a course of bricks or tiles is laid in cement. There are altogether forty kilns on the works, all down-draft. Twenty-four of these are from 18 to 29 feet diameter, and one 35 feet diameter. These are for burning common bricks, fire bricks, etc. There are fifteen special kilns for burning white glazed bricks, sinks, etc. The small kilns are being pulled down by degrees and replaced by large ones. They are of a somewhat special style, patented by one of the firm, and claimed to give great economy in working, but are not arranged to work on any continuous principle. The number of hands employed is about two hundred. The general appearance of these works is not very attractive, owing to their being pretty old and the fact that they have been extended and altered to meet the exigencies of trade, with the result that the various buildings, etc., look as they had been thrown into position without any regard whatever to order and regularity. For the same reason the kilns seem to be scattered about all over the place. I can bear testimony, however, to the fact that the goods are first class of their respective kinds.

Large Hoffman Kiln and small one at end. Maindy Brick Works, Cardiff, Eng.

At Huddersfield, Yorkshire, I visited the old-established and celebrated sewer pipe and brick works of Messrs. E. Brooke & Sons, known as Fieldhouse Fire Clay Works. This is a well-built and convenient place. Their productions throughout are of a very high grade of excellence. The product daily is about 10,000 white and colored glazed bricks, 20,000 fire bricks, and a large quantity of fire clay blocks of all sizes and shapes, besides gas retorts and fittings of all kinds. In sewer pipes they keep one or two presses constantly at work, besides making a large supply of the miscellaneous goods used in connection, such as sinks, gullies, traps, etc., of all kinds. The clay and coal are both mined together on the works, by means of a deep shaft, the top of which is under the same roof as the works, and as the pit cars come up with the coal or clay, as the case may be, they are run off and dumped to the various departments as required. The clay is carefully sorted as to quality. The best and most refractory is used for the retorts, fire clay blocks and high grade fire bricks, and a large part is calcined before being used. A specially clean-burning clay is selected for the white glazed bricks, and all the poorer or less refractory clay goes to the sewer pipes. A large part of the clay is well and carefully washed as soon as it comes up out of the mine. The vein of clay runs from two and one-half to five feet thick. The bricks are all made by hand, and those for enameled goods are pressed in Fitley's screw presses and Pullan & Mann's new power presses. Large quantities of the glazed bricks are shipped to the United States, while their fire bricks and fire clay blocks find a large foreign trade, many going to Australia. Some of these blocks were of immense size. I measured two sizes, which were, respectively, 36x36x24 inches and 30x15x15 inches. These very large blocks require three months for their manufacture—six weeks in the shed, from being made to being set, and six weeks in the kiln, where they have to be very slowly heated up, carefully fired, and then very slowly cooled down. The methods in the sewer pipe making are much in advance over those of a few years ago, but are not up to the standard of production of American machines. They have a good patent die, invented by one of the members of the firm, that effects a great saving of time and labor in changing dies, and for which they also claim a much larger production. The works are heated throughout by exhaust steam. I noticed a handy and useful contrivance for loading up very large blocks or pipes, etc. This was a handy crane, mounted on railway truck or car, so that it could be taken about to any one of the numerous sidings wherever the goods happened to be. The burning is done in round down-draft kilns 21 feet diameter and very high, of which they have twenty-two, besides some special kilns for white glazed ware. Draft for the kilns and for steam purposes is obtained from two fine stacks, one 180 feet high and the other reaching the dizzy height of 300 feet. The latter is a magnificent stack, and is a fine example of tall chimney architecture, the design at the base being very striking. I did not learn how much this chimney originally cost, but a few years ago it was repaired, the cost of which was £600, or about $3,000, from which some idea may be obtained of its character. The total number of men employed is three hundred, one hundred being in the



Lee's Double Cutting Table. Maindy Brick Works, Cardiff, Eng.

mine and two hundred in the works. This does not include a large number of men employed in getting clay at other places, which is sent in by rail.

Written for the CLAY-WORKER.

THE FOUNDATIONS LAID.

BY R. B. MORRISON.

AFTER the reading of one of the best papers read at the last or perhaps any preceding convention, remarks were made by two members, both ex-presidents and both members of the Cincinnati Convention, highly commending the author. One of the speakers referred to closed his pleasant remarks in these words: "Well, we old fellows don't amount to much anyway. What if we do pass away soon. There is a brighter generation coming on." The other speaker concluded his commendatory remarks as follows: "The time is not far off when the old war horses of the Association can sit back and listen."

As I pondered over these pleasant complimentary sentiments I was struck with the truths that were concealed therein just beneath the rippling surface, and, however well we may have performed the tasks of life laid upon us, yet we lay these burdens on younger and stronger shoulders with a pang of regret, and it is one of the greatest triumphs of age to accept the inevitable gracefully and cheerfully.

This incident has suggested some thoughts on this line. But before going further with this subject I wish to add to my text a sentiment which I will quote from an article in December Clay-Worker entitled "More New Blood and Less Old Chaff," by an able and honored member: "If we had all been Ortons the results of our Association would now be a series of deductions, so thoroughly proven as to make further demonstration unnecessary." The great trouble with this statement, and one that takes away its force, is that mighty little IF.

The National Brick Manufacturers' Association was organized ten years ago. Its members are composed of practical brickmakers and active brick manufacturers. I will quote from Article II of the Constitution:

—Objects.—

"First—To promote the interests of those engaged in the manufacture of brick and other clay products by the discussion of all questions pertaining thereto.

"Second—To establish and maintain more intimate and friendly relations between clayworkers throughout the United States."

What were the conditions that confronted this little band of clay workers at Cincinnati ten years ago? So far as literature was concerned we had practically none. No practical treatise on brick making had then been published in this country, neither was there a scientific work available. The membership were almost without acquaintance one with another; prejudices peculiar to brickmakers were firmly implanted within the breast of each individual member. It seemed there was little indeed that was tangible to build upon. They went to work with a will to attain the objects for which they were associated. The foundation stones, though rough, were laid deep and well. As their numbers increased the work progressed more rapidly. Each year there was laid a few courses upon these walls. The lines were uneven and the surface rough, but durable. This was all below the surface, and made little show to an uninterested observer. Slowly but surely practical facts were fitted together and bonded by experience. As it came near the ground level the surface became smoother, the lines were straightening and the courses coming to a level. This could only be accomplished by intelligent co-operation and harmonious effort.

This straightening of purposes and leveling of prejudices was due in a great measure to the helpful advice of civil engineers and wise counsel of technical experts, many of whom became members of the Association when they saw the earnest efforts these practical men were putting forth to accomplish their purpose.

The facts that were gathered during the year were used as a basis for further advancement along the lines laid down. The columns of our clay journals were open to scientific and practical men who gave freely of their best thoughts and results of their experiments. The records of each annual convention were placed before the thousands of clayworkers through the columns of the same journals. During these years the brickmakers were getting in touch with one another, their prejudices were breaking down, their ideas broadening; they could discuss their differences without quarreling and look upon a brother's weakness with more charity. Time was one of the great factors in these grand results. After a decade of years of faithful labor these solid walls have risen above the surface with lines straight and level and corners plumb, and at Atlanta in December, 1895, science and practice met upon this great foundation wall and laid the corner stone of the great fabric that will rise in symmetrical grandeur from this base.

The builders of this foundation can well afford to rest on their laurels, for well-established principles and demonstrated facts will bind and firmly knit these upper walls. It is with the greatest satisfaction these veterans realize that bright strong young men thoroughly equipped can take up this great work and complete this enduring monument to American clay workers. As the superstructure arises science will set windows in the walls, and those that dwell within will not walk in darkness. Our distinguished brothers have carved their names high on the memorial tablet, and nothing their innate modesty can suggest will dim the luster of their fame among the clay workers of the twentieth century.

MARL PIT. Maindy Brick Works, Cardiff, Eng. (See page 19.)

I will quote once again from the communication mentioned at the beginning of this article:

"I am satisfied that if Professor Orton's chair at Columbus was properly endowed and he was permitted to operate experimental kilns we could send him our manufactured ware and have questions absolutely decided that have perplexed the best of us for years."

I wish to emphasize the truth and importance of this terse declaration. The writer has for many years advocated a practical and technical school for clay workers. Professor Orton's school at Columbus is a move in the right direction. It should, however, be enlarged and broadened on lines suggested above. This would not only prove of inestimable value to students in connection with their technical and scientific work, but would prove to be a veritable storehouse of knowledge accessible to every worker of clay in our country, as has been suggested before. The endowment of such an institution by the National Brick Manufacturers' Association would be a fitting monument to its memory. Who will do himself the great honor of leading this movement to success?

Our Association has now reached a stage where every question that presents itself should be definitely settled and every problem solved and the facts carefully recorded. What we need perhaps more than any other one thing at this time is an American treatise on clay working to be used as a text book in this school. I believe we have some men in our Association capable of bringing out just such a work as may be required. I trust others more capable of doing justice to these questions may favor us with their views. I will look with much interest for the promised paper of Brother Purington on this line. I feel confident he will suggest some plan that will lead us to the plane of success.

Written for the CLAY-WORKER.

PAVING BRICK—ITS MATERIAL, MANUFACTURE AND USE.*—Eleventh Paper.

BY DANIEL W. MEAD.

—Fuel.—

THE ITEM OF FUEL is important, not only in the generation of steam for power purposes, but also in the various applications of heat to the drying and burning of brick. It therefore seems desirable to briefly consider the subject in connection with the consideration of the question of power, and before discussing the further operations of brickmaking in which fuel is so largely used.

Fuel, in its various applications in the manufacture of brick, is generally the largest single item of expense. Its proper and judicious selection and use is, therefore, a controlling element of success.

—The Criteria of Fuel Value.—

The value of fuel depends on the relation of the following items:

First—Cost of fuel.

Second—Cost of utilization of fuel.

Third—Available heat which can be obtained from fuel.

The first cost of the fuel will depend on the relation of the locations where the fuel is produced and where utilized, including cost of production, transportation, etc. This item will vary with locality and season, and can only be relatively and locally determined. The cost of utilization will be hereafter briefly considered in discussing particular fuels or classes of fuel and their use.

The available heat is the most important point for comparison with the item of cost, and is the main subject first to be discussed.

—The Heat Unit.—

In all physical measurements a standard or unit of comparison is necessary. In the comparison of fuels the standard of comparison or measurement of the calorific value of the various fuels is called the heat unit. Various units have been proposed and used, but the unit most commonly used in this country for the comparative measurement of heat is the British thermal unit, usually expressed by the initials B. T. U. This unit represents the amount of heat required to raise one pound of water at 39.1 degrees one degree (Fahrenheit) in temperature.

Heat is obtained from fuel by its combustion, which is simply the rapid chemical union of the elements of the fuel with the oxygen of the air. In solid fuels the valuable constituents, on which the quantity of available heat depends, are carbon and hydrogen, while in fuel oils and gases the hydrocarbons (marsh gas, olefiant gas, etc.) also play an important part.

Table I gives the most important data concerning a number of elements and compounds which form parts of various fuels or otherwise enter into the question of their combustion.

TABLE I,—Caloric value and combustion data of various fuel elements.

COMBUSTIBLE.	Symbol.	Atomic weight.	Product of combustion.	Symbol.	Weight of oxygen per lb. of combustible.	Weight of products of combustion per lb. of fuel.	*Air consumed per pound of combustible.		Weight of produced gases, complete combustion per lb. of fuel.	Heat units per lb. of combustible.	Pounds of water evaporated per lb. of combustible from 212 deg. Fahr.	Specific heat.
		H=1			Pounds.	Pounds.	Pounds.	Cu. ft. at 62 Fahr.	Pounds.	B. T. U.	Pounds.	
Air	......	....	......	......	......	......	......	......	......	......	......	.2375
Nitrogen	N	14	......	......	......	......	......	......	......	......	......	.2438
Oxygen	O	16	......	......	......	......	......	......	......	......	......	.2175
Hydrogen	H	1	Water	H_2O	8.00	9.00	34.80	457	35.80	62032	64.21	3.4090
Hydrogen	H	1	Steam	H_2O	8 00	9.00	34.80	457	35.80	53338	55.21	.4805 (steam)
Carbon	C	12	Carbonic oxide	CO	1.33	2.33	5.79	76	6.79	4452	4.61	....
Carbon	C	12	Carbon di oxide	CO_2	2.67	3.67	11.60	152	12.60	14540	15.05	.2170 (CO_2)
Carbonic oxide	CO	28	Carbon di oxide	CO_2	.57	1.57	2.52	33	3.52	4325	4.47	.2479
Marsh gas	C_2H_4	28	Carbon di oxide and water	$CO_2 + H_2O$	3.43	4.43	14.90	229	15.90	9624	9.97	.5929
Olefiant gas	CH_4	16	Carbon di oxide and water	$CO_2 + H_2O$	4.00	5.00	17.40	196	18.40	9775	10.12	.4040
Sulphur	S	32	Sulphuric acid gas	SO_2	1.00	6.00	4.35	57	5.35	3637	3.76	....

* For each pound of oxygen in air there are 3.35 pounds of nitrogen (N).

By the aid of the above table the theoretical calorific value of a fuel can be readily determined if the analysis of the fuel is known. In using it the following facts must be borne in mind. The products of combustion in all operations of brickmaking escape at such a temperature that the consumed hydrogen issues as steam, so that the second value of hydrogen fuel must be used. If the combustion is complete the carbon forms carbon dioxide, and the second value of carbon fuel can be used. With incomplete combustion carbonic oxide is formed, and the first value must be used, in which event the loss in calorific value, as shown by the table, is very great.

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Each pound of water which exists in the fuel will take 966 heat units (B. T. U.) to evaporate it while the fuel is burning; hence the amount of water or moisture in a fuel must also be considered, and the heat units thus lost must be deducted from the total heat units in order to get the theoretical calorific value of the fuel. Calorimetric tests have demonstrated that the calorific value of a fuel can be calculated from its chemical analysis within a possible error of 3 per cent.

As an illustration of the use of this table, the analysis of charcoal may be taken from Table II, and the heat units per pound calculated as follows:

	Heat Units per pound.	Heat Units produced.
.85 lbs. of carbon X......................	14540	12359
.01 lbs. of hydrogen X....................	53338	533
Total heat units......................		12892
Less .06 lbs. of water X..................	966	58
.08 lbs ash..........................		
1.00 lb. fuel has net available B. T. U.		12834

The theoretical evaporative power of a pound of fuel to evaporate water from and at 212 degrees Fahr. can be determined by dividing the heat units (B. T. U.) contained in each pound by 966, which, in accordance with the investigations of Regnault, is the number of heat units required to evaporate one pound of water from a temperature of 212 degrees Fahr. into steam of the same temperature. A pound of charcoal will therefore give a theoretical evaporation of 13.38 pounds of water.

The calorific power and theoretical evaporation of the other fuels in Table II, or any others whose analysis is known, can be calculated in the same manner.

TABLE II.

Average chemical analysis and calorific value of various fuels.

Fuels.	Carbon C.	Hydrogen H.	Oxygen O.	Nitrogen N.	Water H_2O.	Ash, etc.	Authority.	Calculated caloric value.	
								B. T. U. Produced.	Evaporation of water at 212 deg. Fahr.
Charcoal.........	.85	.01	....	....	.06	.08	Unwin......	12834	13.38
Coke (coking)....	.85	.05	.06	....	....	.04	Carpenter..	14893	15.41
Coke (canal).....	.84	.06	.08	....	....	.04	Carpenter..	14881	15.40
Coal (anthracite)	.90	.03	....	....	.03	.04	Unwin......	14657	15.17
Coal (bitum.)....	.70	.05	....	...	.11	.14	Unwin......	12739	13.18
Peat (dry).......	.58	.06	.31	....	....	.05	Carpenter.	9500	9.83
Petroleum (av.).	.85	.13	.02	....	....	....	Deville.....	19150	19.82
Wood (average).	.50	.06	.41	,01	....	.02	Chevandier	7737	8.01

—Temperature of Combustion.—

While the calorific power or amount of heat which can be obtained from a fuel is of importance to the brickmaker, the calorific intensity, or the temperature which it is possible to attain with the fuel, is often equally so. Especially is this so in the burning of brick from the semi-fire clays when it is important to carry such burning to vitrification. In such cases the temperature of vitrification is relatively high.

The calorific power of a fuel, or the heat units it is possible to obtain from such fuel, is independent of the method of combustion, provided that the combustion is complete. That is, a pound of carbon will always give off 14540 B. T. U., whether burned—

First—In pure oxygen.

Second—In just sufficient air to fully complete combustion, or

Third—In a superabundance of air.

The calorific intensity, on the other hand, depends on the amount of gases which must be heated during combustion, and will be greater as the volume of such gases becomes less. The heat which the furnace gases receive will always equal the product of their weight, their specific heat and their rise in temperature. Hence, in the case of the complete combustion of a pound of carbon in oxygen, in air, or in a superabundance of air, the equation representing the amount of heat will always take the following form:

$$W \times S \times T = 14540.$$

where W = weight of furnace gases.
S = specific heat of gases.
T = rise in temperature in degrees.

And the expression for the rise in temperature will be:

$$T = \frac{14540}{W \times S}$$

If, therefore, we have the weight of the furnace gases and their specific heat, we can calculate the temperature of combustion. From Table I both of these factors can be ascertained. In the first case, therefore, where the combustion of carbon takes place in oxygen, the only furnace gas will be carbon dioxide (CO.), and the equation will be: (See note.)

$$T = \frac{14540}{3.67 \times .217} = 18257° \text{ Fahr.}$$

In the second case, where the combustion takes place in just sufficient air to allow of the combustion being complete, the furnace gases will consist of 3.67 pounds of carbon dioxide (CO_2), and also 7.93 pounds of nitrogen (N). The equation will then become: (See note.)

$$T = \frac{14540}{3.67 \times .217 + 7.93 \times .2438} = 5326° \text{ Fahr.}$$

In the same manner the calorific intensity of the combustion of any fuel can be calculated by assuming or ascertaining the conditions under which combustion takes place.

Table III gives various data concerning a number of fuels and their application to steam-raising, but is of particular interest from the fact that it gives the calorific intensity of the various fuels, calculated for various conditions of combustion.

—Testing Fuels by Actual Use.—

While these calorific determinations and theoretical calculations are of much interest and value, actual fuel trials under the circumstances of actual use are often made, and the results thus obtained are often more instructive and valuable than by the more limited scientific determination. By the test of actual use the circumstances of combustion are considered and their effects determined in connection with the fuel question, which they are sure to largely modify. Thus in Table IV are given investigations made on the Chicago, Burlington &

FOOT NOTE—It is probable that the temperature which would actually be attained would not exceed 4,000 degrees Fahrenheit. At temperatures above 4,000 degrees decomposition of the gases resulting from combustion would occur. That is, steam would be decomposed into its elementary constituents, hydrogen and oxygen, and most other gases would be disassociated in the same manner. Hence, the combination or combustion of these elements cannot occur at a higher temperature. The actual result in practice would be that a certain percentage of the fuel would be consumed until the temperature reached its maximum. The balance of the fuel gas would then ignite only as their temperature fell below 4,000 degrees, by radiation or contact with the furnace walls.

Quincy Railway in 1885, in which the value of the fuels was determined by actual use under the particular and peculiar uses and conditions they would be subjected to if adopted by the road as fuel for its locomotives.

TABLE III.—COMBUSTION DATA.
Showing fuel values and influence of air supply on furnace temperature from "Steam" published by Babcock & Wilcox Co.

KIND OF COMBUSTIBLE.	Air required.	Temperature of combustion.				Theoretical value.		Highest attainable value under boiler.	
	In pounds per pound of combustible.	With theoretical supply of air.	With 1½ times the theoretical supply of air.	With twice the theoretical supply of air.	With three times the theoretical supply of air.	In pounds of water raised one degree per pound of combustible	In pounds of water evaporated from and at 212 degrees, with 1 lb. combustible.	With chimney draft.	With blast, theoretical supply of air at 60 degrees, gas 320 degrees
Hydrogen	36.00	5750	3860	2860	1940	62032	64.20	......	......
Petroleum	15.43	5050	3515	2710	1850	21000	21.74	18.55	19.90
Carbon { Charcoal Coke Anthracite coal	12.13	4580	3215	2440	1650	14500	15.00	13.30	14.14
Coal—Cumberland	12.06	4900	3360	2550	1730	15370	15.90	14.28	15.06
Coking bituminous	11.73	5140	3520	2680	1810	15837	16.00	14.45	15.19
Cannel	11.80	4850	3330	2540	1720	15080	15.60	14.01	14.76
Lignite	9.30	4600	3210	2490	1670	11745	12.15	10.78	11.46
Peat—Kiln-dried	7.68	4470	3140	2420	1660	9660	10.00	8.92	9.42
Air-dried 25 per cent. water	5.76	4000	2820	2240	1550	7000	7.25	6.41	6.78
Wood—Kiln-dried	6.00	4080	2910	2260	1530	7245	7.50	6.64	7.02
Air-dried 20 per cent. water	4.80	3700	2607	2100	1490	5600	5.80	4.08	4.39

TABLE IV.

Locomotive Tests of Illinois Coals Made by the C., B. & Q. Railroad in 1885.

(From paper by Wm. Forsyth, M. E., Eng. News, Jan. 17, 1895.)

Name of coal.	Lbs. water evap. per lbs. coal.	Comp. evap. val., Streator coal taken as unity.	Cost at mine.	Actual value.
Streator	5.65	1.000	$1.30	$1.30
Kewanee	4.09	.724	1.45	1.05
Galva	4.48	.793	1.25	.99
Edwards	4.37	.773	1.15	.89
St. David's	4.76	.842	1.15	.97
Elmwood	4.81	.851	1.30	1.11
Norris	4.58	.811	1.15	.93
Kramm's	4.50	.796	1.15	.92
Colchester	5.63	.996	1.875	1.87
Cleveland, Ill.	5.05	.894	1.50	1.34
Astoria	5.15	.912	1.20	1.09
Winchester	5.02	.888	1.525	1.35
Belleville	5.29	.937	1.25	1.17
Mendota, Mo.	4.65	.823	1.30	1.07
Carver	5.03	.890	1.30	1.16
Albia	5.20	.920	1.40	1.29
Whitebreast	4.94	.874	1.45	1.27
Jumbo, Pa.	7.25	1.283	....	....

NOTE.—Each coal was used on six or eight trips. Temperature of feed water, 70 to 75; thermometer, 70 to 80; boiler pressure, 138 pounds; speed, 19 miles per hour; grate surface, 17.6 square feet; heating surface, tubes, 1,078 square feet; heating surface, fire box, 112 square feet.

Table V gives some coal tests made with Babcock & Wilcox boilers, which gives, beside the evaporation obtained, considerable data which should be observed and recorded in such tests, and on which the results of such tests largely depend:

TABLE V.—Results of various fuel trials under Babcock & Wilcox boilers.

Name of Coal.	Duration of Test.	Grate surface, square foot.	Heating surface, square foot.	Percentage of refuse.	Coal burned per square foot of grate, pounds.	Water evaporated per square foot of heating surface per hour, pounds.	Water per pound coal from and at 212 degrees, pounds.	Water per pound combustible from and at 212 degrees.
1. Welsh	13½ hrs	40.0	1679	7.5	6.3	2.07	11.53	12.46
2. Anthracite scr's 1-5 Powelton, Pa... ... Semi-bit. 4-5	10¼ hrs	60.0	3126	8.8	17.6	4.32	11.32	12.42
3. Pittsburgh fine slack.	4 hrs	33.7	1679	12.3	21.9	4.47	8.12	9.29
Pittsburgh third pool lump	10 hrs	43.5	2760	4.8	27.5	4.76	10.47	11.00
4. Castle Shannon, near Pittsburg, ⅜ nut, ⅝ lump	42¼ hrs	69.1	4784	10.5	27.9	4.13	10.00	11.17
5. Ill. "run of mine"	6 days	. . .	1196	....	...	1.41	9.49	......
Ind. block, very good	3 days	....	1196	....	....	2.95	9.47	......
6. Jackson, O., nut	8 hrs	48.0	3358	9.6	32.1	4.11	8.93	9.88
Staunton, Ill., nut	8 hrs	60.0	3358	17.7	25.1	2.27	5.09	6.19
7. Renton screenings	5 hrs 50 m	21.2	1564	13.8	31.5	2.95	6.88	7.98
Wellington scr'gs	6 hrs 30 m	21.2	1564	18.3	27.0	2.93	7.89	9.66
Black Diam. scr'gs	5 hrs 58 m	21.2	1564	19.3	36.4	3.11	6.29	7.80
Seattle screenings	6 hrs 24 m	21.2	1564	13.4	31.3	2.91	6.86	7.92
Wellington lump	6 hrs 19 m	21.2	1564	13.8	28.2	3.52	9.02	10.46
Cardiff lump	6 hrs 47 m	21.2	1564	11.7	26.7	3.69	10.07	11.40
Cardiff lump	7 hrs 23 m	21.2	1564	19.1	25.6	3.35	9.62	11.89
South Paine lump	6 hrs 35 m	21.2	1564	13.9	28.9	3.53	8.96	10.41
Seattle lump	6 hrs 5 m	21.2	1564	9.5	34.1	3.57	7.68	8.49

—Advantage of Testing Fuels by Actual Use.—

The method of testing by actual use is an important one, and probably furnishes the best results when properly applied. The comparative calorific value of fuel will not always show its actual relative value when in use. The class of furnace used, the grate area, the draft, etc., all modify results, and the best fuel for a particular place is the fuel which will give the best results, under the prevailing conditions, for the least money. Calorific comparisons are indicative only; actual trials are conclusive.

For the brickmaker the actual trials can be most readily and most satisfactorily applied. Sample cars of coal or other fuels can be used under the boilers under similar circumstances and the comparative values thus determined. Great care is necessary in order to make the comparison as uniform as possible. In boilers the evaporation of water per pound of coal is the best measure, as it serves also as a measure of the efficiency of the boiler and setting as well. The position of the water at the beginning of the trial should be carefully observed, and it should be left at the end of the trial in similar condition. The same should be done with the condition of the grates and the steam pressure. By placing a meter on the feed-water supply pipe the amount of water evaporated can be readily determined, and by keeping the weight of the coal burned the evaporation can be easily calculated. Care should be exercised to keep all conditions uniform throughout all trials. The pressure carried should be as constant as possible, and the heat of the feed water should be uniform, as should the draft and condition of the grates, etc. Such a test should occupy a considerable time (two or more days), if possible, as the errors depending on starting and stopping the test will thus be proportionally lessened. A strict observance of the rules adopted by the American Society of Mechanical Engineers for making boiler trials will give the best results.

In testing fuel for kiln use, the same kiln should be used for all comparative tests, the brick set in the kiln should be uniformly set in all tests, and should be uniform in dryness. Uniformity in method of firing must also be maintained. Uniformity in weather conditions is essential for accurate determination, and they should be undertaken only in settled weather. In such trials a number of repetitions will add much to the accuracy of the determination. Uniformity in all similar conditions of all comparative tests is essential to the success of the tests, and too great care cannot be taken to insure such conditions.

(Same subject continued in next paper.)

ANNUAL CONVENTION OF THE NATIONAL ASSOCIATION OF FIRE BRICK MANUFACTURERS.

THIS ASSOCIATION of clayworkers held their annual convention in New York city on Dec. 17, 18 and 19 at the Broadway Central Hotel. The various sections were well represented, and there was a good attendance at every session. The stove-lining section, which has a separate set of officers and does its business apart from the general fire-brick makers, held its session on the first day, Dec. 17. After the reading of reports and general discussion of various preliminary matters, the following officers were elected: President, H. S. McLeod, Troy, N. Y.; Vice President, Mayor Horton, Peekskill, N. Y.; Treasurer, John G. Williams, Taunton, Mass.; Secretary, B. C. Pierce, Taunton, Mass.

The business undertaken was of great interest to the members, and was discussed in a very harmonious manner by the numerous members present. The reports were in the main satisfactory, and it was resolved to go on and continue the good work upon the old lines. Trade was reported as being good for the past five months, and there is every indication of a prosperous business in the near future. The prices have been fair and well sustained. There was, however, a feeling that the margin of profit was too small, and hopes were expressed that the trade might soon admit of some gain in this direction. It is not easy, however, to find any way of increase under the existing circumstances.

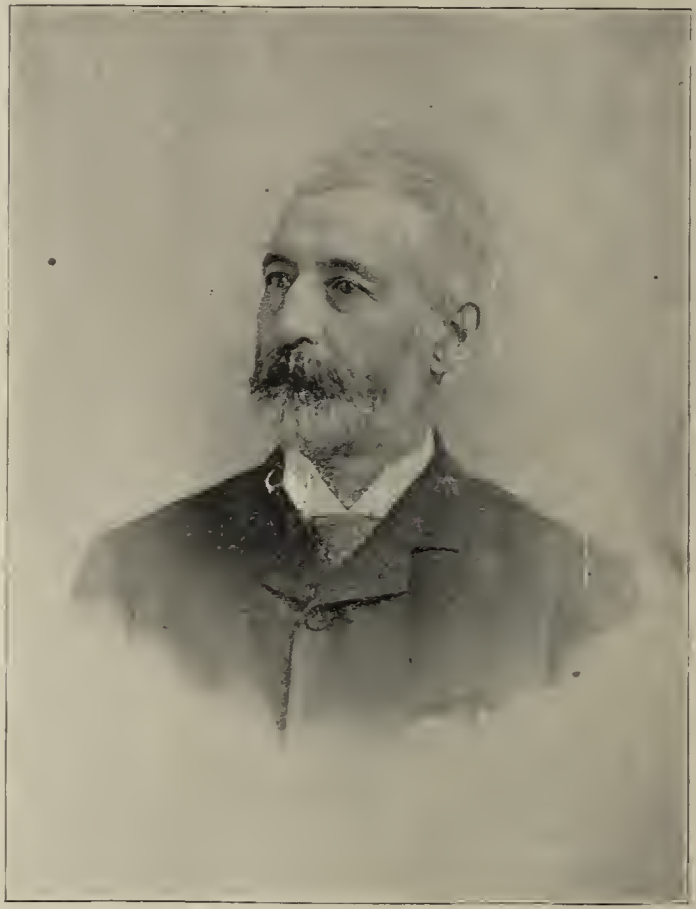
The social element is carefully cultivated by this section of the Fire Brick Makers' Association, and it would be a good thing for the present Association if it would be more generous and fraternal. The stove-lining fire brick men have made their social gatherings productive of much good. They have maintained good average prices, destroyed all vicious and hurtful competition and improved the general quality of the stove-lining brick. They have also especially cultivated a fraternal and social feeling of good will among the rival manufacturers, the clay miners and the stove manufacturers, and upon this foundation are building a prosperous condition of trade. To the retiring President, Gideon Francis, of Dighton, Mass., a large mead of credit is due for his hearty and kindly efforts in aid of this good work. Brother Francis is a large-hearted and whole-souled New Englander, deeply in love with his business and fully possessed of the idea that the best brick he can make is not good enough. He is not only an expert fire brick maker, but he is a boss Rhode Island clam baker. Some stove lining makers do think they can match Francis at brick burning, but none have dared to dispute his claim of being the champion clam baker of Massachusetts. All the ladies say so too. Each year there is a pleasant gathering at the Dighton works, at which meet brick makers and clay miners with their wives and friends. Here in this pretty New England village of Dighton, on the shores of the Taunton river, near the homes of the Williams brothers, B. C. Peirce, Messrs. Parker, Lincoln, Goff, French and Winslow and others who act as hosts, Gideon Francis gathers his friends together once a year. They meet and drink and talk and eat clams. The clams disappear, but a friendship good for more than 365 days grows apace, and all go away feeling that it has been good to be there. These social gatherings have most surely been of great assistance in developing the fraternal feeling which pervades the stove lining section of the Fire Brick Association.

The Eastern fire brick makers have mostly to purchase the fire clay and fire sand which they use. At these meetings and the convention they are enabled to compare prices and the qualities of the material furnished them by the clay miners of New Jersey and other districts. This comparison is valuable to all because it helps to maintain an equal standard of value and compels a healthy competition of care in the mining and selection of clays by the clay miners, and insures a good and reliable quality in material at fair prices.

This section closed its work on Tuesday, Dec. 17, at 6 p. m. In the evening the members were invited by the leading clay miner of the Raritan river district to join him in a theater party. Some, owing to previous engagements, were unable to go, but a large party, headed by Henry Gleason and Wm. Homes, did accept, and spent a most enjoyable evening, thus fitly closing a good day's work by allowing pleasure to succeed business.

—Second Day, Wednesday, Dec. 18.—

On Wednesday the fire brick section met at noon and were called to order by the president H. B. Newton, of Albany, N. Y. Henry Gleason, secretary, read the roll call and minutes of the preceding meeting, also his report. When these matters had been attended to the election of officers for the ensuing year was taken up, and the new board of officers were elected as follows: President, H. B. Newton, Albany, N. Y.; First Vice President, John Sheridan, Mt. Savage, Md.; Second Vice President, M. D. Valentine, Woodbridge, N. J.; Treasurer, Cyrus Borgner, Philadelphia, Pa.; Secretary, Henry Gleason, New York; Chairman of Executive Committee, Wm. Homes, Boston, Mass. This business being completed the President read his address.



H. B. Newton, Albany, N. Y.

—President H. B. Newton's Address.—

Gentlemen of the Convention:

If there were no occasion for banding together the fire brick manufacturers for mutual protection, it is a great pleasure to meet each other for friendly greeting and social intercourse. These annual meetings provide an opportunity for the interchange of views in matters connected with the industry which engages our attention that otherwise would not be possible.

Coming face to face, we lose much of the unpleasant feeling that not unfrequently arises in the competition of business.

It is an old saying that "In union there is strength."

It was therefore upon this principle that the National Association of Fire Brick Manufacturers was organized thirty-two years ago for the protection and advancement of this important industry in the United States.

Many changes have occurred since the first meeting was held, which was in New York city.

There are but few of the original members left. Yet the Association survives, and with a much larger membership than ever.

I do not think there has been a year since the organization of the Association but that the members have met for the transaction of business and social intercourse.

These meetings have been noted for the harmony and good will of the members. The result has been of the greatest advantage to the fire brick business, and was the occasion in several instances of quite an advance in prices for fire brick goods.

That there have been obstacles that prevented the attainment of all that was desired there can be no question. The main difficulty has been to get all the fire brick manufacturers to share in the work and responsibilities of the Association by giving to it their presence and influence. This has been the greatest hindrance towards the end so much needed and hoped for.

Persistent work, however, will overcome the most difficult obstacles. I think the time has arrived for all the fire brick manufacturers to awaken, and not allow the present favorable opportunity for securing fair prices for our goods to slip away without making an effort to regain in part, at least, that which has gone from us, viz., the profits of our business. There has been an improvement in most lines since last spring. It is reported that the price for pig iron has advanced from $2 to $3 per ton; that many iron furnaces that have been idle for some years are now lighted; that merchant and other kinds of manufactured iron are in greater demand, and manufacturers are full of orders.

The fire brick business is mostly dependent upon the iron industry or the manufacture of iron in its various forms. We noticed that the price of iron had advanced. I would ask, have the prices for fire brick goods kept pace with the advance in iron? They have not. In view of the very low price for fire brick at present it does seem as if there must be an improvement.

It is reported that fire brick in not a few instances are being sold at or below cost of production. Now that the iron manufacturers are receiving fair prices for their product the fire brick men ought to receive a corresponding increase in price for their goods. This can be obtained only by the united efforts of the fire brick manufacturers. It can be brought about with the aid of local associations acting with the National Association. Fire brick manufacturers in all sections are equally interested in this matter. Any who will give the subject careful consideration must concede that it is through the action of local associations that we are to arrive at satisfactory results in the improvement of the fire brick business throughout this country.

They should be organized upon business principles, each association having its officers appointed, not for ornaments, but for work. The boundaries for the respective districts can readily be established as may be most convenient. These local associations should, by their officers, be in frequent communication with the National Association.

Whenever any matter affecting the welfare of the industry at any point—prices, condition of trade, the market, etc.—the machinery is at hand for the accomplishment of the purpose desired. Thus all are equally benefited.

The local associations may fix prices for their respective districts; but it should be understood that no one shall be allowed to offer fire brick goods at lower prices outside of their respective districts than are being held in other sections.

It would be of great advantage to call special or hold frequent meetings, say once in two or three months. I am sure if this plan were adopted we would not hear of fire brick goods being sold at such ruinously low figures.

I consider the local associations as important for the prosperity of our industry as is the National Association. Really, the usefulness of the National Association is largely dependent upon the vigor and activity of the local organizations. The members of the local associations, it must be borne in mind, compose the National Association, consequently must work together. To show the importance of associated effort I will quote an item taken from the "Iron Age:"

"During the early months of the present year an important branch of business is known to have been seriously upset by the want of information among manufacturers. A manufacturer, who thought he was not receiving his share of business, wrote to various parties—manufacturers—alleging that certain very low prices were being made by them, and of which a rumor had reached him. It happened, as was ascertained afterwards, that such prices had not been quoted by any of his competitors. Nevertheless, in this way the report became general, of course spreading to the buyers, and they naturally took a stand against paying more; so that eventually the complainant was himself obliged to make the price, and therefore it became general, resulting in an average loss of $1 to $2 per ton.

"This, it is said, took place when there should have been an improving condition according to trade procedure, since it covered the season for ordinary spring requirements."

From the above statement one cannot help believing that had there been a well and carefully organized system for obtaining information, such as I have here briefly outlined, such an unfortunate circumstance could not by any possibility have taken place. The fire brick manufacturers are not the only ones who have to meet severe and useless competition. Manufacturers in many other lines have been obliged to resort to associated effort, and with favorable results.

In the report of the last Stove Founders' Association Convention, which was held in Chicago last spring, it is stated a noticeable event was the return to the association of some who had not met with them for some years. Several prominent houses that had not been present for some time renewed their membership, and signified their intention to hereafter take greater interest in the work of the association. This is of more than ordinary significance. Not only are the majority of stove manufacturers beginning to realize the necessity of association to maintain fair prices, but manufacturers in many other departments of industry are acting in concert to avoid the fearful competition that prevails, and which, as a matter of course, results in loss to all concerned. It is manifestly true that the necessity for unity of purpose and action among fire brick manufacturers is now needed in order to secure and maintain remunerative prices for their goods.

Separated by distance, as must and is necessarily the case, it is evident that some central point be established for the National Association to meet, and from which information can be received and sent to the local organizations throughout the United States. All the local associations should be represented at every meeting of the National Association and take an active part in all of its proceedings.

Many industries in other departments have their national and local associations. It is thought by many that the advance in iron and steel is an indication of commercial prosperity for some time to come. But what will it avail the fire brick manufacturers if they do not stir themselves and take some action towards obtaining better results in their business?

G. C. Dunne, Chairman of Committee on Local Organization, Boston.

The majority of the fire brick men believe in associated effort, and have shown, by the generous contribution of their time and money, that they are in earnest and desire and expect good results from their efforts. If all the fire brick manufacturers would stand shoulder to shoulder in the work of reform soon our business would be restored to what it once was.

We notice that the National Hardware Association was organized about one year ago, and, it is said, is carrying out its plans conservatively and wisely with good results.

The National Association of Agricultural Implements is another evidence of the growing sentiment in favor of association and united effort among manufacturers for mutual protection against useless competition. Also, the Foundrymen's Association, which holds monthly meetings in Philadelphia. Many other industries have or are considering the advantage of united effort for maintenance of prices against undue competition.

From all these evidences we cannot escape the conclusion that it has become a necessity, not only in the fire brick industry, but in most other lines.

It has been said that "Men are like the planets, as parts of a system they behave themselves well enough; but any one of them, freed from the restraints of all the others, would rush to destruction."

Gentlemen of the association, you have left your homes and business affairs and met here to consult with each other as to the best methods for the improvement of your business. You have invested your money, and daily are expending time and energy in producing fire brick goods, and from which you expect to realize at least a reasonable profit. You certainly are justly entitled to some remuneration for the work of your hands. It is hoped that each one will give expression to his views in any matters that may come before the convention.

If each one present would consider himself a part of the system, and not freed from the restraints of his competitors, then there would be a sense of personal responsibility which, I think, would result in a decided improvement in the fire brick industry.

The address was received with enthusiasm, and it very evidently expressed the sentiments which were in the minds of many or even all present.

The next order of business was the report of the Committee on Organization, Mr. Phillips, of Scranton, chairman, and Wm. Homes, of Boston, secretary. Mr. Phillips gave an outline of the work done and read several letters which had been received by the committee in regard to the work before them, including a reply to a request for advice upon this subject received from Theo. A. Randall, Secretary of the National Association of Brick Manufacturers. Mr. Homes then read an address from the committee upon the work before it.

THE PRESENT CONDITION AND FUTURE PROSPECTS OF CLAY MANUFACTURE.

—By Mr. Homes, Secretary of the Committee.—

The circular letter lately issued over my name undoubtedly was, to a certain extent, responsible for so good an attendance at this meeting. Such a letter would naturally enough call from me a paper under the above heading, for you were drawn here with a desire to at least listen to some suggestions, although for that matter they must remain as such, as far as I am concerned, unless you choose to grant me the opportunity to join with you upon the basis of some scheme which seems practical and enticing enough in its benefits for general adoption. There is meetness in everything, and I wish you to feel that in making a suggestion I am really doing all that is allowable or permissible in a body like this, for really it is doubtful if one member could formulate any plan or bring any scheme to a focus to be submitted without its containing thoughts biased by prejudiced motives; full of incongruities and irregularities that must be corrected, and adjusted and sanctioned by wiser heads than his own. In the first place I crave the liberty of presenting briefly the status of the clay business as I imagine it to be in our country to-day. Present prospects to me look dark, and I believe we are on the verge of a still more unsatisfactory chaotic period if we allow prices to be governed by existing methods. The clay industry is, as a rule, unremunerative, and for that reason is taxing every manufacturer sorely, driving him to his wits' end to accommodate himself to surrounding circumstances, trying to study out some method by which the condition can be improved.

As stated above, present methods of maintaining prices on our products are extremely unsatisfactory, and without any basis or foundation upon which to build. Any attempt to raise a price that is already at cost is simply impossible so long as our competing neighbor is satisfied to let his price remain as before; and where the margin is thus shorn from every article one sells, where is the pleasure to be derived in gazing at each other, grim determination not to be beaten outlining every feature, simply waiting for the other fellow to succumb to the inevitable? How much better to cordially grasp each other's hand, arrange a satisfactory figure for the goods, allow each other to share the trade, and thereby make a profit on that which before showed a loss. Of future prospects for outputs, etc., I will speak later. It would certainly be unwise to overlook these future possibilities, but for the moment we will allow them to be set aside, as I know we are all busy with an unsatisfactory present, which has brought so much pressure against our onward march that success in any branch is next to impossible. Will some of the gentlemen present kindly correct me at the close of this dissertation if I make a misstatement when I claim that it is largely owing to ourselves that this state of affairs exists? Will some person also correct me if I make an assertion that if what I just said is true there is no possible way to reclaim ourselves from our embarrassment except we join hands with one another for one mighty tug and pull that will put the clay industry safe upon the shelf with other industries, far above the struggles of competitors who in their mad scramble, for they know not what, would pull us from our secure position to again mingle in the giddy whirl which has but one ending. Like all riotous proceedings, it goes from bad to worse, and financial wreckage is the culmination. I have not said just these words heretofore, but in substance the same. Two years ago I gave this hint, and I now ask if your condition has bettered at all since that time, generally, I mean? No, sir! They are 50 per cent. worse, and then we thought we would bear it no longer. Have you not watched your factories with much more care the last two years than formerly? Have you not instituted savings in one direction or another, not considered of importance before? I will guarantee everything about your factory has received the closest scrutiny to the end that you now dream the bottom of expenses have been reached. Well, supposing they have! Supposing we acknowledge this fact. What next? Has the bottom yet been reached on selling prices? I say to you, No! Not by a good number of dollars, and unless some remarkable change for better takes place prices will decline. That change must be an increased demand for goods to excite a stimulus, or decreased production must be arranged before it can be controlled. One year ago I brightened the lowering clouds somewhat by a hope of a better year, but it did not come to my expectations. I can only speak of my own business, which in bulk was as much, and more, but prices were away off, consequently the margins were too low to admit of anything like satisfactory results.

None of you can laugh it off, and perhaps because you have some little advantage think you can overweigh your neighbors' possibilities. Unsatisfactory results will come to him surely who enshrouds himself in such a delightful maze. Let him put his head under the leaf and dream of security, yet like the poor quail, who adopts the same tactics, will the great gunner find and hunt him out. I wish to make this paper short, as your time is much more valuable upon the question which I trust is to be considered today, therefore, although I plead guilty to saying a great many words hitherto on procrastination, etc., in regard to this association, and might say more possibly, which I believe worked good in their way, I now feel we are getting into shape for more and better work. I have exhorted you to renewed effort, and I think it is now high time that we were embarking in the same boat that carries the leather, iron, coal, furniture, sugar, oil and a dozen of the other industries. Do they benefit by the association? Well, they all tell me they do, and why should I not believe what comes from the mouths of those who have had experience in such matters?

THE CLAY WORKER.

Wm. Homes, Chairman Executive Committee N. A. F. B. M., Boston.

There is general evidence, I think, to show that success has crowned nearly every effort under combined rule. However that may be, I consider this meeting is liable to show to us by the expressions of opinion of those present some of the good or bad features obtained through co-operation in other branches to the end that we may advise together whether it is wise or not for us to adopt similar obligations.

We have with us to-day a gentleman whom I understand to be familiar with the formation of organizations, and who has offered to talk to you regarding them. As I am told, he was connected with the formation of one recently in a direct branch of our line of business, which is reported to be working well, we will, without doubt be interested to hear some statement regarding it. I am one who thoroughly believes there can be no half-hearted work about a matter of this kind, and whatever the scheme proposed, if any, it must be attempted in a sturdy, business-like way.

At this point Mr. Homes opened the report of the Ninth Annual Convention of the National Brickmakers, Association, held at Cleveland, and quoted the essay by John A. Shares, of New Haven, Conn., entitled, "Organization as a Cure for Demoralizing Competition."

Now, as to the future of the clay business. Leaving the prices at their present low ebb, but with the hope that some action will be taken to improve the same, I wish to say that I do not believe the bottom has dropped from beneath us by any means. We have had a fine industry for many years, and one which in the past has shown good gains on capital invested. Formerly we were restricted to the manufacture principally of fire brick, fire tiles, drain pipe, retorts and stove linings, as goods produced from so-called fire clays. As the population increased we found the demand creeping in for flue linings, terra-cotta goods, fancy building bricks and paving bricks, consuming quantities of clay before unheard of. Lately the fire proofing of buildings has become an important adjunct, which, although many different materials have been brought forward as substitutes for clay, yet none have yet been shown that for real downright fire-standing qualities could equal the silica and aluminium combined in fire clays.

Terra cotta and kindred articles it may seem out of place to mention in a brick convention, and yet they are all in the direction of clay products, into which many of our brick men have drifted, and the time has come when we should make our association as national and broad that nearly all clay industries could be included.

Because one refinery might have granulated sugar, while another made the loaf, or lump, is no reason why they should drift apart, as both make sugar. We all make clay goods, and should, therefore, stand shoulder to shoulder to protect all branches of the industry and tend to build up the grand whole. None of us care one whit whether our money is made on fire brick or fireproofing, so long as we make it. This being the case, I think we are on the eve of larger additions to the clay-producing factories of the country.

The recent disastrous fire in this city, whereby the supposed noble structure called the Manhattan Bank Building succumbed so quickly, melting before the flames even more rapidly, perhaps, than had it been a wooden structure, has set the whole country, yes, the whole world, thinking upon the question of fireproof construction. It may seem unnecessary to restate what has been so vividly portrayed in all of the papers of late, yet this catastrophe carries with it a lesson which should be understood by us brick and clay men in particular, from the fact that we should always be alert to that which may aid our pocketbooks in a very substantial manner. The reduction of this building, in the manner stated, immediately points to something as wrong in the construction. Was it poor workmanship? Undoubtedly that was good. Was it the fireclay slabs that constituted the so-called fireproof portion? That surely could not be, as these are subjected originally to over 3,000 degrees of heat to burn them in the kilns we use for the manufacture of these goods. But in iron, the very one thing that must hold the clay block in position, is exhibited the weakest material of all. This cannot be said to be the fault of any human being, except it be him who, as owner, chooses to use it, for up to this time it has been considered as the only material of sufficient strength to carry the enormous stress of those high buildings. The question immediately arises: What is to be done in the future? Like he who uses stone as an exterior structural material, and who, when the fire comes, immediately takes dollars from his pockets, or those of the company with whom he insures, yet immediately proceeds to put up another monument, to have the same thing repeated perhaps later, we are apt to say to them, they learn no wisdom by experience. By this I do not mean to deprecate the use of stone, one of our best building materials in many situations, but there are places in crowded cities where, to my mind, it is far from being the ideal thing. Iron and steel in certain places have no peers, yet when we expect them to withstand the heat of conflagrations, then I do not consider them as good as a solid hard pine timber, which usually retains its form until nearly consumed; while even extreme heat radiation will so warp and twist iron that its tendency is to leave its support, thereby precipitating whatever it carries.

At white heat it is not much better than so much molasses candy, which means that it will bend of its own weight. What, then, is to be the remedy for this, and what is to take the place of iron and steel? I wish I could answer you positively, or rather, I might say, I wish I knew secretly, of some material to take its place. If so—well, I might let some of you in on the deal, but it would be entirely according to the largeness of my heart. One thing is certain: They would like to construct their whole building of the material that stands the most fire, and if it is clay, as I sincerely believe it is, what is your future, gentlemen, if they hit upon some plan for its entire use?

Prof. Nichols, of the Massachusetts Institute of Technology, once said to me he knew of no better material for standing fire than silica and aluminium, which is fire clay in its purest form. You, then, gentlemen, are the persons to whom eventually the world will look to help them over this dilemma, unless there is something yet to be discovered to stand more heat. I fear our old friend Mephistopheles will have to be consulted and his kitchen floor taken up to show a better material than we now possess. What must be determined is, how can our buildings be constructed and use entirely this material?

Here our friends the architects are confronted by a problem, which, let us hope, they may solve. I do not, in my own mind, believe that a fireproof building exists to-day, unless it be some form of office structure. Our present idea of beauty must succumb to what is to be a more popular idea of safety, and instead of floor areas of twelve to fifteen thousand square feet of surface, where sufficient inflammable goods can be stored to twist every iron beam above when once the goods are fired, which to-day combines our beautiful stores with so-called fireproof edifices, we must work on the plan of compartment ship building, where doors can be closed and suitable water sprinklers can be put in operation to hold the fire within certain limits; this is supposing iron as at present is used.

But the trend of popular feeling is against the use of iron to-day, and the substitute of a more stable material, if it can be found, for there has been altogether too much loss of life and property by repeated fires, where iron was expected to stand up and do its duty, but did not. Iron fronts went out of favor for this very reason, and they were strong and ornamental, also. Just as bad is a floor beam which holds all above it. Were I to erect a building to-day it does seem I would use wooden timbers, properly coated and covered, in preference to iron, considering that of two evils I had chosen the least. Gentlemen, this is not a treatise on building, but these few ideas are simply jotted down as showing that something is to be done, and soon, too, in trying to construct a building entirely of clay goods. When they do this we shall, I believe, have reached a standard of construction as nearly fireproof as it is possible to make them.

Below I read the views of President Atkinson, of the Manufacturers' Mutual Fire Insurance Company, which appeared in the Boston Advertiser Nov. 11, 1895:

—Referring to Manhattan Building.—

That building, as I understand it, was of a type which is not to-day considered a safe building when exposed to heat from the other side of the way. The dangers of collapse of iron and steel construction when exposed to heat have been long known and often anticipated. It will be recalled that the high iron frame roof of what was known as the Richardson Building, on Kingston street, destroyed in the great Thanksgiving-day fire, was twisted and collapsed from heat over the way before the fire had attained destructive headway in that building. The only iron or steel-faced building within my knowledge that has resisted fire is the Cathedral Building, on Franklin street. That iron facing was backed on the inside by heavy brick construction, and when the interior was destroyed by fire the walls stood firmly, and the present building is constructed within the original walls.

HENRY GLEASON, Secretary N. A. F. B. M., New York.

What is your latest conception of a fire-proof building? That there is, and can be, no such building. Since an iron furnace may be destroyed by the heat of the combustion of its contents, so a building constructed wholly of incombustible materials may be wholly destroyed by the high heat generated by the burning of its contents. The most complete destruction I remember was that of a wheat elevator, constructed wholly of irón and brick. When filled to only one-tenth of its capacity the heat of the wheat in intense combustion so completely destroyed the elevator that the iron did not even pay for the cost of its removal from the wreck. How iron or steel may be left by the heat is illustrated by this picture, given in warning to our members that they may not employ naked steel beams in the construction of cotton factories.

The picture which Mr. Atkinson exhibited was one from the Engineering News of April 18 of the present year. It is a cut of the condition in which steel beams, cement protected, were left after a fire in a Toronto building. It shows beams 20x6¼ twisted and bent as badly as 10x4¼ ones, showing that even the heaviest steel construction cannot resist high heat. When steel beams become red hot they have no more rigidity than if constructed of lead, and are easily bent by the superincumbent weight. In answer to the question, What is the nearest approach to a fire-proof building within your knowledge? Mr. Atkinson replied: The Boston Public

Library, an example of a return to the clay age. The slight amount of metal required in its construction is embedded among clay tiles, of which the interior mainly consists. What about the new form of steel construction with self-sustaining frames, using the so-called sky-scrapers? The question of the stability of those buildings when exposed to high heat from outside depends on many factors. First, the area of the buildings, whether they are broad or narrow; second, the amount of surface of the building exposed to high heat on one side while the other side is not subjected thereto; third, to some extent, the size or body of metal incorporated in the self-sustaining frame; fourth, the effectiveness of the stone or brick encasement, which forms the outside of the building first exposed to heat. Granite is manifestly unfit, and is seldom, if ever, used. The fossil water in the granite is quickly converted into steam by the heat and reduces the granite to sand. The sandstones vary, and much remains to be learned of their properties under the influence of heat. The effectiveness of brick on encased steel depends on the thickness of the brick walls and the quality of the brick themselves. There is little or no science regarding brick. The subject is under investigation. The different properties in retardation of heat among the clays is very well established in the distinction between fire and ordinary brick. In ordinary brick there are widely different qualites both as regards retardation of heat and the absorption of moisture.

When bricks are used for encasing steel frames the absorption of moisture becomes an important factor, as the best steel embedded in and resting against absorbent brick is liable to become rusted or oxydized. "What is being done to solve what, according to your statements, appear to be still unsolved problems?"

The properties of clay and brick have been under investigation for a year under the direction of Prof. Shaler, both at the Lawrence Scientific School and the Massachusetts Institute of Technology. The properties of brick already in the market are now being investigated as a part of the study by the Steam Users' Association, under my direction. A combination has been formed by the New York Board of Fire Underwriters, the Architects' Association, the Society of Mechanical Engineers and the Factory Mutual Insurance Company for the complete study of the methods of protecting iron and steel frames, posts and other elements of modern construction from the effects of heat and moisture. But the investigation is just begun, and will take many months.

"What remedy is there in the interval?" In my judgment a very ample water supply, carried direct to the roofs of buildings, from which heavy streams may be thrown from the high buildings to the low buildings in the neighborhood, or from the roofs of the low buildings to the sides and ends of high buildings projecting above that level. It is now admitted to be useless to cope with fires in high buildings from the street level by the means of ordinary apparatus.

The fact that fire proofing of buildings has become such a vast proportion of the clay industry must form an excuse for my causing it to become such a prominent feature of my paper. I do not disregard also the fact that many of us are still engaged in the manufacture of fire, or front, bricks alone, and might with that I give less time to fire proofing and more of my mind as regards the future of these two mentioned articles. A few words can convey my ideas in regard to them, but allow me to say that the future, to my way of thinking, can but demonstrate a large increase of the output of these products. Of course, we look largely to iron mills for the sale of fire brick, and should there be any movement towards the lesser use of iron in building construction it could but affect the demand of fire brick, as many of our large iron works are now engaged in the supply of iron and steel for this purpose. Usually, however, demand in some new direction generally replaces any diminution of trade in an old line, and although iron and steel might suffer depletion in the erection of buildings, some new channel would be developed for its use. However, it is a great question whether we can, in our present unfortunate craze for high buildings, substitute any form of construction to do away with that which, to the present time, has formed the only material suitable.

Regarding front brick: The manufacture of colored bricks for building purposes has come to stay, to increase, to make a business of substantial growth. Stone is not now the favorite building material as of yore, for here again comes in the fire-standing quality of the material used. I predict that the clay industry is destined to surpass in bulk almost any known industry of the country, and where but in the innumerable varieties of clays extant can you obtain the varied colorings for architectural purposes? Now, gentlemen, in the face of our deplorable condition of unsatisfactory prices, with a future prospect of putting the clay manufacture on a very broad basis of demand, for which we have an inexhaustible supply of the crude material, does it not seem unwise not to put this association on plans so broad and long that our interests involved shall hold us together as brothers and partners, fully convinced that, our past having been discouraging, we are warranted in adopting a particular policy that will give us fair margins and enable us to hold any competitive manufacturer within bounds? This can only be accomplished when we, like others before us, meet on one plane of thought, meaning a burial of all petty jealousies and animosities that have heretofore existed.

When Mr. Homes had concluded his address the President called upon Mr. Geo. L. Record, a lawyer who had had considerable experience in organizing capital and manufactures, and who is one of the receivers of the Staten Island Terra Cotta Lumber Company, to give the members his views upon organization.

Mr. Record gave a very clear and explicit statement of one class of organization which he knew to be working successfully in several other lines of manufacture. He strongly urged the formation of a combination based upon legal forms, formulated within the law and capable of enforcement by the law. He said it was absolutely necessary to have the members of such an organization bound under bonds to conform to the conditions of the organization or forfeit a sum of money to be agreed upon at the beginning, and to have the scheme given a term of years. He thought five years a good period. Under such a system each manufacturer would be bound for a period of five years to place all his product into the hands of a board of directors, who would fix the prices, make all sales and regulate the output of each fire brick factory.

The result of this discussion pertaining to local organization was the appointment of a committee for New Jersey. The local committee of New Jersey was then appointed by the President as follows: Henry Gleason, of New York; Wm. Homes, of Boston, Mass.; Geo. L. Record, of Jersey City. This committee was instructed to visit the fire brick manufacturers of New Jersey and obtain their several views regarding the matter, and to endeavor from this collection of opinions to formulate some system of organization that should commend itself to the National Association of Fire Brick Manufacturers.

Session adjourned until Thursday noon.

THE BANQUET.

—Wednesday Evening, Dec. 18, 1895.—

After the Wednesday session the National Association were entertained at a banquet furnished by subscription. The feast was a royal one in the very best style of host Tilley Haynes at the Broadway Central Hotel. It embraced all the delicacies of the season, including fish, game, etc., generous in quantity and superb in quality. Flowers in profusion, music to charm, wine to cheer and cigars to soothe were also provided by the generosity of Charles A. Bloomfield, the clay miner of the Raritan river. About fifty sat around the festive board and did ample justice to the viands and the cooking, good digestion waiting upon appetite under the sweet influence of song and music. When these material things had been successfully disposed of Wm. Homes, the genial and witty toastmaster, resumed his baton and marshaled his legion of talkers into order and called upon them to proceed to toast making. He had willing servitors who were ready to do his bidding how and when he told them. For who would not respond for the good of the craft when called upon by a jolly good fellow like William Homes, of Boston. Toasts called for and given:

"Our Visitors and Officers," H. B. Newton, President, Albany, N. Y.; "Our Treasure," Cyrus Borgner, Philadelphia, Pa.; "Our Work and Record," Henry Gleason, New York; "Our Maine Chance," Edward Winslow, Portland, Me.; "How to Make Mud," John Sheridan, Mt. Savage, Md.; "A Good Brick," song, by Robert Lyle, Woodbridge, N. J.; "Bricks vs. Banking," Mr. Phillips, Scranton, Pa.; "Pleasant Days," M. B. Valentine, Woodbridge, N. J.; "Our Mortal Clay," Chas. A. Bloomfield, Metuchen, N. J.; "The Politics of Clay Selling," Milton A. Edgar, Little Washington, N. J.; "Terra Cotta and Red Brick," James Taylor, Port Monmouth, N. J.; "Old Virgin Soil," F. H. Morrison, Richmond, Va.; "Successful Organization," Felix Chillingworth, New Haven, Conn.; "What Not to Do," Mr. Perkins, Stamford, Conn.; "How to Do It," Geo. L. Record, Jersey City, N. J.; "How to Collect," George Dunn, Boston, Mass.; "The Relation of Politics to the Fire Brick Industry," Mahlon Chance, New York Tribune.

The address of Mahlon Chance was a surprise and a pleasure to every one. He spoke as the representative of the Hon. Warner Miller, who had expected to have taken this topic. Mr. Chance discussed the tariff in its aspects toward the fire brick industry. He referred to its antiquity, claiming that Adam was made of clay and fired very soon after he was made. The fire brick man must have preceded Tubal Cain, for Tubal worked in iron. Clayworking is an honorable craft, for what Mason does not recognize the responsibility of the tiler. Mr.

Chance then counseled clayworkers to co-operate; urged them to seek improvements of methods in manufacture and in selling their product. He suggested the advantages of broadguage and liberal relations between all the members of the Association and the establishment of safe, fair and business-like principles for the government of all their personal and business relations. Mr. Chance has been United States consul at Nassau. His great experience and vast knowledge of practical trade and commerce well qualifies him for giving sound and wise counsel which cannot fail of being useful to the members of the National Association of Fire Brick Manufacturers.

THIRD SESSION, THURSDAY, DEC. 19.

The work of this session was entirely of a routine character, having no interest for our readers, therefore we omit it. Desiring only to say that this convention has proved to be one of the most, if not the most, important one in the history of this Association, we think that the fire brick men are where the National brick men were a few years ago—that is, without a literature. We cordially tender to them the good offices of the Clay-Worker, and they will ever find our pages open to defend or help in their cause. They are clayworkers; so are we, and we extend to them the right hand of co-operation.

JAMES TAYLOR.

Written for the CLAY-WORKER.

OLD VS. MODERN BRICK ARCHITECTURE IN AMERICA'S METROPOLIS.

AS THE BEAUTY of light-colored brick began to impress itself more forcibly on the architects and builders of New York, there seemed a disposition on the part of some of the more enthusiastic among them to permit their admiration of its tasteful effect to run away with their common sense. In other words, there was just the faintest possibility that, had not the metropolis already been a city well and substantially built, it might have been constructed thereafter of nothing but light and buff buildings, which would have destroyed all the beauty of contrast and made of Gotham a white city beside which Chicago during the Exposition days would have been compelled to hang its head in envy.

Still builders have never had any cause for complaint in the fact that buff brick has taken the place of so many other building materials, and more especially that it has almost totally deposed brown stone from its one-time throne as the chief ornamental material for expensive dwellings. Brown stone is, in fact, now relegated to a very minor position. It is merely used to give a thin veneer of elegance to cheap structures, and is a flimsy material as thus used, because it is set with its lines of cleavage vertical, and is thus rapidly destroyed by the action of the elements. With the plane of cleavage horizontal, however, the stone is fairly durable.

The era of light and art brick has resulted in the city gradually acquiring a lighter and more cheerful hue. This is especially true on the upper West Side, and yet if the five miles of flat-houses, for instance, which run alongside Central Park from Ninth avenue to the Hudson river, that have all practically gone up within the last five or ten years, had been built immediately after the war, the charge of monotony could have been made. For in a way the West Side would then have been almost as dull and prosaic and minus variety as the East Side for the same distance still is, with its miles of red brick or brown stone residences, flats and tenement houses.

What has relieved the monotony to a great extent in the use of the more aesthetic brick has been the combination of shades and the introduction, as well, of ornamental terra cotta work. With the aid of these two, upper New York has been made to blossom out into a veritable artist's dream. Light brick is not seen in one shade alone. Its beauty is to be admired in all the charming varieties of the mottled or Pompeiian, in every warm tint from light yellow to deep chocolate and purple, while the plainer white, buff or gray—occasionally white enameled, occasionally chipped or rough-faced—is also largely in evidence. Then, for proper effect, are added elaborate terra cotta designs and a great variety of cappings and courses. Some of the buildings have quarter-round brick, rounding all the angles prettily, and various dimensions are used, from the old standard to the new long, thin "Roman."

Another aid in the beauty of the light brick houses that are going up is their individuality of design. Builders of what are known as "speculation houses" have turned to light brick and terra cotta almost exclusively in their efforts at meeting the popular demand, which calls for houses that are individualized.

POSTAL TELEGRAPH BUILDING.

Gotham, breaking away from the tyranny of the speculative builder and the tiresome monotony of the brown stone front, welcomed the fashion of house-owners having their residences built to order. Naturally, this reacted for a time against the speculative builder. It did not, however, prevent him from putting up his long rows of houses as before, but it served a good purpose in compelling him to individualize them. The happy result has been that "ready-made" houses of the last few years produce the illusion of having been made to order for their occupants, and add much to the beauty of the city.

Among conspicuous examples of the good use of light brick in long rows of houses are to be mentioned a block front in West End avenue, extending from Eighty-fifth to Eighty-sixth streets. This row shows a complete assimilation of the style of his choice on the part of the designer, and is extremely pleasing to the eye. The houses are of yellow brick and white terra cotta, while the basements are of light gray stone. The result obtained by the combination is most effective, if a light, restful sensation to the eye is not undesirable. Then there is another conspicuous example in a row of five houses of moderate size on the south side of Seventy-sixth street, near West End avenue, which are especially noticeable for the very fortunate result of their coloration. The general effect is that of a golden brown, ranging from bright yellow in the lightest tints to a delf amber in the terra cotta. The design, too, is quite worthy of the coloring, and a view of it must convince the makers of the new brick and building material that their ability to produce new color results has not outrun the ability of the architects to make full and artistic use of their labor.

One of the finest examples down town of the proper use of light brick is to be found in the Postal Telegraph Building, at the corner of Broadway and Murray street, an illustration of which we give herewith. Although it can hardly be seen from the picture of the building, which is one of the loftiest in the city, the general effect of the structure is such that its front is mistaken for stone. Indeed, it is only those interested in the use of building materials who are aware that it is not stone. In fact, it is up to the fifth story, but above that there are nine stories of brick, and it would take an expert to tell at a distance just where the dividing line was.

Some 170,000 gray brick of a medium shade were used in the erection of the building, the architect of which was George Edward Harding, of Harding & Gouch, whose offices are in the structure. In order to get the effect of the big blocks of stone, a stripe is made by a brown brick, which is three-quarters of an inch in thickness, eight and one-quarter inches long and four inches wide. These are laid flush with the wall, and in that way the effect of the use of stone is obtained at a figure materially less than the use of the stone itself for the entire front of the building would have amounted to. The arches are also of brick, and the ornaments are of terra cotta. BRIC-A-BRAC.

THE ILLINOIS CONVENTION.

Programme of the Illinois Clayworkers' Association—Annual Meeting to be Held at Streator, Ill., Jan. 21, 22, 1895.

—Tuesday, Jan. 21, 10:30 a. m.—

Enrollment of members.
Annual address by the President, E. M. Pike, Chenoa, Ill.
Reports of members.

—Second Session, Tuesday, 1:30 p. m.—

Address of welcome, by Hon. Joseph Kopf, Mayor of Streator.
"From Clay Bank to Kiln."—Essay, by W. M. Pratt, Earlville, Ill.
"Paving Brick."—Address, by Thomas Townley, Alexis, Ill.
"Sewer Pipe."—Essay, by James A. Daugherty, Streator, Ill.
"Washing Brick Clays."—By F. Lehman, Chicago.
A poem, by D. O. Loy.
"Most Economical Way of Emptying Kilns and Sorting Wares."—General discussion, led by ——————.

The social feature of the Convention will be a banquet at 8 p. m., Tuesday, under the direction of the brothers of the craft from Streator.

SECOND DAY.

Wednesday forenoon will be given up to a trip to the various clayworking plants in and around Streator, the Association to be escorted by the committee from Streator.

—Third Session, Wednesday, 1:30 p. m.—

"Hollow Brick."—Essay, by Mr. Smith, Sibley, Ill.
"Comparative Value of Side-cut, End-cut and Repressed Brick for Street Paving."—Address, by T. C. Tridell, Streator, Ill.
"The Utility of Drain Tile."—Essay, by P. S. Kempton, Budd, Ill.
"Fads in Clayworking."—Address, by William Beahan, Streator, Ill.
"Whitewashed Brick, and How to Prevent Them."—General discussion, led by ——————.

After reading each paper the subject under consideration will be discussed by the Association.

Report of Treasurer, William Stare, Mendota, Ill.
Miscellaneous business.
Election of officers.
Question box.

Headquarters will be at the Plumb House, where arrangements have been made for special rates to all members.

E. M. PIKE, President, Chenoa, Ill.
G. C. STOLL, Secretary, Grant Park, Ill.

OBITUARY.

James A. Boyd.

JAMES ANGUS BOYD, who has done more than any one man in this country for the development of highgrade building material, died on Sunday, Dec. 29, at his residence, No. 5207 Hibbard avenue, Chicago, after an illness of about four weeks. His death was a great surprise and blow to his many friends, few of whom knew that his illness was of a serious nature.

Mr. Boyd was fifty-nine years of age, having been born Feb. 28, 1836, at Rochester, N. Y. His father was a physician, and his ancestry is traced to the old Knickerbocker stock on the Hudson. At the age of twenty, after going through the public schools, Mr. Boyd left Rochester for Buffalo, where he was employed by Finney & Co., book publishers, in the capacity of confidential clerk and department manager. He remained with this firm until the war broke out, when he responded to Lincoln's second call for troops and became a member of the Forty-ninth Regiment of New York Volunteers. Private Boyd shared the honors of his famous regiment and took part in all its battles, notably the Gettysburg campaign. In 1863 he returned home on a furlough and married Miss Jennie A. Woodbury, of Buffalo. He returned to the front immediately after his marriage, however, and served until the close of the war, when he was mustered out as captain of his company. He is still known among his old friends as Captain Boyd.

J. A BOYD, Deceased.

After the war Mr. Boyd received an appointment from President Grant as revenue assessor at Martinsburg, W. Va., where he remained seven years. He then returned to his native city and started in the real estate business. In the spring of 1873 he came West and located at St. Joseph, Mo., where he became the promoter of the Kennedy dry press brick machine and manager of the company. The works were afterwards removed to Minneapolis, where Mr. Boyd resided five years. From this time on his entire energies were devoted to the development of the dry press process of brick making, in which he had a great and abiding faith, and of which he is practically the creator. It was while at Minneapolis that he invented the Acme dry press brick machine, which created no little stir among manufacturers at the time. It did not satisfy Mr. Boyd, however, who even then had visions of the dry press process as it now exists, and that machine was afterwards abandoned.

In 1886 Mr. Boyd came to Chicago. In 1887 he became associated with Mr. B. C. White, and in the spring of 1888 they brought out the first of the now world famous Boyd brick presses. This machine was the triumph and pride of Mr. Boyd's life, and while numerous changes and improvements have been made in it since, many of the elements, principles and proportions were so perfect that they are embodied unchanged in the machine as built to-day. The first machine is still running regularly and successfully, a thing almost unknown in the history of any radical departure in mechanics or methods. This first machine was a two-mold, but the trade soon demanded an increased capacity, and the three, four and six-mold presses followed each other in rapid succession. In the fall of 1888 a partnership was formed with Mr. S. S. Chisholm under the firm name of Chisholm, Boyd & White. From a small beginning the business grew rapidly to large proportions. In 1890 a five-acre tract of land was purchased at Fifty-seventh and Wallace streets, within the city limits of Chicago and but a short distance from the business center. Here a large and substantial factory was equipped and operated expressly and exclusively for the manufacture of these machines with ever increasing success. When the firm was incorporated as a company in July, 1894, Mr. Boyd became its president, which office he held until his death.

Mr. Boyd's devotion to the dry press process was unceasing and untiring. Since the death of his wife some years ago he has spent most of his time on the road in the interests of his machine and the development of the highest grade of front and building brick. No man in the country was better known among brick makers East and West, North and South. His commanding presence and military carriage, as well as his enthusiasm and devotion to the cause, made him a striking figure at all conventions and gatherings of brick makers. He died in harness, having spent his last few months in the erection of a large plant at Baltimore, to which he gave his personal supervision with the determination, as he said, of making it the model brick plant of the world. So long as a detail remained uncompleted he stuck to his post in spite of repeated urging to take a rest, though even then battling with death; but when the finishing touch was given and the plant completed his overtaxed strength gave way. He managed to reach his home in Chicago, but never left his bed afterwards.

Personally Mr. Boyd was one of those rare natures who make hosts of friends without making an enemy. Throughout his long life no man ever received from him an injustice or an intentional injury. Large-hearted and open-handed, no one came in contact with him without feeling the benefit of his genial personality. He never for a moment lost faith in human nature. Many a wreck he has lifted from the gutter, placed him on his feet, took care of him, found a good position for him and restored him to the world and to his own self-respect a man among men. Mr. Boyd was ever a warm and unchanging friend to his associates, and to his family the most tender husband and father. To his employes he was always the sympathizing friend and adviser, almost a father. None of them can recall an unkind or impatient word from Mr. Boyd, even under the most trying circumstances, and in him they feel they have lost their best and truest friend.

Mr. Boyd leaves one son, Harrison W. Boyd, who holds a responsible position with the company and is also one of its directors. This son and his wife, to whom Mr. Boyd was devotedly attached, were with him at his deathbed. His end was peaceful and painless, and he was laid to rest in Oakwood on the last day of the old year amid the sincere mourning of his many friends and business associates.

Augustus S. Blaffer.

IN THE DEATH of Augustus S. Blaffer, which occurred at his home in New Orleans on the 18th of December, the brickmaking craft loses one of its most ambitious and enthusiastic young members. He was a native of that city, having been born there in 1866. After graduating from college he spent a year or two in Germany to complete his studies, but on his return home decided to continue in the footsteps of his father, and accordingly engaged with him in the brick business, instead of following professional lines.

He was exceptionally bright and of a very happy disposition, and was highly esteemed by the members of the National Brick Manufacturers' Association, of which organization he was elected Recording Secretary at the second meeting in Chicago, in 1887, and subsequently was made Vice President at the eighth annual meeting.

A. S. Blaffer, Deceased.

At home he was an honored member of the leading social organizations, and at the time of his death was Vice President of the Mechanics', Dealers' and Lumbermen's Exchange, the principal commercial organization of New Orleans. He was elected a member of the Louisiana Legislature in 1893, a position which he filled with much credit to himself. At the time of his death he held the rank of major on Governor Foster's staff, and was an active member of the famous battalion of the Washington Artillery. Indeed, his prospects in life were brilliant. Few men at his age have more to live for, and his untimely death will be deeply mourned by countless friends, both abroad and at home. He was not married, but lived with his parents, who have several bright children to help carry their great burden of grief.

Some people are as much afraid of letting their light shine as a stingy man is of burning gas.—Ram's Horn.

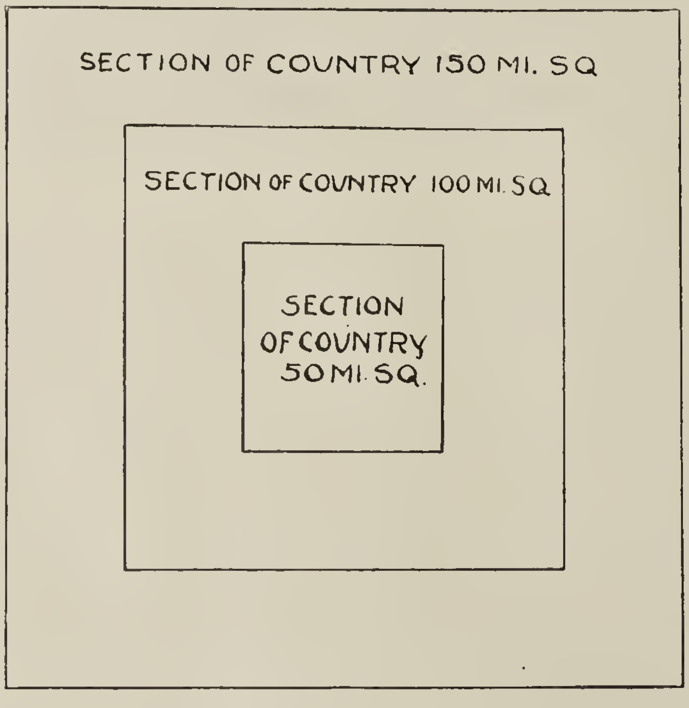
HOW IT ALL HAPPENED.

A TALE OF A NEW ENGLAND BRICK YARD.—Chapter Eighth.

SOMETIMES a good vessel is lost because of poor seamanship—carrying too much sail or too little ballast, and sometimes she may be wrecked by an incompetent captain or drunken pilot; but this was not the case with The Organization—not a bit of it. Ebenezer was captain, and we the pilot, and we knew right well what we were about, "and don't you forget it." It was the confounded piratical brickmakers that lived 'way up in Massachusetts, and Crafts' old gunboats from Connecticut, and Chinese junks from Jersey and the Hudson river and Fisher's island, and every stink-hole on the Atlantic coast from Maine to Florida, that loaded their guns with every kind of brick under the sun, and one day, without warrant or permission, they lit into the good ship Organization and sunk her, with all on board but Ebenezer and ourselves, into Narragansett bay in less time than greased lightning will slide down a Georgia nigger.

How did it all happen? Well, just go and ask Ebenezer, and he can tell you all about it in three minutes—that is, he can unless he is angry when you find him, for when he is angry he stutters, and when he stutters you could not get it out of him in three hours, unless you were good at reading signs.

Ebenezer and our experience in the line of a combination in the brick business has, however, led us to some conclusions, which we have decided to lay in squares, about as follows:


SECTION OF COUNTRY 150 MI. SQ
SECTION OF COUNTRY 100 MI. SQ
SECTION OF COUNTRY 50 MI. SQ.

The Combination Square Ebenezer and We Formed.

The above cut represents about how we and the general run of brick combinations find the lay of their land. Let the inner lines represent a section of country fifty miles square, the middle lines a section one hundred miles square, and the outer lines a section of one hundred and fifty miles square. Let us now figure from the basis that in the first square of fifty miles there are five manufacturers of brick. In the second square, or section of country one hundred miles square, that there are twenty manufacturers, and in the outer section of one hundred and fifty miles square there are forty-five brickmakers, and that before any combination is formed brick are bringing six dollars per thousand with each manufacturer, and at any point in either of the square sections of country. In the matter of freight rates, let us take it for granted that in the fifty-mile square the charges are sixty cents per thousand brick from any one to any other point; that from any place in the second square to any place in the inner one the freight is one dollar per thousand, and from any locality in the outer square to any point in the inner one the freight charges are one dollar and twenty-five cents per thousand. If a combination be now formed and prices raised fifty cents per thousand, the general equillibrium of the brick business will be upset to about the following extent:

Ebenezer angry.

The excess freight of forty cents per thousand against the twenty manufacturers has now been entirely raised, and they can get ten cents per thousand more for their brick in the markets from which they were formerly barred than they can in their own territory. The excess freight of sixty-five cents against the forty-five manufacturers in the outer square is now but fifteen cents, and they are enabled to use the territory of the inner square as a dumping ground for their surplus stock, if for no other purpose.

A little figuring in arithmetical progression will now show us that if the five brickmakers in the inside square could fill the legitimate demands at an ordinary profit, it will be immediately seen that on their forming a combination and raising the prices above those of the ordinary level of supply and demand, it immediately opened their market for the whole twenty manufacturers in the second square, or four times as many as their whole trade demanded, and besides that, tempted the surplus product of the forty-five manufacturers in the outer square.

Now, then, the first question is, Would the general conditions of a given section of country, as set forth, be true or false, and if false, in what particular? Our belief is that it is only false in so far as the proportion of brickmakers might vary in the three squares, or the ratio of freight be found in given sections to be different. What other results might therefore be expected in the ordinary combination of brickmakers than those which led to the sinking of the good ship chartered by Ebenezer and ourselves?

The cause of the cyclone, we believe, is generally thought to be a rushing of the wind to fill the vacuum from which rarified air has ascended. In like manner, when the price of brick is artificially and abnormally elevated in a given locality, it will cause a trade cyclone to sweep into that vacuum in short notice, and the fellows that get up the combination will have to hunt their "cyclone hole" on a double-quick march.

Finally, is there then no plan whereby an organization could be effected where the ordinary conditions and circumstances exist? Also, is there any locality where circumstances and conditions exist in which a permanent organization can be secured? Answering the last question first, we will say it would seem possible to form such a combination in a given section of country only where naturally protected by freight rates, or where all available clay was in the hands of the parties combining. Where the clay lands are abundant, and especially those in the hands of parties not in the business, there is certain to spring up plenty of new brickyards as soon as an organization has been formed which will show a good profit in the business. As regards the forming of a combination in a locality where ordinary conditions exist, we will give our idea of the matter in a second illustration of squares, and if it proves indigestible after you have taken it in, you can exercise your privilege and take an emetic or physic to suit yourself:

50,SQ MI.	50,SQ.MI.	50,SQ.MI.	50,SQ. MI.
50,SQ MI.	50,SQ. MI	50,SQ.MI	50,SQ.MI.
50,SQ. MI.	50,SQ MI	50,SQ. MI	50,SQ.MI.
50,SQ.MI.	50,SQ. MI.	50, SQ. MI.	50,SQ. MI.

The Possibly Practical Combination Square.

We therefore draw a second series of squares as above, and in explanation let each section again represent a territory of fifty miles, but instead of stopping upon a limit, let the entire country be apportioned off, and an organization be effected in each section and prices fixed after consultation with the organization contiguous to it. More than fifty miles square can be embraced in any given organization if found advantageous, but when once the limit has been fixed, then let each combination make sales only in its own territory, and never enter that of another.

Under this plan of uniformly and simultaneously increasing prices the question of freight rates would no longer be a disturbing factor, and as all sections would obtain increased prices, the main incentive to breaking out of the fold would be removed.

Do you tell me that such an undertaking is so big that it will have to rest for a generation or so? Well, perhaps it is; but one thing is certain, and that is that just so long as only a local organization is built up here and there about the country and subject to all outside competition, just so long every separate organization will run a pirate on the high seas of brickmaking, and so also will every separate ship sooner or later receive the fate of the one owned and manned by Ebenezer and ourselves, and soon be sent to "Davy Jones's locker." It may be thought that in this rather lengthy airing of personal opinion in regard to the question of trade organization we have lost sight of our partner, Ebenezer, or he of us, but that would be a good deal of a mistake.

Short-term partnership which results in profit to those interested generally leads to lasting friendship, but if the ship sinks each is apt to swim for his own shore, and not cross back very soon to see how the other is prospering.

Realizing this trait in human nature, and also that Ebenezer was not one under the circumstances to seek our presence very quickly, we concluded, with the prophet of old, that "If the mountain would not come to Mohamet, then Mohamet must go to the mountain," and so one day, the water being pretty low in the swamp, we thought we would take an outing and just foot it across to Ebenezer's yard, instead of taking the long drive of a couple of miles. Before reaching Ebenezer's, however, we realized the truth of the old adage that "The longest way around is often the shortest way across;" but then we had our outing all right—that is, we were out one boot we left in a bog hole. But having one boot more or less makes little difference around the brickyard.

On reaching Ebenezer's office we were lucky enough to find him within and apparently enjoying good digestion. We have heard lots of people say that they would rather be happy than rich, but blamed if we would not rather have a healthy stomach than either.

It is an easy thing to part company with your money if you wish to, and happiness is only another way of expressing that you are feeling well; but who ever felt well with a load in his stomach from which he would gladly part company if he only could?

(The labor question next.)

"Count that well spent that brings content,"
And folks are realizing
That profits true must needs accrue
From careful advertising.
—Fame.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS.

Number Forty-one.

THE CUP AND CONE—sometimes called the "bell and hopper"—arrangement for feeding the blast furnace needs no description from my pen. I think I may, however, say it is not only a convenient feeding device, but a very efficient portable crown or close top for retaining the heat and gases generated in the furnace. About on a level with the under side of the cup and cone there is an opening, or openings—sometimes one and sometimes two—through the side of the furnace for the escape of the gases. These are conducted down from this part of the furnace to an underground gas flue by a large iron tube lined with fire brick, and called the "down-take." The gas flue leads the gas to the hot-blast stove and the steam boilers for consumption there.

Formerly, these gases and heat were wasted at the top of the furnace, which was open, allowing the gases to blaze away into the air, lighting up the neighborhood all around at night for a considerable distance, just as the open-topped kiln allows its unused heat to escape to-day. While the open-topped kiln ought not to allow the escape of unconsumed gases, it was a necessary condition of the open-topped furnaces; hence there was a great waste in fuel.

The blast nozzles or twyers, as I have before intimated, are placed equidistant round the lower part of the furnace, and the blast is supplied by a large engine specially constructed for that purpose, furnishing an air blast of six to ten pounds per square inch. This blast, impinging on the highly heated fuel in the furnace, keeps it at a dazzling white heat, and consequently generates an abundance of carbonic acid, which forces its way, with the assistance of the blast pressure, through the materials—coke, ore and limestone—in the furnace, which, I may state, is kept full within a few feet of the top. The hottest part is, of course, at the twyers, or maybe a little above. From this up the heat gradually diminishes, until within about 20 feet of the top the materials are at a dull red heat, the height of the furnace being 80 to 90 feet. The blast, which was changed at the twyers from ordinary atmospheric air to nitrogen and carbonic acid, undergoes other changes in passing up through this hot material, the fuel converting the carbonic acid into carbonic oxide, while the limestone furnishes more carbonic acid to the mixture. It finally reaches the top a composition of about 56 per cent. nitrogen, 8 per cent. carbonic acid, 26 carbonic oxide, hydrogen and marsh gas 10 per cent. This is an analysis of the gases taken from a furnace with which I was very familiar. The high percentage of hydrogen may be accounted for when I state that the fuel used was bituminous coal. The gases taken from another furnace using coke for fuel gave 57 nitrogen, 11.5 carbonic acid, 28.5 carbonic oxide, 2.5 hydrogen.

It will be seen that more than half the gas is nitrogen, which is introduced with the blast and passes through the furnace unchanged, and, for anything we know, without influence in the process of reduction.

The collection and utilization of these waste gases was a long step in the economy of iron production, as was also the introduction of the "hot blast." This latter takes precedence in the matter of dates, and such a thing as "cold-blast" pig iron is now almost a thing of the past—in fact, I am not aware of the existence of such a thing as a cold-blast furnace in this country, or of one any nearer than Sweden.

The furnaces of half a century ago were small in all their dimensions except the outside, which were very ponderous and generally square in horizontal section, and pyramidal vertically, about 45 feet high, with a bosh or widest part of crucible from 9 to 12 feet in diameter. The lining was of fire brick, with an immense backing of stone masonry for the necessary retaining strength; hence the bulky outer dimensions.

The modern furnace is about double the height of its ancestor and more than double its interior dimensions. The low furnaces were very wasteful of heat, besides the gases which they burnt to waste. In the higher furnaces this heat is absorbed by the raw material fed into the furnace, and it is thus gradually heated and prepared for the reducing part of the furnace below. It was assumed that the higher the furnace the greater the saving of this waste heat, and this was partly correct; but an obstacle from another quarter put in an appearance. The material—ore, coke and limestone—gave way under the crushing strain from the materials above and began to pulverize. This set a limit on the height of the furnace, which in one instance rose to 105 feet, but was subsequently reduced to 90 feet. Here again there is some analogy to the brick kiln, which also has its limit to the height of setting, for similar reasons, too.

You will easily understand now why so powerful a blast is used, if you consider the resistance it has to overcome in rising through such a mass and column of materials, some of it in a molten state, some of it in a semi-molten or pasty condition, some of it spongy, etc., and all of it packed pretty close by the superincumbent weight.

The charges are all weighed before being put into the furnace. The proportions are determined by the manager according to the quality of pig iron he desires to produce. This proportioning is called "burdening," the meaning of which is the amount of fuel that will "carry" a certain charge of ore and flux down to a desired quality of pig iron. When the proportion of fuel is high the furnace is said to be running on a light burden, and when the proportion of fuel is low "she" is said to be on a heavy burden. So really the burden is on the fuel, not on the furnace.

WASTE GASES.—I said above the waste gases were conveyed in underground flues to the boilers and hot-blast stoves. Their consumption under the boilers is simple enough; a shovelful or two of live coals is spread on the grate and ignites the gas as soon as it flows over them, there being a sufficient supply of air provided to keep it burning. If for any reason the gas is poor or insufficient in quantity, the stoker fires on some coal. A similar arrangement supplies the hot-blast stoves. The modern stoves are simply enormous regenerative chambers filled with fire brick set very loosely—that is, with good and free passages for the blast. A well-equipped furnace will have three of these stoves, which are more like a tall, round brick kiln than the furnace in my comparison above, inasmuch as the walls and crown are very similar, and, being filled with fire brick, they are like a full kiln of burnt brick. These are about the same diameter externally as the furnace, and the same height, too, or nearly so. They are worked on, and are neither more nor less in principle than Siemens's regenerative chambers, although some are known as Cowper's, some Whitwell's and some Siemens's. Until Siemens brought out his regenerative furnace hot-blast stoves were constructed with cast iron pipes of various forms and patterns; these were heated and the blast passed through them. The limited heat these would endure and the comparatively short circuit of the blast, restricted its (the blast's) temperature to 600 or 700 degrees F., while with the modern fire brick stove double that temperature is attained and maintained.

The passing of the products of combustion from the boilers and hot-blast stoves to the smokestack completes the circuit of the blast from the twyers to their final destination, so far as the blast furnace is concerned; so now we can account for all that went into the furnace both at the top and bottom. The fuel is the heat-producing and reducing agent, but without blast there would be no heat, so it will be necessary to include the blast with the fuel for this purpose. When these have done duty in the furnace they have not been deprived of all their heating power, so are taken to the boilers and stoves to surrender that which the furnace did not require. A small portion of the fuel is absorbed by the reduced metal, for we find the pig iron contains about 3 per cent. of carbon. With this small exception, the blast and fuel are finally discharged into the atmosphere as nitrogen, carbonic acid and steam. The iron ore gives up its oxygen, which finally goes with the waste gases, while the iron in its metallic state is run out on the pig bed. The foreign matter accompanying the ore, the ashes of the fuel and the lime finally descend in one body and run out of the furnace as slag. This completes the operation. Everything that goes into the furnace comes out again and is accounted for, and it will be noticed that everything that went in—except the nitrogen—is changed.

IRON ORES.—Before proceeding to the conversion of cast or pig iron into wrought iron, it may be advisable to examine very briefly a few of the numerous ores of iron. The term "ore" is rather indefinite, for it may be an oxide, a sulphide, chloride, silicate, carbonate, etc., but the most available for iron making are the oxides and the carbonates. These are the most abundant and easily reduced ores. Magnetic iron ore, or magnetite, having the composition of Fe_3O_4, contains, when pure, 72.41 per cent. of iron, and is the richest ore available for smelting. By smelting, something more than mere melting is to be understood. Melting is simply reducing to the liquid state, while smelting is reducing to the metallic state and liquid state, too. The famous Dannemora iron is made from this ore. The smelting is accomplished with charcoal as fuel. The bar iron, or wrought iron bars made from this cast iron, is, or was, used in Sheffield, England, in the manufacture of the best crucible cast steel.

RED HAEMATITE.—This is the next richest oxide, and in its pure state contains 70 per cent. of iron. Its formula is Fe_2O_3. It is that unctious red ore that is used for "fix" in the puddling furnace, and so familiar to ironworkers. It gives a red polish to the clothes and hands that become smeared with it, similar to stove polish. It is highly probable that the red brick is permeated with this ore, or at any rate with ore of this composition. I do not say the clay has it, but the red brick is permeated with this ore, or at any rate with ore of this composition. I do not say the clay has it, but the burnt brick. This and similar ores are used in the blast furnace for the production of "Bessemer pig," from which is made Bessemer steel; also a steel known as "open-hearth steel," almost identical with Bessemer steel. There are extensive deposits in this country; also in Canada, in Lancashire and Cumberland, England, Sweden and Norway. The ore described above is not the only red haematite; it occurs in different forms, and varies in color from a bluish gray to a deep red, and from soft to hard and compact masses; but in whatever form or color it is found, it invariably produces a red streak when rubbed on something hard. Malleable castings are made preferably from haematite pig iron, and its conversion is effected with powdered ore. Of this more anon.

BROWN HAEMATITE is a hydrated oxide with the same composition as red haematite, but with water in its combination, as will be seen by its formula, $2Fe_2O_3, 3H_2O$; that is, two molecules of iron oxide and three molecules of water. This varies in form from soft ochre to hard, compact masses, and in color from blackish, down through the browns to yellow or brownish yellow, and invariably gives a yellowish-brown streak. It contains, in its pure state, about 60 per cent. of iron and about 14.5 per cent. of combined water, but its percentage of iron, as usually found, is considerably reduced by earthy impurities and a variable percentage of manganese.

It is not difficult to conceive of clay being intimately mixed up with a small percentage of brown haematite, and such clay burning to a red brick. WILLIAM WAPLINGTON.

Written for the CLAY-WORKER.

TERRA COTTA IN ARCHITECTURE.—Eighth Paper.

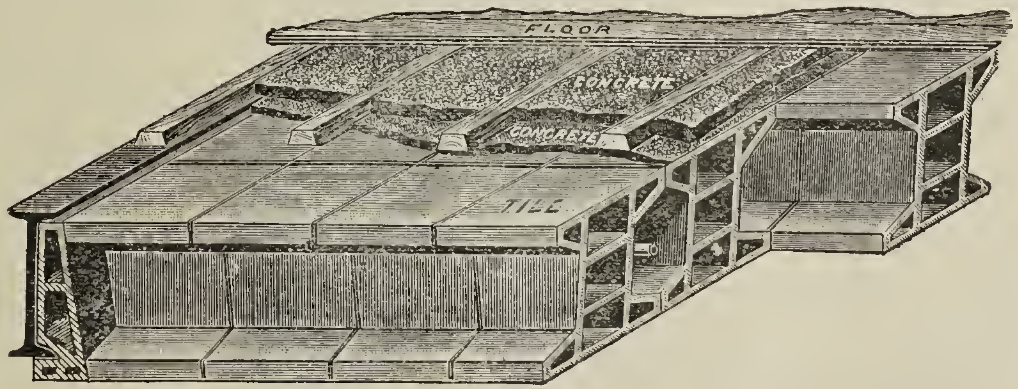
—Fireproofing.—

THE GENIUS of American progress never turns backward, but constantly evolves new and better things, leaving the old to be relegated to the shadows of obscurity. The wise man investigates and proves all things, welcoming whatever is good, and rejecting nothing on account of its mere newness, thus helping onward and upward the march of civilization and humanity, while securing for himself the benefit of each fresh advance.

The genius of American progress never turns backward, but constantly evolves new and better things, leaving the old to be relegated to the shadows of obscurity. The wise man investigates and proves all things, welcoming whatever is good, and rejecting nothing on account of its mere newness, thus helping onward and upward the march of civilization and humanity, while securing for himself the benefit of each fresh advance.

When terra cotta fireproofing was first introduced many architects and builders scoffed at the idea, because such a thing had never been heard of before, and declared that it would never come into practical use, but to no purpose, as time and experience have proved that no building is strictly fireproof unless its floors, ceilings and partitions are composed of this material, its ironwork, such as beams, trusses, columns, etc., are enclosed within it, and its chimney flues lined with it.

For floors and ceilings flat arches made of hollow brick are probably the most generally used. The brick for these arches are made of hard-burned fire clay and terra cotta material, hollow, of equal vertical thickness, and laid in place in cement mortar to break joints alternately. The number of brick to form an arch will vary according to size or distance between the iron beams in which they are to be laid. The two outer bricks are called "skewbacks," and are laid with a shoulder so formed as to fit the flange of the beam and drop about three-quarters of an inch below its soffit, to allow for an extra thickness of plaster as a protection to the under side of the beam (except when the "skewbacks" are so constructed as to meet on the under side of the beam). The center brick is the key, and the intermediate bricks are so placed that the whole mass, when laid, will form a self-supporting flat arch. All the brick are grooved or "dove-tailed" before being burned, in order to afford a rough surface for plastering, which is applied directly to the bottom of the arch. The mode of setting these bricks is as follows: A flat center made of two-inch planking, being supported on 4x4 joists, which are hung to the iron beams by means of hooks hanging below the bottom flange of the beams at a proper level. After the arch is formed, giving sufficient time for the mortar to set, the center can be let down and removed to other places for further use.

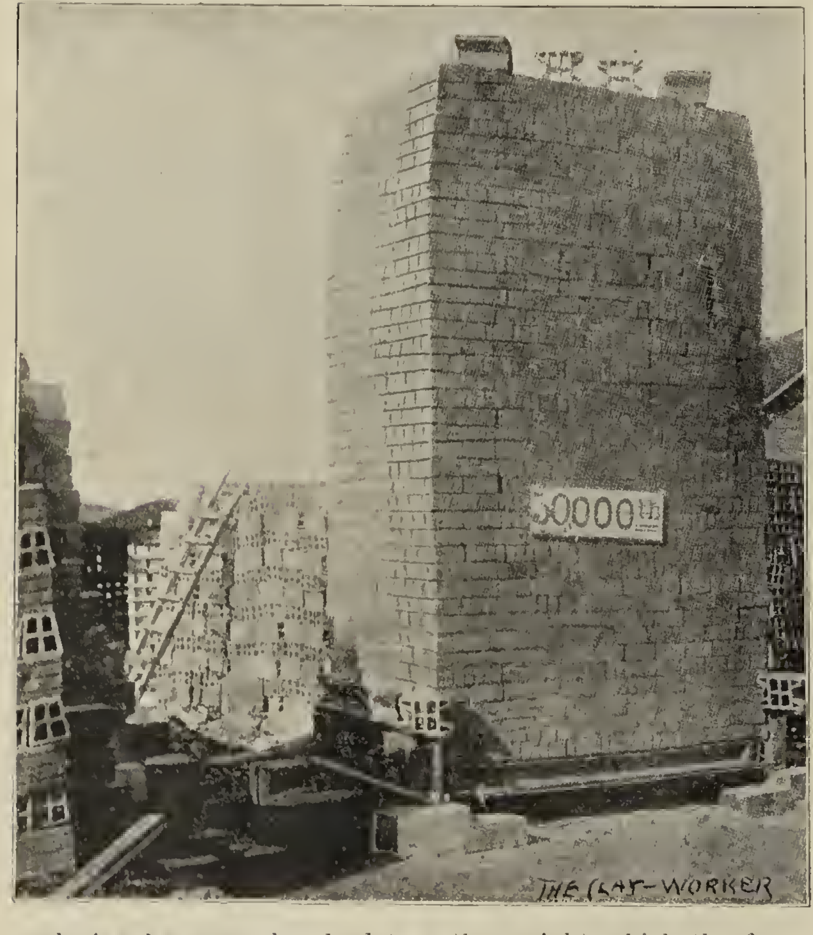


ISOMETRICAL VIEW.

Among some of the numerous and also great advantages possessed by this method, the following can be mentioned: A level ceiling and a floor above, dispensing with the necessity for furring or lathing, also with the heavy concrete filling always necessary on top of the solid brick or corrugated iron arches. A saving in weight of floor of 60 per cent., which admits of a great reduction in the weight of the iron beams and girders, thickness of the side walls, foundations, etc. A saving in the thickness of the floors. Work can be laid in any season of the year. Great saving in the cost and time, as the work is dry almost as soon as laid. Strength and elasticity to resist sudden impact. Rat and vermin proof. Freedom from unsightly cracks observed in floors constructed of materials affected by changes of temperature, causing expansion and contraction, thus destroying the plastering.

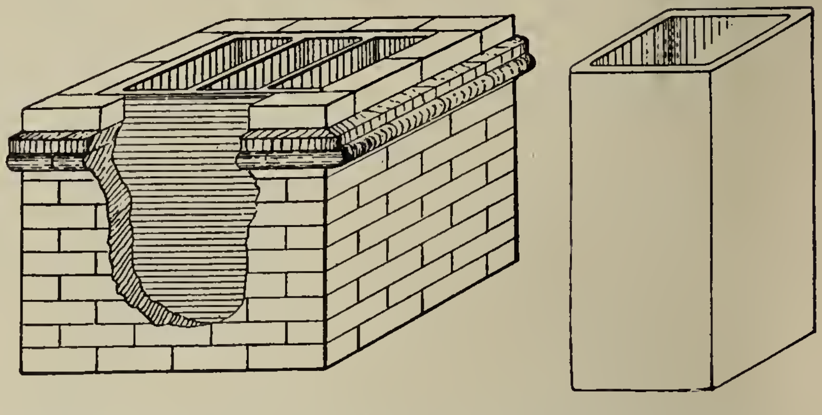
A room constructed of above-mentioned arches and partitions, providing all ironwork is protected, is entirely fireproof, and should a fire break out therein it could be confined there, not being able to spread either above or below or on the sides, as this material, in course of manufacture, has been subjected to more fire than it could possibly receive in a conflagration.

The "skewback" mentioned above, which protects the under side of the beams, is preferable, as it not only protects the beams, but also the plastering, keeping the latter from rust stains which sometimes appear when beams are not protected in this manner. A form of arch somewhat different in construction from the above is shown in the illustration, and is called the "end construction flat arch," which has received the indorsement of leading architects and builders. This system is claimed to be 25 per cent. lighter and stronger than the old style flat arch with the hollow spaces running parallel with the iron beams. Besides lightness and strength, there is a large saving in the constructive ironwork, as the distance between the iron beams can be increased. The blocks are so made that they can be adapted to any span up to ten feet, according to the depth of the block used, thereby reducing by many hundred tons the weight which the foundations have been obliged to carry under the old method.



The setting or constructing of this arch is the same as the "old style" arch, with the exception that the blocks run across between beams, endways, instead of with beams. It can be erected as cheaply, however, as arches of the older pattern.

A test of this arch was made a year or so ago at the works of Henry Maurer & Son, near Perth Amboy, N. J., a photograph of which is given herewith. This arch carried the enormous weight of 50,000 pounds, the span being 8 inches deep, 8 feet wide and 5 feet in length—equal to 40 square feet of surface.



The construction of fireproof partitions made of hollow burnt clay and porous terra cotta blocks have many invaluable advantages other than their fireproof qualities. They have the greatest degree of strength combined with lightness, are entirely vermin proof, and do not transmit cold or heat. Being hollow, all sound is deadened, and are absolutely free from dampness. A partition built of these blocks is self-supporting and perfectly secure against fire. The plaster is applied the same as on the ceilings, directly to the brick, the same being grooved to give the plaster a firm hold. Wherever it is necessary to drive a nail for the securing of base-boards or wainscoting, the porous terra cotta blocks are used.

Porous terra cotta is a mixture of clay and sawdust, or any other combustible matter can be substituted in place of sawdust, such as shavings, tan bark, charcoal, etc. After the compound is properly mixed, the brick or tiles are molded, and when sufficiently dry are placed in a kiln prepared for the purpose and subjected to an intense heat, adequate to consume all the combustible mixture, leaving the brick porous, and at the same time reducing the weight materially, the fireproof qualities remaining intact. This material is utilized in many ways, as it readily admits driving of nails, and, being of a tenacious quality, holds equally as fast as if driven in wood. For arches, partitions, furring, column covering, roof and ceiling tiles, etc., it is particularly adapted. A partition made of this material in blocks 2 inches thick, and held together by galvanized iron clamps, is now used considerably. No support in the shape of ironwork is required, neither is it necessary to use mortar. The blocks can be laid by either carpenter or mason.

Hollow brick, the same size as common brick, are much used to form the inside face of the outside or bearing walls, thereby taking the place of furring, either of fireproof material or lathing, without increasing the thickness of the wall itself. They are grooved and roughened to receive the plaster directly, the hollow places preventing the moisture from passing through. The actual cost by using these brick is increased only by the difference in price between common and hollow brick, which is very little, and saves the cost of furring and lath, to say nothing of space and time.

The destruction of iron beams or columns by fire has caused great losses, and their demolition during conflagrations in buildings supposed to be fireproof, and in which incombustible materials of construction have been used, has shown the necessity of devising some feasible means of protecting them from intense heat under all circumstances. These disastrous effects have been intensified by the sudden throwing of cold water on the heated beams or columns, causing them to buckle or break by contraction on the side upon which the water is thrown, and consequently to collapse, taking away all support or forcing outside walls to bulge and fall. The recent destruction of the Manhattan Bank Building, on Broadway, New York, is a good example of this state of affairs. In order to guard against such an occurrence it is necessary that they should be thoroughly protected, which is done by using hard-burnt clay and porous terra cotta, designed in various sizes and shapes to meet all requirements.

The cause of many fires, and certainly the cause of much anxiety by nervous landlords, is defective chimney flues. The efficiency of fire clay flue linings has been thoroughly tested and approved, and are now recommended by leading architects and builders as a necessity for the proper protection of buildings against fire. Insurance companies give better rates on buildings constructed with them. They are superior to metal as conductors of hot air, and will carry the heat with less loss by radiation, are safer, being made of non-conducting material, and will not transmit the heat to wood coming in contact with them, are cheaper and more durable. They are used for chimney linings, partitions in chimneys, for conducting hot and cold air, for ventilation, etc.

Written for the CLAY-WORKER.

WHY DO BRICK STACKS VIBRATE?

BY D. W. STOOKEY.

THE ARTICLE in the June Clay-Worker entitled "Do Brick Stacks Vibrate?" suggests some new ideas—new to me, at least—upon the vibration of brick smokestacks. The statement has often been made that they do vibrate, and it has been accepted as a fact by many that they really do swing backwards and forwards like an inverted pendulum, with the base as a fixed center of oscillation. The casual observer who may have noticed the tall, massive column of brick and mortar swaying from side to side would naturally attribute the motion to the action of the wind, and doubtless the conclusion, in some instances, would be well taken.

—Is Brickwork Elastic?—

In order that a brick stack may vibrate, it must either be elastic and bend and spring back again, or it must rock upon its foundation. A careful examination of the bases and a thoughtful consideration of the facts and conditions involved will, I think, dispose of the idea that they rigidly rock upon their foundations. Accepting the conditions stated so far, we are led to one of two conclusions: Either brick stacks do not vibrate, or they are elastic and bend and return to their original positions like bent springs. "From my youth up" I have had the idea that masonry was solid, substantial, rigid, and probably the masses of American boys have the same notion. With others, I have had to unlearn many things that I learned when young, and maybe this is only another instance in which recent investigation shows that ancient opinions were erroneous.

It has never been my privilege to know of any careful observations having been made with instruments upon tall brick stacks to determine the amount and direction of their vibration, and for the present I want to assume the position that I do not know whether they do or do not vibrate. Granting that they do, I have some interesting ideas to present as to why they vibrate, and in what directions they swing. For the sake of simplicity we will assume that they are round and of uniform section. If the wind sways them as it does a tree, they will swing backwards and forwards in vertical planes standing in the direction of the wind. The amount of vibration, or the arc through which the apex vibrates, will vary with the intensity of the wind, a strong wind bending them more than a light one, just as it does the trees. If they are rigid and rock upon their foundations, their axes will remain straight lines, but will swing to angular positions first on one side of the perpendicular and then to the other. If they are elastic, and bend in vibrating, their axes will curve first to one side of the perpendicular, and then, returning, pass to the other side in a similar curve, the base remaining stationary as a fixed center of vibration.

—Not Caused by the Wind.—

The article referred to denies that the wind is the cause of the swaying of the big Yerkes smokestack, and suggests a theory to my mind that I will introduce, after making a few quotations by way of introduction.

The man with the corncob pipe says it is "not a bit rigid. * * * At the top of that stack the sway is more than two feet, day or night—all the time. * * * They've got to sway to be healthy. * * * A rigid smokestack is sure to crack and fall. Never knew it to fail, but one that sways will stand almost forever." When asked "What's the cause of the sway?" he replied: "Now, I'll be hanged if I know, but it isn't the wind, for I've felt 'em sway when there was no more wind going than you could find in a cocoanut. They just sway all the time east and west—that is, if they are healthy."

The man with the corncob pipe evidently believes that brick smokestacks sway, and that they are elastic, and "not a bit rigid." He says that the wind is not the cause of the swaying, but that they "sway all the time." The statement that they sway "all the time east and west" suggests my theory that the vibration is caused by the rotation of the earth upon its axis from west to east. Points in or on the earth farther from the axis revolve in larger circles than points nearer, and hence must travel faster in order to complete the circuit in twenty-four hours. That is, the top of a smokestack or tower must travel faster than the bottom.

One proof of the revolution of the earth is based upon this fact. A plumb line is drawn from the top to the bottom of a high tower or deep mine. After two points have been established, one directly above the other, a weight is dropped from the upper point. The weight strikes the bottom east of the point at the bottom of the plumb line, because it is moving east with the velocity of the upper point from whence it started. Now, to apply the principle to the smokestack. The top must acquire its motion from the bottom through the column. The bottom has no power to impart a greater velocity than its own, and cannot give to the top the velocity that it should have in its greater circle farther from the center of rotation unless the column is rigid—but we are accepting the belief that they are elastic. Being elastic, the top will lag behind until it reaches a point where the combined energies of the motion of the base and the elasticity of the column impart to it the velocity of its circle of rotation. At this instant its velocity is just enough to keep it in its position behind the perpendicular, but the elastic force of the column, acting to urge it forward or towards the east, increases its velocity, and it travels faster and faster until it reaches the perpendicular. It now is traveling towards the east with a velocity greater than that of the circle in which it moves. The momentum at the perpendicular carries it on past the vertical, and bends the column towards the east until the extra force is consumed in bending the column. The top again, for an instant, has the speed of its circle. Now the elasticity pulls it backward, and reduces its velocity towards the east until it reaches the perpendicular, when for an infinitesimally small time its eastern velocity is the slowest of any time during a vibration. The momentum carries it backwards again until the extreme western point is reached, when it starts through another vibration.

The amount of vibration, according to this theory, would hardly be perceptible in ordinary smokestacks, and when we remember that the radius of the earth is about four thousand miles, it shows that probably the ideas of the man with the corncob pipe were a little smoky when he stated that the top of the big Chicago smokestack, which is two hundred and fifteen feet high, sways more than two feet. The exaggerated amount may possibly be accounted for by the excessive wind for which that city is noted.

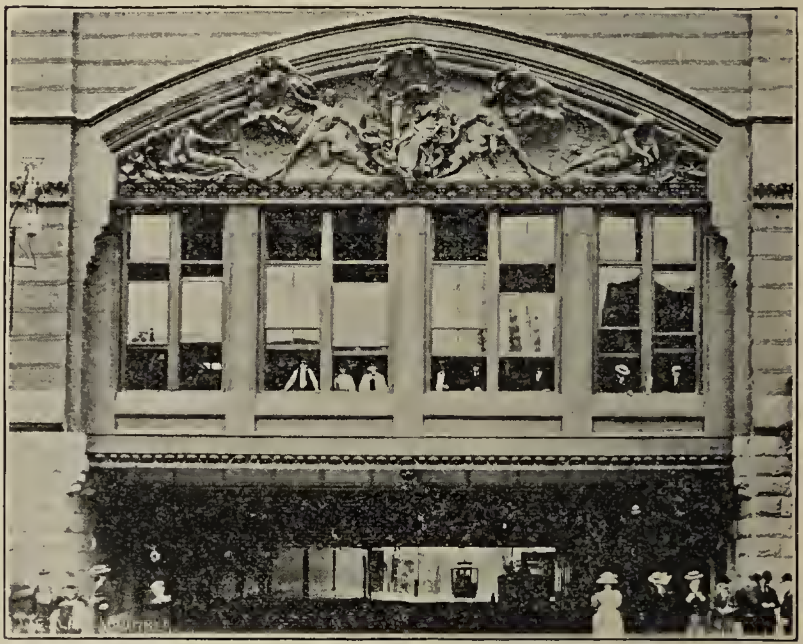
TERRA COTTA WORK IN PHILADELPHIA

THE CLAY and terra cotta workers of this city are reaping the benefits of last year's phenomenal building boom, which up to this present has already caused an expenditure of $21,000,000. Terra cotta enters as largely into the specifications of architects to-day as almost any other material, and scarce bears an affinity to the infantile manner which characterized its use six or seven years ago. Orders to-day for 80,000 square feet of terra cotta flooring or hollow brick are common. The Mutual Fidelity building, on North Broad street, will absorb 10,000 square feet of terra cotta exterior moldings and belt courses.

The terminal of the Pennsylvania railroad, at Broad and Market streets, bears upon its exterior and interior walls some of the finest panels in the city. On entering the station do not take the elevator, but walk slowly up the main stairway, and directly facing you will be seen a panel 12 feet by 40 feet, set up in "staff"—that is, in plaster, with a fibrous backing to lend strength and prevent a possibility of its breaking away. This has been ivorized or tinted in fine half cream shades. The work is that of Karl Bitter, that dashing young Austrian, who, preferring not to be a soldier by force, made his way to this country, resolving to carry out his life's desires—modeling, molding—rather than be molded. He it is who was identified with the eight fine groups of 32 feet each erected at the Administration Building of the Chicago World's Fair, symbolizing air, water, fire, the earth, water controlled and uncontrolled, and two others at present slipping my memory; also the $100,000 gate which was designed by him for the Astors, of New York, and placed in Trinity Church, Broadway. Thirty-four years of age only, but one of those hard, sincere workers that call on their mental, physical and nerve forces to prove to the world's satisfaction the wholesale power of one individual and one who preferred a life of self-dependence in preference to the pardon offered by proud Austria.*

The panel alluded to before I started rambling to tell you something of the man who designed and executed it, is termed "Transportation and the Progress of Transportation." The theme is accentuated in the graceful figure of a woman poised well up in the center of a float, dainty boat-shaped, with the canopy and drapings of the days of romance, drawn by four prancing steeds, guided by a young girl in modern costume, symbolizing America. The center figure extends both hands, the left to the East, represented in the background by the figure of an aged Syrian, and a vivacious-looking Japanese maiden to the right, the North and South in the foreground are cleverly depicted by the youth in Puritan garb supporting the well-clothed figure of a Southern maiden, in whose wake is seen a good type of the Spanish woman bearing the typical platter of fruits and flowers. Following immediately after is seen the figure of a Spanish cavalier astride a charger, full face, bearing in his arms a model of the Santa Maria, the supposed first transport to this country. The West is represented bringing up the rear with the team of oxen drawing the emigrant wagon, led by one of the early pioneers. The head of the procession embodies a group of children, one bearing a model of a locomotive, another a steamship, and the third typifying our present desires by showing the model of an airship, all guarded over by the watchful eye of a dignified matron—Education. Regarding this elaborate conception in all its delicacy of detail and execution, the resolve came to me to go deeper in the work of clay to see in the embryo stages the development of the earth's grandest product. Armed with a courteous permit from the offices of Stephens, Armstrong & Conkling, I made my way to the plant, situate at Forty-sixth and Girard avenue, where, under the guidance of J. Howard Moore, the genial Superintendent of the works, the writer was soon introduced to the modeling shop and to Prof. H. Plasschaert, of the University of Pennsylvania and the Philadelphia Industrial School of Arts, who, with his nine assistants, were working the black clay into diversified forms of Cupids, capitals, chains, wreaths and columns, but ready in an instant to place their services at the disposal of a representative of the Clay-Worker.

The mixing room, with its atmosphere of cold, damp clay, is a charming reminder of an autumn day. Here the common grade of clays are mixed to conform to requirements, and comprise South Amboy, Woodbridge, New Jersey and Philadelphia clays, all brought into such close relationship as to defy to the closest observer the exact component parts. The architect's drawings, or the design, is then placed in a good position, and the model is worked up in these clays. From the hands of the modeler it then is taken to the drying room, which is made usually on the second floor of the building, since the generation of heat from the up-draft of the kiln, sustained by a steam pipe extending round the entire floor, serves to make it an all-important factor during the gray days. After a period of two to three days the model, thoroughly dry and hard, is transferred to the "staff" or pressing room, where the casts in plaster are set up and the impressions made.



PANEL OVER 15TH STREET AND FACING MARKET STREET, PENNSYLVANIA RAILROAD DEPOT, Philadelphia.

The next important move is to start (slowly) the fires in the muffle kilns. In this plant there are no less than seven—four inside and three out in the grounds, all up-draft kilns, measuring 18 feet in diameter. Gradually the heating process extends, and into the kilns, on fire slab sections, the various pieces are carefully stacked. These are always made in excess of the design, to admit of the shrinkage, which in terra cotta is one inch to the foot. Every precaution having been made to secure the pieces from slipping or colliding, the next affair of importance is to close up the mouth of the kiln with heavy batches of fire clay, and the process of "firing up" is continued until about the third day, when 2800 degrees Fahrenheit is obtained. (Where is hades now?) Testing is an operation performed by inserting the rod into the peep holes extending from the outside of the kiln, for the purpose of extracting small sections of terra cotta that serve as samples to show the various degrees of baking, and also as a signal when to "draw fires." After "slacking off," the kiln is allowed to cool gradually for two or three days, when, being in the approachable stage, the mouth is broken open and the debris of fire clay cleared away—and the contents pass through three stages, i. e., white heat, then very dark, and gradually lighting up as the cool air dominates the whole.

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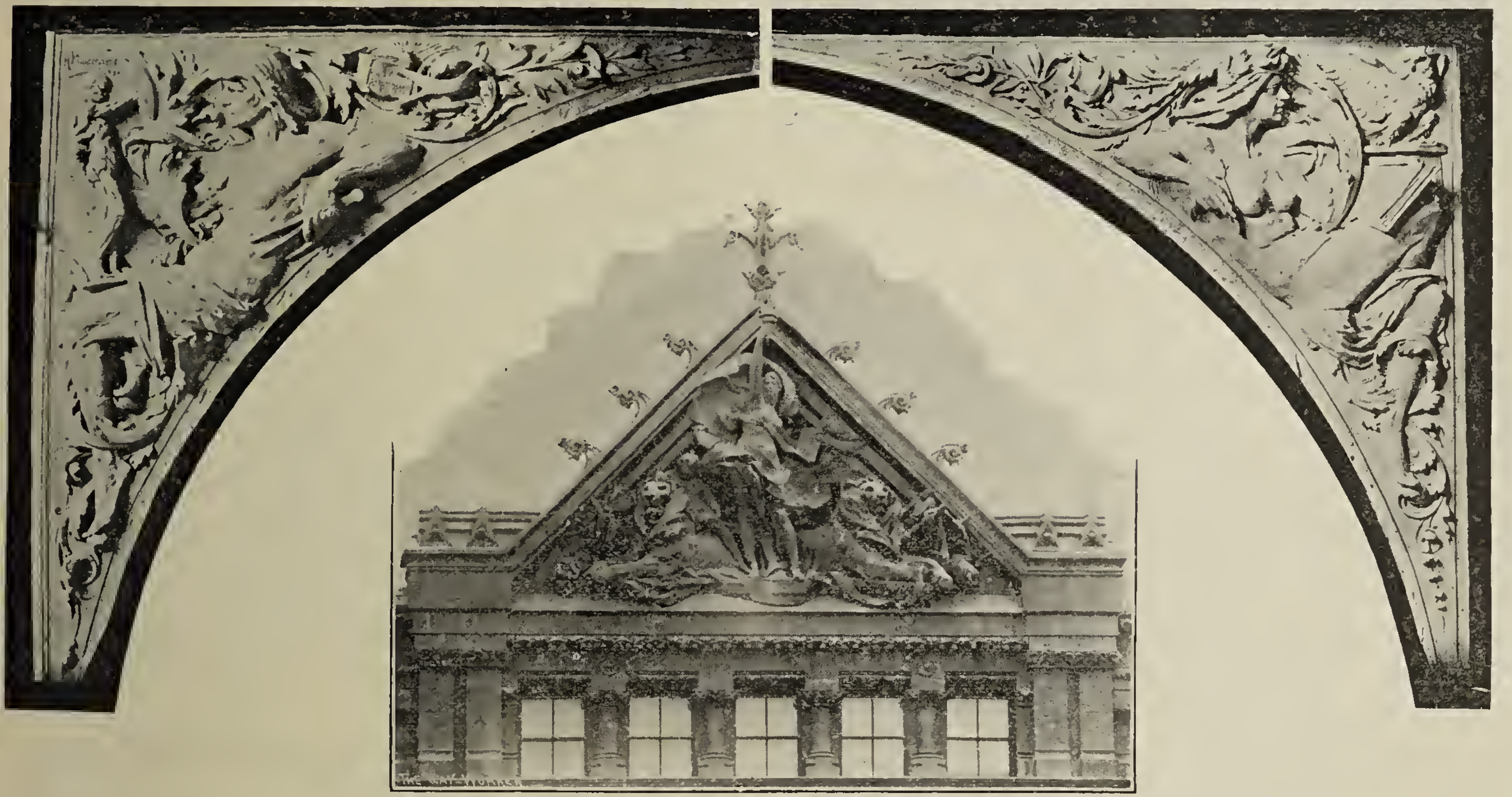
*It is a known fact that the above deserted from the ranks of the Austrian army, and on completion of the groups at the World's Fair was offered a pardon by the Austrian government if he would return. This, I believe, he rejected.—W. P. L.

Two examples here reproduced represent the spandrels, right and left, of the Wister Institute, an annex of the University of Pennsylvania, of which G. W. & W. D. Hewitts were the architects, "Anatomy" being the motive, which, at the hands of Professor Plasschaert, has been well conceived and executed. The figures are graceful and pleasing, and the title fully justifies the subject.



Spandrels for the Wister Intsitute, University of Pennsylvania and Pediment Panel Broad Street Depot, Pennsylvania Railroad, Philadelphia.

In the finishing room lay capitals, columns, cornices, moldings, panels, plaques, and two hundred square feet of cornice 18 inches high and 3 feet 6 inches deep, destined for a large office building in Wilkesbarre, Pa.

The combination of clays determining the shades desired in terra cotta work demands many experiments, and to the uninitiated the variable forms of shades seen in panels, cornices and in brick work often call forth adverse criticisms, and yet to the terra cotta manufacturer and the architect that very diversity of shade is what goes to make up their beauty. The Pompeiian or mottled effect is caused by "fire flashing," i. e., being placed directly over the fire, thus causing an exudence of the iron, culminating in the dark or clinker-like spots. The yellow is baked in the kiln, the fierce heat being reserved for the shade in coloring. Successful results are now being obtained in the gray imitation of limestones. The two reproductions here given are also examples of the work lately executed on the Broad Street Depot by Karl Bitter, who as a decorative sculptor has probably no equal in this country. The pediment panel over the Fifteenth-street bridge, and facing Market street, is one of the largest in the city, being 52 feet by 9 feet, a reproduction of which is here given. It symbolizes Commerce; the female figure seated in the car, with Mercury standing over her, as representing the idea of Trade; the car being chained by two figures, Strength and Modern Knowledge, who are seen thrusting aside, left and right, the male and female centaurs, emblems of old trade fogeyism; Fire and Water in the foreground, symbolizing the car's progress. In the right and left corners are the figures supporting the arms of the city and State.

Our alternate illustration represents the top pediment panel, on the south side, showing the Torch Bearer with the two lions couchant, signifying also Progression.

The two twelve-feet panels located on the south side of the interior of the train shed lobby, representing the Trumpet Blower, are splendid pieces of good modeling, worthy, indeed, of a close inspection and analysis, as are also the two figures supporting the clock in the restaurant. In the near future this enterprising, never-resting and ambitious young company—for it is doubtful if either the Stephens brothers, Armstrong or Conkling can say "We have seen forty winters"—will have the pleasure of placing ten panels in the train shed, stretching from Fifteenth to Eighteenth street, each panel being 18 by 10 feet, in terra cotta, representing the founding of the ten principal cities of America.

The plant comprises two large three-story buildings, 200 feet by 150, with an additional 100 feet, now nearly complete, to the modelers and designers will soon be transferred. Seven muffle kilns, with up and down draft, are distributed, four outside and three in the old building, the second floor serving as a drying room from the heat generated from these three kilns. The roll consists of 145 hands, consisting of five draughtsmen, under the superintendence of Mr. I. D. Shay, formerly of the Perth Amboy Company; nine modelers, under Professor Plasschaert; twenty-two plasterers, forty-two pressers, and the total in kiln setters and laborers. In addition to this may be mentioned the plant for plaster molding and casting, at Seventeenth and Filbert, and offices at 1341 Arch street, and also in New York, all serving to show the strides which this progressive company have made during the past six or eight years.

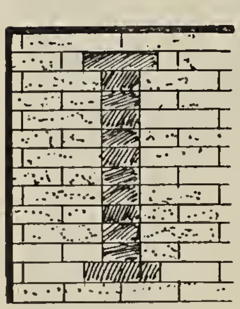
(To be continued.)

TERRA COTTA CAPITAL. Executed by the Staten Island Terra Cotta Lumber Co., N. Y.

Written for the CLAY-WORKER.

SETTING AND BURNING BRICK—WHERE THE MONEY IS.

BY J. W. CRARY, SR.



N ALL the very excellent work of the N. B. M. A. lately at Atlanta, only one paper was read on the subject of setting and burning brick. I was impressed with that, as the writer recommends almost exactly what I did sixty years ago on my father's brickyard, in Cincinnati, O. Mr. Jacobs says that certain courses of brick should be set tight in the arch, and that the whole kiln should be set loose, so as to get a good draft up through it, but he does not say how the brick should be set, or how loose. All late writings on the subject of setting and burning brick are very indefinite as to the exact way brick should be set. This is the most important matter in burning brick. If a kiln of brick is improperly set, no amount of skill will be able to make a good burn.

I think I have several times in my writings given special directions for setting brick, and the theory or reasons therefor. As this is a subject that cannot be easily exhausted, it is in order to repeat and emphasize every real, indispensable thing to be done in setting brick. If a kiln of brick are well set for successful burning, it is not impossible to make a good burn even with a bad plan of burning; but if a kiln be badly set, it is impossible to make a good burn, however perfect the skill and material may be. If we take it for granted that the conditions present are all perfect for good brick when ready for setting, then the main question is, How shall the setting be done? The answer is, Set the brick to get the best draft and best circulation of heat.

No brickmaker or writer that I know of has yet given any exact specified directions for setting brick. They say "set the brick so that the kiln will have a good draft." They don't say what is the best way to set, nor do they say what is needed to make both draft and combustion of fuel perfect as possible. Now, the intelligent brickmaker should know that perfect combustion of fuel depends upon the supply of as much air as will unite with the fuel, or, in other words, as much oxygen as will unite with the hydrocarbon. Now, if we assume that the furnace at the end of an arch of a brick kiln has 200 square inches of air inlet, that would make 400 inches to each arch. Now, if we set an arch with 100 brick in each course of a "bench," the bench five courses high (set on course of "salmon"), then five "overhangers," in all ten courses high (besides the course of salmon at bottom), all set three-quarters inch apart, we have about forty superficial feet of "draft space" between the brick. This "draft space" is not free and open up vertically through the kiln, as it is obstructed more or less by the "abutting brick" and "overlaying" courses, by which about one-half of the draft is cut off, and we have about twenty feet of clear "draft space" to each arch. It will be seen that there is seven times more "draft space" up through the arch of a brick kiln (if properly set) than there is in the furnaces of the arch.

According to very good authority, it takes about 150 times in volume of air to burn to complete combustion one pound of dry wood. One hundred pounds of dry wood, say 4½ feet long, will fill a common furnace of a brick kiln arch, or by weight it takes about seven pounds of air to burn one pound of wood. Now, it is easy to see that brick must be set in a kiln with at least seven times more "draft space" up through the kiln than there is in the furnaces. This theory is very near the "books," but I am not "bookish," and when I set and burn a kiln of brick I draw on the bank of experience, where I have made deposits that meet all drafts that I desire to make.

The "benches" and "overhangers" of a brick kiln arch is best set "skintling," as I have said often and over again in the Clay-Worker. If brick are set loose, one parallel over the other, in order to get draft sufficient, they are liable to crushing when very hot, especially with fusible clay. "Skintling" is the only sure way to set brick in the arches—indeed, the best way from bottom to top of kiln. It is the easiest, fastest and most philosophical way to set brick, and the reason, or rather the excuse, that it is not done is that it is not common, and is hard to learn. If the know-it-all bosses would use a little of their leisure and the best ingenuity that a boss ought to have, they would soon become experts in setting brick in the skintling style. Of course, any "bull-head" can set brick crossed, "three over three." I have time and again explained the "skintling" process of setting brick, and the reasons therefor. A few have taken my advice, and are much pleased with their sucess. If Brother Jacobs will take the trouble to read my writings he will see that he is traveling on the same road I took sixty years ago, and that I have found a much better one, which I have plainly marked and blazed in the Clay-Worker.

THE CERAMIC ASSOCIATION OF THE OHIO STATE UNIVERSITY.

This new organization was recently formed by the students of the clayworking department of the Ohio State University. They realized that in forming such an organization it would not only be a great benefit for themselves, but it will make the school more known all over the country. The Ceramic Association of the Ohio State University will hold its meetings every three weeks in Orton Hall. Different papers on the clay subject and on any subject connected with ceramics will be read at those meetings. The students hope to call more attention through this organization to the clayworkers of America, and will show them, after finishing this course, what a benefit it is to have a trained educational study.

The Association elected the following officers: E. E. Gorton, Tonawanda, N. Y., President; S. Geysbeek, Cincinnati, O., First Vice President; W. W. Ittner, St. Louis, Second Vice President, and Carl Giessen, Canton, O., Secretary-Treasurer.

The Association will adopt within a short time a nice-looking pin, which will be the pride of its members, as they hope to make it their legal credentials as expert clayworkers in the United States. At the last meeting Prof. Edward Orton, Jr., the director of their school, was elected unanimously their first honorary member, and he will open their first meeting after New Year's with the reading of an excellent paper.

CORRESPOND-ENCE.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

CONVENTION ECHOES.

Vice=President Fiske's Impressions.

My Dear Mr. Randall:

Several years ago a brick manufacturer said to me: "I do not see the object in going to a Convention and telling your competitors all you have learned by hard work and costly experience. Let him learn for himself." Within two years from that time this man had practically been driven out of the industry by those with whom he found it impossible to compete, owing, largely, to improved methods of manufacture. Moral: Attend the Convention, tell all you know, and you will be pretty sure of getting more than you give. I overheard one man remark: "This Convention has not been quite equal to former ones; the information given has not covered as broad or practical a field, and there was little said which was new." This man said that he had attended every Convention but one since the formation of the Association, and I think the trouble (?) with him was that he had absorbed all the information imparted by nine Conventions, so that there appeared to be very little that was new under the sun to him. My own idea is that it was a good Convention. It is the first one that I have attended for four years, and I think I can note the improvement in the management of the Convention, and character of the information imparted.

Professor Orton's report was exceedingly satisfactory, and the line of inquiry which he and his committee are pursuing is certainly very valuable to the paving brick industry.

Other lines of inquiry especially relating to other branches of the industry can be taken up later. It was quite noticeable the large number of ladies present, and it struck me as somewhat ungallant, to say the least, that they were not permitted to attend the reception at the clubhouse. I would like to suggest a change of custom in this respect. Let us make the evening entertainment an occasion to be looked forward to with pleasant anticipation by the ladies, as well as the gentlemen; let us call it by some other name than "Pow-wow," say the banquet or reception. Perhaps it was fortunate for the Convention that the weather was so cold and blustering that it was more comfortable in the hall than out of doors. So far as seeing the city and the exposition was concerned, my visit to Atlanta was a failure. I brought North with me one of tho severest colds I have had for a long time, and I did not get it on the Midway, either. Your truly, GEORGE M. FISKE.

Boston, Dec. 30, 1895.

The Way to Obtain Good Prices.

Editor Clay-Worker:

The tenth annual Convention of the National Brick Manufacturers' Association has gone into history, it is now a matter of record, its work is done, but the lessons to be learned from its work are yet to be studied and well applied if they are to produce a full measure of usefulness in the education and profit of the clayworkers.

Once more have we met at the crossroads of business life and set up a monument to record the progress of our ancient craft. From the East, the West and the North we have gathered and assembled in the halls of our brethren of the South in friendly association. We met to relate our experiences, to discuss our difficulties, to show our successes in order to educate and help each other toward a more prosperous future.

The gathering was a grand one, such well-known faces, such generous smiles and such hearty voices; it was good to be there. It was a grand rally of the seniors, the old war-horses of the Association, of the men who were its founders, and who carried it forward in the days when there was no brickmaking literature, before it had become so popular and successful as it is to-day. Ex-Presidents Eudaly, Purington, McAvoy, Adams, Ittner and Eggers were all there; ready and willing, as always, to support our esteemed friend of the brick yard, R. B. Morrison, of Rome, Ga.

Chaplain Flood, of Philadelphia, was there, too, and, as usual with that genial gentleman, was both ornamental and useful. He presided at the organ, playing the march music during the introduction of the new officers.

The radiant spheres of Brothers Pike and Crafts were, like Castor and Pollux, clearly visible, especially the latter, who was not only visible, but was distinctly heard. Crafts claims to have had a new birth (some say he needed it), and to be entitled to all the privileges of extreme youth. He has passed the three-score and ten years allotted to man, and is nearly two years along in a second span. The new years sit very lightly upon his stalwart shoulders, and certainly he is one of the most punctual, regular, vigorous and cheerful attendants at the sessions of the Convention. Long may he be spared to us in council and work.

The friends of Atlanta gave us a royal welcome; it would have been a warm one under ordinary climatic conditions, but our friends who come from the Northwest and are so jealous of their vigorous cold waves, being fearful of the enervating effects of the Sunny South's influence, opened the "Gates" and brought one along with them, while Fiske, of Boston, to keep himself cool, brought with him a special east wind. But if these winds did cool us, the southern sun shone over us, warming our greeting and cheering our hearts. Within that Convention hall, and in the elegant home of the Capital City Club, there was the full Southern sunshine of hospitality, friendship and welcome. The powwow was, as is usual with the brickmakers, a success, and within the elegant parlors of the clubhouse, cheerful, light and warm, the visitors were welcomed by the handsome Mayor of Atlanta, the Hon. Porter King. The Mayor's address of welcome was wide, deep and hearty; tendering the city's freedom, offering its resources and wishing us joy and prosperity.

Having been given a general welcome by the worthy Mayor, in order to allay any doubts which might yet be lurking in the breast of any stranger, as to the propriety of this public gift of a private hospitality (for it is well known that brickmakers are Democrats and jealous of personal rights), the use of this beautiful clubhouse and all its privileges was given to the National Brickmakers' Association by Dr. Cooper, the Vice President of the club, in a jolly speech which suggested that the club possessed a pantry and a cellar, and servants, and that when the mental provender so generously provided was expended, there would be dry and wet refreshments furnished to repair the physical exhaustion incident to appreciating the oratory of Cleveland, Cincinnati, Chicago (two doses), Boston, Atlanta and Indianapolis.

This promise was kept, and well kept, amid the rattle of steel and silver, the grinding of ivories and the tinkling of glasses, could be heard the cheerful rumble of voices and the ringing of laughter until, at last, the end came and we went out into the starlit world, seeking our hotels and able to say with Shenstone:

"Whoe'er has traveled life's dull round
Wher'er his stages may have been;
May sigh to think he still has found
The warmest welcome at an inn."

Of all the Presidents who have presided over the councils of the National Brickmakers' Association, none has given himself more thoroughly and pleasantly to the duties of the office and to the social welfare of the members, than ex-President F. H. Eggars, of Cleveland.

It will be a permanent source of pleasure for every one to look back to Cleveland and Atlanta, and remember his genial personality and cheerful voice.

His valedictory address was broad in its patriotism, uniting all sections in one grand country, and his tribute to Atlanta voiced the sentiments of the whole Association.

Mr. Eggers referred to the condition of the markets and the low prices of common brick, bricks having been sold in Cleveland and its vicinity the past season for $4 to $4.50 per thousand. He spoke the truth, when he laid the responsibility for these unprofitable conditions upon the brickmakers themselves. No one buys brick because they are cheap. Bricks are bought because they are wanted. Just as many would have been sold had the price been $6 per thousand, and, probably, if it had been $7. This difference in price would make the difference between serious loss with laborious toil, and a trade both healthy and profitable.

Why does Cleveland sell brick for $4 to $4.50 per thousand, while New Haven and Boston sell them for $7.50 to $9 per thousand? It is because Cleveland sells against her brickmakers, while New Haven and Boston sell for their brickmakers. These low prices result from the isolation and selfish determination to work alone for personal rule. "I will do my business my own way, if I have to get under every other fellow." That is the spirit that ruins. Arrogant self interest too often leads to humiliating strife and ill-will; the parents of loss and ruin. Logical recognition of mutual interests will surely lead to mutual understandings, and, just as surely, lead to good prices and prosperous trade.

Wm. Homes, the fire-brick maker of Boston, once asked the fire-brick makers: "What will it profit a man to make all the brick in the world, and lose his last dollar?" Brickmakers, think of this, and think hard. One year ago, at Cleveland, John O. Shares, of New Haven, told the story of low prices and how to cure them. He explained the experience of the New Haven brickmakers and the successful working of a Brick Exchange. This year, at Atlanta, our friend Crafts reported the continued success of the system.

Why not study this method of selling? You may also succeed. Try it. If you would have good prices; it is you who must make them. The contractors won't do it for you. The architect will not help you; then help yourselves.

There was a gentleman at the Convention who told me that once he closed his season with two millions of brick in the clamps. His neighbors, in their hurry to clear out, were cutting the prices. A contractor who wanted five hundred thousand came and offered him $5 per thousand for that quantity. The brickmaker smiled and said he wanted $6 per thousand. The contractor said he could get brick for $4.50 per thousand. "Can you? Then do not waste any time; go and buy them. I have none to sell." The contractor went away mad. Some weeks later the contractor, having made another contract, came to see about a larger purchase of brick. "Have you any brick to sell now?" he asked. "Yes, at my price," was the answer. "Do you mean $6 per thousand?" he said. "No, my price is now $7," replied the brickmaker. "Why, you offered them to me for $6." "Yes, but you would not buy them; now they have gone up some." "You go to —— with your brick," was the rejoinder, and the contractor went off somewhere.

A few days after, when he had cooled off, he returned and asked the brickmaker to go down town and see his partner. The brickmaker went this time, the partner apologized for the hasty temper and words of his colleagues and requested him to talk business. "We want a lot of brick, and yours suit us. What will you sell them for?" was the question. "Seven dollars per thousand, if you buy to-day," was the reply. "We accept the terms," said the builder; "but how many can we have?" "All you want of that lot, as long as they remain in the yard." "Agreed," said the builder, and the trade was made.

Here my friend says he made a mistake, for before they were all gone, other contractors were hauling them away at $10 per thousand and hustling to get them at that price.

What made my friend act so? Simply confidence in himself. Brickmakers, have confidence in each other and help yourselves; that is the price of freedom. JAMES TAYLOR.

Criticisms and Suggestions by a Non-Attendant.

Editor Clay-Worker:

Those members of the National Brick Manufacturers' Association who were so unfortunate as to be deprived of the privilege of meeting with their brethren in Convention at Atlanta, have still much to be thankful for in the full reports of proceedings published in the Clay-Worker. This report was anxiously looked for by the "Stay-at-homes," and you have no class of readers who honor and esteem your reports as they who were not permitted to hear the papers read or the remarks made. They feel keenly the want of that stimulus and inspiration that come only from personal contact by ear and eye with the living speaker. We wish it distinctly understood that any criticism we may make will be in a kindly spirit, and prompted solely by the interest we take in the matters discussed. Our desire is chiefly to call attention to some omissions. We believe in prayer and cannot commend too highly the reverent, devout and comprehensive prayer offered. Whilst it comprehended the members present and their families left at home, its omission consisted in overlooking the absent members deprived of the privilege of being present. We may note here that this omission ran through the whole proceedings of the Convention. The absentees were an unknown quantity.

The excellent address of the retiring President needs no comment. It speaks for itself. But the principal recommendation in it, and one that aimed to promote the best interests of every member, was not afterwards noticed or discussed by the Association. Here we record an omission. No more important business could have engaged the thoughts and wisdom of the members than "The developing and perfecting a practical plan of organization whereby brickmakers from cities can secure a fair price for their product." This matter refers to local organizations for the purpose of securing fair prices, prevent cutting and guard against making bad debts. Light is wanted as to the best form of organization so as to secure the desired results with the least amount of machinery. If any member has experience in this line I think he should make it known through the Clay-Worker. The pleasantries and reciprocal soaping processes usually indulged in at the reorganization must be taken as the spice needed to season the substantial matters that are to follow. Here let me say that at the opening session of our Conventions too much time is needlessly wasted in wordy mouthings which usually has the effect of crowding through at the close of the meetings many important matters half considered for lack of time.

The remarks of Brother Eudaly in regard to the burden of entertaining the Convention by cities where the Convention meets, and that, chiefly, on account of the pow-wow, are timely and may be backed by other considerations aside from the burden to the entertainers.

In the membership of the National Brickmakers' Association, there are, perhaps, as many strictly temperate men as can be found in any other organization of its size, these pow-wows are usually supplied largely with liquors, and drinking is in order—toasts are offered and drank. The temperate man feels that his presence there is encouraging a practice that may be, to many, the stepping stone to intemperance and the accursed evils that follow. But these temperate members love the brethren and have a horror of being considered singular and their scruples are stifled, and they go into the pow-wow—partake with the others, blunt their consciences, stifle their manhood, sadden the hearts of their wives and dishonor their children and put a black spot on their memory that time will not wash off. Why, then, keep up this practice? Let the pow-wows drop and then almost any small city can entertain the Convention by providing a hall and committee to make the meetings of the Association pleasant to all. At any rate the public use of intoxicants at pow-wows are not in harmony with the progress of the age on the boasted spirit of progress and brotherly love that should rule in the hearts of the brickmaker. This matter has been referred to the executive committee and it is hoped that if they do nothing more they will lop off the liquor nuisance. Let me remind the executive committee that if the annual fees are increased and the funds of the Association used for defraying the expense of powwows, with the liquor practice continued, there will be a thinning out of the membership. The reforms suggested would elevate the moral tone of the Association and be a comfort to many anxious wives who shudder to have their husbands go where they are tempted to indulge. In passing in this brief review such able papers as those by Purington, Manson, Butterworth, Professor Orton and others, I do so because no comments are needed. They only need to be read to be appreciated.

The paper of Mr. Jacobs on setting and burning is good, as far as it goes, but is confined to setting and burning in the old up-draft kilns. But the increasing use of continuous and down-draft kilns calls for a different mode of setting. Pressed brick, for example, must be carefully spaced and faced so that at least one face can be had on each brick that is free from fire marks or discoloration. The desideratum in the matter of setting paving brick is to secure proper draft and prevent warping or twisting of the brick. The opening between the brick must be longer to promote draft and thus prevent the top brick from robbing the lower brick. These longer openings increase the tendency to warp and hence other methods of procuring draft must be provided. Proper setting is of vital importance in making any kind of brick and has been largely overlooked in the discussions of the Association. The man don't live who can make a good burn where the setting is bad.

The discussion on the difference between fire clay and shale divulged some characteristics of each not generally known, but did not clearly define any measure or rule that would show the difference in all cases. Mr. Fiske's definition of shale, viz., "that of coming apart in layers," is good, but if the material at Galesburg and Canton is shale the layer definition will not hold, and yet the layer idea as the leading characteristic of shale, is the proper one. Fire clay may be defined as a material that, under high heat, shrinks but little, and the particles do not fuse or vitrify. Shale may be defined as a material that, under a high heat, shrinks largely and the particles fuse. In Galesburg, Canton and in other places this material is without the layer formation. It is like soft, light, gray rock, but free from grit. In this we have a shale that is in layers of light greyish color and the layers about one-quarter of an inch thick. Between these layers is a streak of red keel-like substance about as thick as blotting paper. This has been called soft iron ore. These layers are horizontal, but a peculiarity is that it is in hexagon columns, which separate in making a fall at the bank. The only characteristic of fire clay and shale common to both is weight. They are both very heavy, whilst many clays that burn white, like fire clay, are very light in weight. The discussions on methods of measuring temperatures in kilns were interesting and novel. Admitting that the Seger cone is the proper thing, a few words as to how to become possessed of materials—the mode of admixture of ingredients and approximate proportion of each and the size of cones would have been acceptable to many. The practical question asked by W. S. Purington, viz., "What kind of cone should be used?" was answered by Professor Orton, not in his usual clean-cut and unmistakable style, but thus: "Use a cone that fuses at a temperature where your clay vitrifies nicely." Correct. But this would naturally lead to another question, viz.: "How shall I find out what that is?" And the answer to this would likely be, by experiment. And this reminds me about the answer of the Irishman about hanging: "It is all right, though, when you get used to it, but you are likely to die before this occurs." So a man might spoil several kilns of brick before finding out what kind of cone to use. But experiments alone can certainly tell the heat required for a given clay. The interesting proceedings of the Convention that follow we will, Mr. Editor, with your permission, briefly refer to in your February number.

J. K. CALDWELL.

The Atlanta Convention—Going and Coming.

My Dear Randall—I herewith hand you a check in payment of the small amount it became necessary for me to borrow to enable me to get out of Atlanta after the Brickmakers' Convention. You were about the only man that had any money left after three days in Atlanta, and I knew where to come for help. I have been a little delayed in remitting, for which I beg pardon, but the truth is it has taken me about three weeks to sober up after that trip. You see, the fact is we did not find things in the sunny South just as we had expected. Now, there was a party of some twelve or fifteen, including ladies who had talked the matter over, and concluded to take an early start and take in some of the sights on the way, so they arranged to assemble at Indianapolis and start Saturday afternoon before the Convention. It was a jolly crowd, and there was much talk of what they would do when they got out of this cold Northern climate and reached the balmy air of the sunny South. Jesse Adams said they would strike oranges about Chattanooga, and that he was sure that when they drove out over the battle grounds on Sunday they would find groves loaded with the luscious fruit along the slopes of Mission Ridge. One lady was sure they would find bananas that far South, and her greatest ambition was to get into a banana plantation, but they assured her that she would not find anything of that sort before reaching Atlanta, for Atlanta was away down South.

Well, the party reached Chattanooga safely early Sunday morning, and as an appetizer concluded to walk nearly a mile to the hotel for breakfast. It was a delightful, fresh, frosty morning, and the walk was much enjoyed. Of course, so many hundred miles from home we did not expect to see any one we knew, but the first man we struck was our own Eudaly, the only one, and we've got him. We also found that his better half was with him. After a hurried breakfast, some one made arrangements for a long side-seated four-horse party wagon for a ride out to Mission Ridge, Chickamauga and Lookout Mountain. In the hurry and bustle of getting off and each fellow looking after himself, one of the party, not knowing exactly the arrangements, stepped to one side, looking for the water cooler, we presume, and when he came out to the door two minutes after, all he could see was Randall's plug hat going down the street like a whirlwind, and the half of Jesse Adams hanging over the tailboard, and Eudaly standing up in the wagon, with both arms stretched out, already commencing to point out the sights. Well, the fellow that got left took off his hat and said mildly to himself, "Well, I'll be double d—d," and walked back in search of the water cooler again to bathe his head, and then took the first train for Atlanta. Well, the party had a very interesting but tiresome ride of about thirty miles, visiting the different battle fields, and reached the hotel about dark, and, having had no dinner, were tired and hungry. Jesse Adams got his oranges, but he picked them from an Italian fruit stand, and came to the conclusion that he was not much further South than Indianapolis when taking temperature into consideration. When the party reached Atlanta that night, about 12 or 1 o'clock, the thermometer had dropped about twenty degrees. They concluded that the atmosphere did not smell a bit like what they had imagined banana plantations smelled like, and quietly decided to say nothing about their intention of pulling the luscious fruit from the stalk.

Three of us concluded that Monday would be a good time to take in the Exposition, as the Convention did not open up until Tuesday. On entering the ground we talked the matter over. Of course, we would take in the sights, deciding to steer clear of the Midway, as we had heard some very naughty stories about the performances there. So we started through the Colored Building, and, emerging from the same at the other end, found ourselves at the foot of a high stairway, which we climbed to see what was at the top. Here we found ourselves on a commanding point, from which we could take in a bird's-eye view of the whole ground and see with what wonderful skill they had utilized the natural surroundings. It seemed to lay in a horseshoe shape, the rim being high ground, possibly thirty feet above the center. On the rim or high ground were many of the buildings, interspersed in such a manner as to give it beauty, and half way up the rise, a part of the way at the back was a terrace, with driveway and a few buildings. From this terrace ran broad stairways, both to the walks and driveways above and the drives around the basin below. Up this stairway, at either side, were fluted columns, with statues, and arrangements for electric lights, giving a beautiful effect. In the center of the horseshoe, or basin, was a beautiful lake, with arched bridges and statues and everything to beautify the surroundings. Beautiful little boats were plying back and forth to carry passengers to the different points of interest, but the day was too cold for such enjoyment, so we did not accept of the pressing invitation of the genial boatman. But to go back where I left my party.

We were at the head of the high stairway taking in this bird's-eye view. On turning round we heard a most everlasting din and clatter. It seemed all Bedlam had been turned loose, and, without knowing it, of course, we found ourselves at the head of the Midway, so we concluded, as we were there, we had better take it in, and then we could tell the other boys whether it was best for them to go near. Well, the first thing we struck was the wonderful chicken show. Here was the three-legged chicken and the four-legged chicken, and a lot of common dunghills and measly-looking turkeys.

Then we tackled a man with a long cane, jumping up and down and running back and forth, throwing his arms like all possessed, calling out the wonders of his show. He announced the most wonderful Egyptian dancing, with all the movements. We concluded that we could not stand that, so started on, but he headed us off, saying that part of the show consisted of a most wonderful clay modeler. When he mentioned clay we could not resist, and had to go in; besides, he said the exhibition was for men only. That settled it. We found two or three others waiting for the show to commence, and when we three came there was a crowd and the music started up, which consisted of a nigger boy and a French harp behind the curtain at one end of the stage. There was a Circassian girl sitting below the stage, selling photographs of herself and the principal dancer. She had a head of lamb's-wool hair as big as a bushel basket. She was a blonde, with pink eyes. She at once took a fancy to one of our party, a gentleman from Terre Haute, Ind. Before I knew it she had him cornered, and how many photographs she sold him was never known. Then the wonderful dancing girl came out. She was a brunette, with short, black hair, that hung just to her neck. She went through with all the fancy work of wriggling and kicking and twisting, with an attempt at the muscle dance, and finally she looked down upon the audience of five, and the situation seemed so ridiculous that she stopped short and broke out in a loud laugh. Finally, tearing our Terre Haute friend away from the blonde Circassian, we left the place.

Once out, we concluded that, as we had got a starter, we would take in the whole show, and if there was anything we did not see I do not remember what it was. It was hard to tell which was the worst sell. The streets of Cairo were simply awful, and the balance was not any better. It was a fake all the way through. But I must say for the Exposition that the balance of it was creditable in every respect, and I only wonder how they managed to get up such a show.

Tuesday afternoon the Convention opened up for business. President Eggers "done himself proud" in his remarks. Then our worthy friend and fellow-brickmaker, R. Brick Morrison, was most unanimously elected as President for the ensuing year.

As the proceedings of the Convention are given in full in the December number of the Clay-Worker it would be folly for me to say anything about it. But Tuesday night came the interesting time that is always looked forward to with great interest. That is the banquet. For there we meet for good cheer and good talking. A large clubroom was thrown open to us, the name of which I have forgotten. Everything was comfortable and pleasant, and every attention shown us. We assembled in their beautiful hall, and there were received by the Mayor of Atlanta. Toast after toast was given and responded to. After the Mayor came Purington, and Fiske, Gates and others, but I cannot call by name the Atlanta parties who spoke. The speeches were good, but it seemed hard for any of the speakers to cut them short. And the members from the North could not, it seemed, get it into their heads that the Mayor had been obliged to receive just ninety-nine conventions since the Exposition opened, and there was another booked for that week. The members from the North could not get over the idea that it was the becoming thing to bring up the blue and gray business, and slobbered it on pretty thick. They did not seem to comprehend the fact that every convention that had come down there since the Exposition opened, and had been received as we were received, had made speeches with the same gush.

Now, I will let Gates out on this score. He had been reading Poe's "Black Cat," or gold-bug stories, which caused him to have a dream. Knowing him to be strictly temperate, I am confident that nothing else induced that dream. Now, although he went away off down into the Mobile swamps to have that dream, I do not remember of his referring to the blue and the gray. Now, there was another man who is generally cocked and primed that looked as though he was going to miss a chance. He moved nervously on his chair, and had a look in his eye as though he had something to say. It was all right; he was simply saved for the last of the feast. And Eudaly got the floor, and attempted to mix cotton-seed oil and Northern corn juice and smooth over the blue and gray business, that had been so lavishly spouted by those who came before him.

After the meeting we were invited to the ante-rooms, where a most excellent lunch was set, with plenty of the etceteras to wash it down. We left feeling that we had been treated royally under all the circumstances, and with all good wishes for our Atlanta friends. I found the banana breezes and the smell of the orange blossoms too much for my blood. The cold seemed to get right into the marrow of my bones. The old grippe feeling came back on me, and before the Convention was over I took my little grip and started for home, and for three weeks I was hardly able to be out of bed.

There were some other things I wanted to write about, but I have already run this letter too long. There was the Machinery Men's Convention, held in a side room, in which there were some lively discussions regarding advertising, etc. Then there were night sessions for each evening, held in different parts of the town. Upon the matters of interest at these different meetings I cannot dwell, so will bid you my kindest regards. Hoping to meet you in Boston at the next Convention, I remain yours very truly,

A CHARTER MEMBER.

Congratulations and Regrets of a Stay-at-Home.

My Dear Randall—Please accept my congratulations on your dispatch in issuing the Convention Clay-Worker. It is, as usual, excellent, but I cannot help feeling that I missed something only obtained by a personal attendance. For instance, that smile of Brother Gates (that is one of the impressions of the Convention), the words of sage advice from Brother McAvoy, the hearty handclasp of Brother Stiles, the eloquence of Brothers Purington, Eudaly, Ittner and many others, which you cannot, in spite of your journalistic skill, convey through printed matter. They must be felt to be appreciated, and once felt the "tingle" does not depart in a hurry. May they all be spared to us indefinitely, and may I be fortunate in meeting with you next year, is my earnest wish.

J. W. CARSON.

Enameling and Enamelers—Reply to "A Clayworker."

Editor Clay-Worker:

Under cover of asking for information as to the personality of S. L. De Koth and myself, "A Clayworker" executes an acrobatic performance which he no doubt calls criticism, but which appears to me to be a supreme effort on his part to stultify and discredit the ability and work of another man. To do this he has taken refuge in the Clay Record, though he is a reader of this journal, and would no doubt have been granted space therein to have recorded his effusion. I will not occupy your space by trying to correct all the definitions, inferences and conclusions of "A Clayworker," but I would ask if, in his definition of English grit, he has not taken ton for t'other. It is on record that there is American grit. Then he is mistaken in his inference that I never had a master or that I never went through the evolution of apprenticeship. I want to say to "A Clayworker" that from the time I landed on the other side that brickyard fence, so long ago, to the present hour I have been only an apprentice, serving one master, who has always been inexorable in his demands, and yet he has been very kind to me in one particular. In addition to being a clayworker he did not demand that I should be a soldier, a sailor, a tinker, a tailor, a butcher, a baker nor a candle-stick maker. Then the sublime(ly ridiculous) way in which he speaks of the superlative degree, in which the American manufacturer of enameled bricks, pottery and encaustic tiles will eventually supercede his old dad's countrymen, and his definition of what is crude and what is not in the textile art, makes it more apparent to me that he should saddle his definition of English grit on to the other horse. Then "A Clayworker" suggests in a sweet and pleasant way that I had not the ability to discover the mixture of a glaze, and that I copied the secrets of others who lived before me and appropriated their knowledge, and then expresses a mild doubt that the bricks I am making will not stand climatical action or that they will not stand the frost, etc., etc. All this reminds me of a man who, I think, must be one of "A Clayworker's" ancestors. His name, if I remember rightly, was Anthony Horner. He was contemporary with Robert Burns, the Scottish poet, and, like his descendant, "A Clayworker," he took upon himself to discredit Burns as a poet, saying that Burns made extracts and got his ideas from other poets that had lived before him, and that his poetry lacked every element of genius and ability. On one occasion Burns and Anthony met, and, true to his convictions, he offered a bet that he would make a verse of poetry right on the spot better in every way than Burns could produce. The challenge was accepted, and Anthony was to have the first try, and he began something like this:

"In the year seventeen hundred and eighty-nine"—and Anthony came to a pause, a kind of full stop. He made another effort and repeated the same sentence, but could get no further, and now, amidst the jeers of his companions, he tried again, with the same result. Then Burns, with that magnanimity which was one of his chief characteristics, but with scathing rebuke to his would-be defamer, took up the sentence which Anthony started out with, and, if I remember rightly, he worked it out in the following lines:

"In the year seventeen hundred and eighty-nine
The de'il took stuff to make a swine
And put it in a corner;
But after that he altered his plan,
And thought that he would make a man
And call him Anthony Horner."

There is nothing in the letter of "A Clayworker" that calls for serious consideration, and any reply that I might be tempted to make could only be made on slow-time principles, but he says that enameled brick, after all, is only a very crude article to the arts of pottery glazing and coloring in glass, etc. This is in itself proof positive that he knows nothing about the manufacture of enameled brick, and, I believe, just as much about pottery glazing, etc. This may be another proof of bad taste to the refined instincts and training of "A Clayworker," but the fact that I have not gone round to the back door to make this statement will no doubt commend itself to his considerate notice. I. H.

Question About Burning Brick.

Editor Clay-Worker:

While reading an article in your valuable paper headed "Enameling and Enamelers," and signed I. H., I was very forcibly impressed with that part of the letter referring to the burning of press bricks. While I am not interested in the manufacture of enamel bricks, I am very much so in that of dry pressed brick, and wish to dwell on that part of the letter stating that a boy was put to burn the first kiln of 75,000, and out of that kiln was drawn 98 per cent. of hard burned first-grade brick, and out of the six kilns burned the lowest per cent. drawn was 96, the highest being 99 per cent. Now, this is the most remarkable burning for any dry press brick, especially so under the circumstances set forth in his letter. I will be pleased if our friend I. H. will answer a few questions through the columns of the Clay-Worker in hopes that some of my fellow-craftsmen, myself in particular, may learn something of the methods employed leading to such excellent results. First, I would ask, What make of machine was used for pressing the bricks? Second, were the brick set direct from the machine, or were they previously dried? Third, what kind of fuel was used? Fourth, what kind of kiln was used for burning, up or down draft, and whose make? Fifth, would it be possible for any good dry press brick burner to obtain the same results elsewhere, with the same make of kiln, with some good American grit mixed in? Were good red and cream burning clays used? AMERICAN.

Setting Brick in Kiln.

Mr. T. A. Randall, Secretary N. B. M. A. and Editor Clay-Worker:

Dear Sir—The December Clay-Worker came to hand about the usual time. It is a splendid issue, and should be read by every brickmaker and all interested in the clay industry. I am very sorry I could not be with you, for after reading the proceedings of the Convention I can more fully realize what I missed. The addresses were all good, and a great many things may be learned by studying them. I have carefully read every page, and sometimes I could almost imagine myself in Atlanta. In discussing my little article on "Setting and Burning Brick" Mr. Geo. Drew misunderstood me in regard to putting on the platting. In my letter I said one course of platting. I meant one course of platting on flat. From the way he spoke he must have thought I meant to put them on edge, which was a mistake. Captain Crafts said if you can find a piece of coal dust in one of his well-burned brick he would eat it. I have never said you could find coal dust in a hard brick, and I have never seen such a thing, and there has never been a coal discovered that would resist the heat it takes to burn a hard brick without being consumed, but there is one thing I have seen, and that is this: If you put coal in the clay as fine as mustard seed, when that coal burns out it will leave holes the size of mustard seed. If it goes in the size of grains of corn, it will leave holes the same size. If you put a bushel of coal in a brick, there will be a bushel of holes in that brick. Then will this not weaken the brick and make them more porous and cause them to absorb more water? I have been told the clay would expand and fill up the holes. This may work in some clay, but it will not work in our Eastern Virginia clay. I know of two yards here that used coal in their clay several years ago. They had no crushers, and the dust went into the brick too coarse. Some of it was as coarse as grains of corn, and their brick looked like they had passed through a severe case of smallpox. In the four yards in Suffolk there is no coal dust used at all, and they make excellent burns. A. N. Oldtimer criticises me in the December Clay-Worker. He says I burn with one-third of a cord of wood to an arch in five to six days, and asks how large my arches are. If he will read that letter again he will find it reads one-third to the thousand brick. My arches contain twenty-five thousand brick, and I burn an average of seven cord to an arch (no coal dust). Our wood costs $2.50 per cord on the yard, or seven cords at $2.50 per cord makes $17.50 per arch, or 70 cents per thousand brick. He says "far-off birds have fine feathers." If he doubts my figures let him write to D. C. Harrell & Co., brick manufacturers, where I was superintendent and burner for four years before going into the business. I have not burned longer than five and a half days on a kiln in five years. I said my kilns run 80 per cent. hard. I had a brick machine agent call on me a few days ago. He has been on my yard every season for three years, and he says every kiln is just alike. I told him what Brother Oldtimer said, and asked him what per cent. hard brick there was in the kiln. He examined it very closely, and said it would not run over 5 per cent. soft. His own words are: "If I was put under oath I would say 92 per cent. good hard brick." It is needless for me to go any further with this discussion, as I only wanted to convince our brother that I was not boasting, nor of a boasting nature, and am sorry he jumped on me with his saying, "Far-off birds have fine feathers," etc. We had a Haverstraw burner here a few years ago. He could not burn without coal, and burned seven and eight days. I have seen his kilns run 35 per cent. soft brick. Another (coal-dust burner) burned a kiln here, and when it was opened the "niggers" called them soda bricks. They were all swelled and whitewashed. He said the brick were too wet, poor weather and bad luck. It was a total loss. He tried one more, and then got a ticket to go home on. H. L. JACOBS.

Enameling and Enamelers—A New Hand.

Editor of Clay-Worker:

My name has been drawn into the discussion between S. L. De Roth and I. H., and nothing will do now but that I shall follow.

It seems to be necessary in order to obtain credence in this discussion that the writer tell what he has done. A sort of ticket of admission, as it were.

I was not thrown over a brickyard fence at an early age, but was sent to school the day after I was five years of age, and continued thereat until I was fifteen. I then put in one year in a machine shop. I was first put to work chipping. My evident duty and desire was to cause the head of my chisel and the head of my hammer to connect; but at first my hands suffered more than either hammer or chisel. After much thought, "and considerable staying by it," I found the only way was to hit the head every time, and I have found it a good rule ever since.

At sixteen years of age I entered, as a freshman, the Rensselaer Polytechnic Institute, at Troy, N. Y., graduating therefrom at the age of twenty, with a diploma entitling me to the degree of civil engineer. I have found my mechanical education very useful in my charge of machinery, as manager of plants, and my chemical education has been invaluable in my particular line of work.

In a practical way, since leaving college, I have worked at the bench in a pottery, and remember distinctly that I earned the enormous sum of forty cents for my first week's labor. I was set to work making jugs. I found I could make them fast enough to earn seventy or eighty cents a day, but oh! when the inspector came around, what a difference. I found the ways of clay were peculiar, and especially of clay made into jugs by a greeny. From the bench I advanced through the different departments of the pottery until at last I was given charge of the mixing department. Our business was the manufacture of C. C. and white granite, both plain and decorated; also, majolica. I mixed all the bodies and glazes, and some colors.

"My American modesty" will not permit me to claim my advancement as due to merit. No, I was one of the partners in the concern, and merit had nothing to do with it; but still, I had exceptional advantages, a good potter to guide me and unlimited opportunities to experiment, both as to time and materials. If I learned nothing it must have been from sheer stupidity.

While at the pottery I conceived the idea of enameling bricks with a single burning. Now I. H. may be inclined to doubt me when I state that at that time I had no knowledge that such a thing was being done, but I thought I detected certain marks on the English bricks that indicated that the dipping had been done before the bricks were burned. I broached the matter to our potter, who, by the way, was an Englishman, and he laughed at me, saying it could not be done. But it could, and I did it, and have made about five million of them. They have been laid up in quantities up to over three hundred thousand in one building, and may be seen every day you walk abroad in Philadelphia county, Pennsylvania. They may also be seen in the city of Chicago.

Trouble, of course I had trouble. What else could a man expect who had never before made enameled bricks in marketable quantities, and who had never seen one made. I had good kilns and bad kilns; at first, nearly all bad, but better and better, until at last I reached what I consider a good showing, viz., ninety-three per cent. good No. 1 bricks.

Burned open? No. All, or nearly all, burned in saggers. But whose business is that? Get there; no matter how you do it, get there. The man who burns his brick in a continuous kiln may say or write until he is tired that it is the only way to burn them. Such talking or writing does not materially affect the one who is successfully burning some other way.

I am now successfully enameling and glazing terra cotta in white and in colors, and in many colors. Open? Well, just about as open as any terra cotta is burned. In one fire? Yes; and in pieces varying in weight from ten pounds to seven hundred pounds.

My ticket of admission is now presented, and, I hope, accepted.

I forgot to mention that I graduated from the R. P. I. in 1877, from which any good mathematician may be able to figure, if he can properly differentiate and integrate, that I have nearly reached the age which I. H. puts down as that of fooldom, but, thank God, I have a year or two left in which to enjoy the other state.

I humbly apologize to I. H. for my scientific education, but more especially for my knowledge of French, which enables me to read Brogniart, and I am really afraid to admit that from Brogniart I have gathered much that is useful. After reading the article of I. H. I presume I ought to feel sorry that I have not spent all my time wallowing in a glaze or enamel tub, but I don't. My business has been to glaze and enamel other things than myself. As to the whistle, I have never worried much about it. I believe there has been one in every establishment with which I have been connected, but I have never been so situated as to have to bother much about it and hope I never may be.

I thought I was a glazer and enameler, but you will see from my admissions above that I evidently have not even mastered the first principles of the business.

The whole discussion between S. L. De Roth and I. H. seems to hinge upon what is an enamel and what is not. There seems to be very little of the hinge left, though there is considerable discussion.

I think we all know thoroughly well that an enamel is an opaque glaze. Our ideas as to the amount of opacity necessary to entitle a glaze to the distinctive name of enamel have never been fixed, and probably never will be. So long as this is the case, argument may go on "ad libitum."

It is quite customary, I believe, to call ware enameled in which an enamel effect is produced, or where a body of one color is concealed and covered with a coating or coatings that give it an evenly colored glazed face of another color. This is especially the case where the resulting glazed surface is white or cream color. This is, of course, not strictly correct, but has been accepted without question for years. The resulting effect is what is sought and desired. By accepting this distinction between enamel and glaze much dispute or discussion has been avoided, as no one with seeing eyes can well dispute a visible effect. In this latter view of the case I. H. is undoubtedly right in claiming his bricks to be enameled; yet, in the strict and proper meaning of the term, I do not see how he can do so.

I will ask him whether he depends entirely upon his surface coating to conceal the color of the body of brick, or whether he uses a coating of slip under the surface coating. If he will answer this question through the columns of the Clay-Worker I think it will do more to convince the readers of that paper, as to whether his bricks are enameled or glazed, than any amount of discussion. I do not desire the question answered for my own information, as I really do not in the least care whether they are enameled, slipped and glazed, or tarred and feathered, and presume it is none of my business.

I. H. need not have admitted that he is an Englishman; it is evident that he is a typical one, and cannot admit anything as being right but his own peculiar methods. I cannot blame him much for this, but must take issue with him when he practically tells others they do not know what they are writing about.

We Yankees may not be smart enough to make an enamel that is a "proper enamel for brick and that will not flow or run at all, no matter what position it may be in in the kiln, or how hard it may be burned," but our athletic abilities are so great that we can catch it, no matter how fast or far it runs, bring it back and convince the architects it never ran at all, so that some few of them get into buildings. HENRY R. GRIFFEN.

Brickmaking in the Blue-Grass State.

Editor Clay-Worker:

The fire-brick yards alone in this section have prospered the past year. Through an unprecedented rush of business supplied by the coke fields of West Virginia and the iron districts of Virginia, as well as those of the more purely Southern States, the local output has been kept up to the full capacity of the plants all along. The general cessation of building has allowed just the reverse to be the case with the red-brick men, and now there is not a yard in this end of the State that is doing anything at all. There are two red-brick yards here, the John Gates & Co. plant and that of John Geigher & Co. Both have been practically idle the better part of the summer, although several kilns were produced at the two. Most of this stock is yet on hand, and there is little hope of placing it this winter. By working together with local contractors they have been able to realize somewhat on the work, but in the main the results have been anything but flattering. At Catlettsburg, four miles above here, the plant of the Catlettsburg Brick and Tile Company has been permanently closed down, and it is doubtful if it will ever be operated again under the old management. This was a stock company organized on the flush of the boom that swept over this end of the State some years ago, and has never been successfully operated, save for one brief year, when it was under the management of practical brick men. It was unfortunate in being backed by men wholly unfamiliar with the business. The plant will probably be sold.

As has been stated above, the condition with the fire-brick operators has been just the reverse. Locally there are two large concerns, the Ashland Fire-brick Company and the Clinton Fire-brick Company, while directly across the Ohio river, and backed by local capital, is the Forestdale Fire-brick Works. All of these plants have been making steady runs for some months past. Of the three, the Ashland Fire-brick Company has probably had the best trade. This company's active management some years ago opened up a large trade in the coke fields of the Pocahontas coal fields in West Virginia, and all during the recent idleness in that section, when repairs were in order at all of the coking plants, they shipped as rapidly as they could turn out the stock. In this they were joined by both the other companies, but they held the best of it. Heavy demands are made also by the Kanawha coke operators, and the local yards have the furnishing of the most of this. Second comes the Clinton Fire-brick Company, that makes practically the same brick as the other local plant. This company is at present making arrangements to increase their plant to nearly double its present capacity, and will be able to compete with any one in this section when this is accomplished. The Ashland Fire-brick Company lost its only time this season in similar work. Both concerns use principally Olive Hill, Ky., clay for their best grade brick, and local second grade clay for their inferior grades. The Forestdale Company, which is on the line of the Norfolk & Western Railway, uses a clay that is obtained near the plant from the Lawrence county hills, and also the Kentucky clay. They make a very good article, and have their principal sales South. Locally, a number of clays have been tested the past year, and only a fair second grade has been developed so far. This is found in considerable quantities close at hand, and is supplied in large quantities to all of the home plants. Out on the line of the Lexington division of the Chesapeake & Ohio Railway the Olive Hill Fire-brick Company, formerly the Kentucky Brick and Manufacturing Company, is operating a lately completed and extensive plant to its full capacity. Pennsylvania capital backs this company, which is one of the strongest in the business in the South. Their plant was built the past summer at an enormous cost, and is the finest in the State beyond doubt. They are fitted out with all the latest appliances, and are able to put out a fine article in extremely large numbers. The company controls the apparently inexhaustible cay banks of Carter county, off the line of the C. & O. road from Olive Hill, and which have for years past supplied in part the fire-brick yards of this city, Ironton and Portsmouth, O. Although the product in past years has been something terrific, it has had no visible effect upon the vast deposits, that have given no suggestion of exhaustion. The placing of the immense plant there has so far made little difference in the supply of the local plants, and they will continue to draw largely from these mines for some time to come. The company, however, will give its principal attention to working up the stock itself, and will endeavor to control the Southern demand, upon which it already has a very decisive hold. They are running steadily and are supplying many customers in the Alabama coal and iron fields, besides the Tennessee territory. Another promising venture in the country back of us is that of the Portsmouth Fire-brick Company, operating a branch line of railway, known as the Portsmouth & Tygart Valley road, extending from the C. & O., near Limestone, to Lawton, a distance of six and a quarter miles. The clay mines of the company are under the personal attention of T. W. Kinney, of Portsmouth, and are putting out a fine article in large quantities. The company has been pushing the work at an unusually lively rate of recent months, although they have been actively working the property for several years. Theirs is the chief deposit in that section, and is of superior quality. It is expected that with the opening of the Big Sandy Valley for development by the proposed extension of the C. & O. road many new fields will be opened, in which event this will be the fire-brick Eldorado of the Central Southern country. R. G. C.

Ashland, Ky.

Argumentum ad Ignorantiam.

—The Target "Busted."—

"An ingenious and efficacious method of establishing the draft in gas producers is adopted by D. C. W. Siemens. The gas delivery tube rises to a certain height, is then laid horizontal for a short distance, and finally descends vertically to the original level. The gas. in passing along the horizontal tubes, loses heat by radiation, and on arriving at the downward tube is sensibly denser than when it started, so that the second vertical tube acts as a siphon and maintains a constant exhaust on producer. In some cases the gases from the fuel are modified in composition by AN INJECTION OF STEAM from a pipe below the grate, E (fig. 10), which, impinging on the ignited coal, is decomposed into HYDRO-CARBON and CARBONIC OXIDE gases. This transformation is necessarily attended with considerable cooling effect, from the large amount of heat expended in the decomposition of the water, so that the method is of limited application. BUT the 'richness' or FUEL VALUE of the gases IS VERY CONSIDERABLY INCREASED BY ITS USE." (The capitals are mine.)—Geo. H. Bauerman on "Gas Producers" after 1874.

In the "long dim past," when I was a boy serving my appreticeship to mechanical engineering in one of the largest iron works of England, we had six or eight gas producers of the Siemens type supplying gas to the furnaces there in use. It was owing to this early experience that I conceived the idea (new to me) of applying the system to brick burning. I wrote to various engineering firms and gas manufacturing experts for particulars as to their specialty. I visited some in company with a member of my firm. We finally selected one (after seeing our own coal used and tested) which was called by the makers "a Siemens, with some modifications of our own." It was constructed very much like the producers of my earlier acquaintance, except the modification referred to. I think I gave a very minute description of this producer and its workings in my Louisville paper. So much as introduction.

Now, does Bro. A. D. think I am such a contumacious ass as to say and reiterate anything before a convention of intelligent brick makers, and through the columns of a paper so widely read as is the Clay-Worker, without substantial proof that what I said was correct? It is news to me that I was "cornered" or even "warned," but I want to assure Bro. A. D. that I take no part in any business that is not strictly "creditable" and above board; neither do I "quibble." And now I must apologize. For what, pray? Is it because I truthfully quoted the Professor, or because I took him (the Professor) for an authority in advance of my learned (?) and egotistical friend A. D.? That that passage is not the passage referred to is certainly not my fault, but it is unfortunate for my friend and fatal to his forlorn hope attack. The pyramid upon which he has enthroned himself is likely to prove his funeral pyre unless he climbs down very quickly, and if he will take my advice he will "not stand upon the order of his going," but "git." Of course, with my experience of Bro. A. D., I do not for one moment expect this; on the contrary, I expect more prevarication, "inuendo," etc. My friend asks with emphasis, "Can anything be found in Prof. Bauerman's work that will justify the imputation and position assigned to him by Bro. Carson?" I venture to assert, "Certainly yes; the extract at the head of this letter fills the bill exactly." If the passage referred to "brands the author as strikingly ignorant of his subject, then the humblest apologies" are in order from somebody, but who that somebody may be I leave Bro. A. D. to discover. It certainly isn't any "funeral of mine." If apologies are in order, then I think Bro. A. D. owes one to me, and if he has the courage of his convictions he will certainly tender it at the very first opportunity. Another point strikes me as being very much in order. Bro. A. D. gives the date of his authority as 1874, while mine is some years later. Does it require an inference? I think not. Even Bro. A. D. can see this point without my rubbing it in, but it confirms my opinion that the music of the band will be very faint, indeed, by the time it reaches Bro. A. D. Now, my friend, I must bid you good-bye. I would like to play with you a little longer, but really the game is not worth the candle. I think I have complied with all the requirements of your challenge, and hope you are satisfied with the result of your temerity and obtuseness. Now take a little advice (Honi soit qui mal ypense): Erect a new target, but be careful that it is made of better material than the one just shattered, then come again and all will be forgiven. J. W. CARSON.

Be not too presumptiously sure in any business, for things of this world depend on such a train of unseen chances that if it were in man's hands to set the tables, still he would not be certain to win the game.—Herbert. J. W. C.

The Business Outlook in Nebraska.

Editor Clay-Worker:

The outlook for the brick business for 1896 in this section is encouraging. The plans have been drawn for a large new Union Railroad Depot to be erected in this city the coming season, as large as the new one in St. Louis, which will take five million brick. A large store and office building was let last week, to be erected opposite our new City Hall. The South Omaha Water and Electric Light Company will erect a large building for their purpose next month, which will consume half a million brick. A new schoolhouse at Valley, this county, will be let next week, for which Omaha hydraulic press brick are specified, and it will take 400,000. A large main sewer of this city, which was stopped on account of the weather, will resume in the spring. A large amount of brick sidewalks will be built in the spring. A large glucose factory will be erected here in the spring, that will take three or four million brick, and many other enterprises are in progress which will assist materially in the good work, such as a United States postoffice at South Omaha. Several of our large brick plants are being reorganized, which have been idle owing to the depression in business, and several have been bought by other parties, who will resume operations in the spring. Council Bluffs, Ia., had a large fire a few weeks ago, which burned out several large firms, who will rebuild. Omaha is a good location for brick manufacturing on account of the scarcity of good building stone. All our foundations are brick, even to our seven and ten-story buildings. The county, in improving the roads, uses considerable sewer pipe, mostly 18 and 24, double strength, probably about twenty-five carloads last year. Better times are in store for us. Everybody who can is getting down to a cash basis. If you go to do anything for anybody you come right out and say, When do I get my money? If the answer is not satisfactory you don't touch it, and nobody does it, as we are all getting down to business. Dollars only count. Brick sell for $6 per thousand.

R. E. L.

The Survival of the Fittest.

Editor Clay-Worker:

Inclosed please find $2 subscription to the Clay-Worker for the year 1896. While general business in our city is picking up very encouragingly, the prospects for brickmakers are still somewhat gloomy. During the last few years the clay craftsmen, of which there was an immense number here after our big fire in 1889, have been gradually thinning out. During the thinning out process, if brotherly love toward their fellow-brickmakers had been the sole condition of their eternal salvation, I am afraid that the Spokane brickmakers will have their hearts' content of burning clay (something denied them here) in the great world below and hereafter. Under such circumstances it is needless to expect that the price of brick could be kept up to a living figure, and a further reduction below $4.50 per thousand delivered is threatened for the coming year. There are only three concerns left in the field now, and if we keep on as we are doing one would think that it would not be long before we are reduced to one in number. Still, it is hard to tell. We three held the field before the fire, and I am inclined to think we will hold it till we die off. Then the question arises, "When shall we three meet again." Aren't we three lovely graces? We are all fixing up somewhat for the coming season. The Washington Brick and Lime Company has just finished six tunnel dryers, and is now making common brick along with a full line of the finer wares, regardless of the wind and weather. N. Triplet is resetting his engine and boiler and fixing up generally. We are putting in a disintegrator and some other minor appliances for improving and cheapening our goods. Yours truly,

Spokane, Wash., Dec. 23, 1895. J. T. DAVIE & CO.

From a Satisfied Knickerbocker.

Publishers Clay-Worker:

Inclosed please find $2 to pay our subscription for the Clay-Worker for year ending 1896. We feel that we could not be without the Clay-Worker, and gladly look for its appearance every month. Take great interest in the discussions published of the National Brick Manufacturers' Association. We have had a very busy season throughout, with both building and paving brick. Our output has been greater than ever, and the sales are increasing each year. We have shipped all of our paving brick this season to Wilkesbarre, Pa., although having supplied some in Olean, Rochester and Elmira, this State, as well. We have manufactured paving brick for upwards of four years, and are pleased to say that up to the present time we have never furnished a single brick to replace any from undue wear or any other cause, which certainly speaks well for our brick. The prospects are first-class for a larger trade the coming year in this section of the country. Wishing you the compliments of the season, we are very truly yours,

I. PRESTON, Secretary. PRESTON BRICK COMPANY.
Hornellsville, N. Y.

New York Market.

Editor Clay-Worker:

Mild weather prevails, though it is Dec. 30, so that the demand for brick should be good for immediate consumption, but it seems that the manufacturer is doomed to disappointment both as regards prices and the call for his stock. All channels for navigation are open, and vessels could be placed on the market without any hindrance from ice; in fact, shipments of brick from Kingston, one hundred miles from New York city, are reported at this writing. The cold snap in the earliest part of the month closed the Hudson down to Haverstraw, and the Hackensack, as far as shipments of brick was concerned, was "nil."

The general expectation was that, the supply being reduced to South Jersey and Haverstraw Bay, the long-looked-for, but late to arrive, decided advance in price would be a reality.

"Hope deferred maketh the heart sick" is an old saying. From present outlook the hope of any advance is still to be looked for. The quantity placed on the market from Haverstraw was more than sufficient for all wants, and left a surplus at the docks.

The rates at present are below the corresponding date of a year ago from 25 to 37½ cents per thousand, with a probability of a still further decline. The buyers seem to think that they are conferring a favor in purchasing what they want, which certainly shows that they have no fear of being left without material or that they have stocked enough for their wants. As, no doubt, the shipments this week will be free the shipper is placing the market in his hands. Your readers must think as they read the market report from month to month that the shippers, after stopping manufacture, would so handle their stock that a steady advance would result. It seems that a raise of only an eight has the same effect that a "bull" movement on the Stock Exchange brings out, long stock, i. e., increased shipment of brick. The market report in November Clay-Worker was low for that time of year. Within three weeks after the advance in brick of 12½ cents per thousand, they receded 25 cents per thousand, making a quotation of an eighth of a dollar per thousand below the figures given in November. The amount of stock under the sheds at Hackensack is ten million more than at this time last year. I have not present the returns from all other sources. The general expectation is that it will exceed that of last year's by several millions.

The outlook for remunerative rates in the spring is not of a rosy hue. Unless the balance of the winter is very severe the rivers will be open by the first of March, and probably at an earleir date, when everybody will send brick to market. Our local trade is very dull at present. Some of our home manufacturers, expecting a good demand and an increase in home trade, molded about a month later than last year and now find that they have stock that cost them more to make and no remunerative returns.

—A Successful Man—

Among the many who have manufactured and are at present engaged in the manufacture of brick was John C. Rose, whose notice of death was in the November number of the Clay-Worker.

His knowledge of the trade was limited to a short service on yards when a young man. As far as a thorough knowledge of manufacture from A to Z, he was not in it. When he took hold as a manufacturer it was at a time when the old skippers thought it was foolhardy, as the trade was not in good shape. In 1877 he bought the lease and fixtures of a yard in Grassy Point and the next year purchased the adjoining yard from parties who, a few years before, had paid about thirty thousand dollars for the lease and fixtures, the rent was ten per cent., which was a great help, when low prices were prevailing.

His aim was always to make a grade of brick that would have a reputation for quality. In 1875 the manufacturers along the Hudson combined to restrict production, as the previous year had been a very poor one in a financial way. If memory serves me right he was the only one of the Haverstraw manufacturers who would not sign for a reduction, with the result he made all that he could. As the others were reducing their output, he made many thousands of dollars. It has always been his course to attend all meetings of the manufacturers, but never join with them in the movement. However, he always had some proposition to place before the meeting that would be of a personal interest to J. C. Rose. It was not over five years from his first purchase of the yard before he bought one-quarter of the property which had ten leased yards on it, pay- $75,000 for it. A short time after he sold out all his interests in Haverstraw and purchased the Bancroft-Davis property on the south side of Danskamer Point, three miles above Newbery, N. J., and called it "Roseton," where, at the time of his death, he had a plant of sixteen machines, with an annual output of between thirty and forty million. He was a strict prohibitionist, and, I was going to say, that he conducted his yard on those lines. If a man got drunk on the property he was paid off. If all were not at work on Monday and drink was the cause, the offenders were called to the office and paid what was coming to them. Arbitrary in many ways on the yard, he always had plenty of help, simply because he paid more wages. He was always honest in loading brick. If the cargo was hard it was made to run strictly on these lines, no light brick allowed to be put in, so that the Rose brand was second to none that went on the market.

—An Important Innovation.—

He was not only a successful brickmaker, but was the first to introduce the transportation of brick by barges. When he first came to Haverstraw he had a canal boat, in which he carried brick to the New York market from his brother's yard. As all cargo had to be carried in the hold, it was slow and expensive loading. He tried to interest some of the manufacturers to join him in building a barge. After a time, Mr. S. G. Mackey consented and a boat was built that would carry one hundred and fifty thousand. Before she was launched other manufacturers laughed at them, saying she would be a failure, as the cargo was too large and that they would not be able to get berth room to discharge the cargo. Well, she was a success and made him many thousands of dollars, and those who laughed at his foolishness of building a boat of that size now own boats that will carry double the number of brick. A boat of that size now would not pay expenses.

—Death of George S. Wood—

Senior member of Wood & Keeman, brick manufacturers, of Haverstraw, has been called home, and there are many who will miss his friendship and bounty. As a manufacturer of brick his had been a long term of years in common with others. He has had prosperous as well as dull times, which caused him to give up manufacture. The yard that produced the Wood & Keeman brick was for many years a horse-power temperer, and about eight years ago they put in steam and soak pits. They found that they could make as good brick, and at less cost, than by the old way. Of the many yards in Haverstraw the Wood & Keeman is the only one that ships brick by sailing vessel. Mr. Wood was the oldest son of Jimmie Wood, the father of the use of coal dust in brick. He learned the trade with his father, and had a good teacher.

—The Market—

The weather favors the material man, while the manufacturers must suffer in the range of low rates, as well as the depletion of stock that ought to be at least fifty cents per thousand more. Navigation has been closed and opened, so that shipments have kept rates low for the time of year. To judge by other years, if navigation closes within the next week, it will not remain shut more than a month or six weeks at the longest, so that what stock is piled in the yards for winter use will be enough, with what may arrive from Long Island, to probably hold the price at the present rate. This date:

New Jersey ordinary	$5.00 @5.12½
New Jersey good	5.25
Common, hand	5.12½
Good	5.25
Fine	5.37½@5.50
Special	5.62½

A. N. OLDTIMER.

The True American Spirit.

Publishers Clay-Worker:

I am in receipt of your pathetic appeal of the 23d inst., and hasten to alleviate the stress upon your exchequer by forwarding my "mite." I regret that I cannot forward same in specie to increase your "gold reserve," not having seen the color of that precious metal for an age. However, I thoroughly appreciate your services in the past, and should the Venezuelan gold mines bring a flux of that article into our market will be careful in future to remit in same. I would offer the suggestion of issuing bonds, but in case these should be shunned on the market I think you could with justice increase your tariff. At any rate, continue to send the Clay-Worker. I heartily reciprocate your good wishes, hoping the inclosed Canadian ammunition will cause no dire effect upon entering your office. Yours respectfully, CHAS. SHEPPARD.

Several experienced fire-brick manufacturers advertise for situations in our "Wanted, For Sale," etc., columns.

Our English Cousins Organize.

Editor Clay-Worker:

The Institute of Clayworkers, 222 Strand, London, W. C.,
Nov. 13, 1895.

It may be of interest to your readers to know that we have recently started the above Institute at this address. It is an association of clayworkers somewhat similar to your National Association of Brickmakers. All clayworkers in all parts of the world are eligible for membership, and the annual subscription, which includes a copy each month of the British Clayworker, the official organ of the Institute, is only 21s 3d per annum. In connection with the Institute we have opened a large meeting room at this address, where a collection is kept of bricks, tiles, terra cotta, etc., from all parts; literature appertaining to the trade, copies of the most important journals, etc.; legal decisions, and any other matters appertaining to the trade. It is proposed during the winter to hold meetings here and have papers and discussions upon various matters of interest to brickmakers. I need hardly say that one of the great objects of the Institute is to promote good feeling among the different manufacturers, and at the same time to bring them in direct touch and closer connection with architects and others who use or are interested in the various clay products. Our membership is already very representative, and the idea has been well supported in all parts of the United Kingdom. Edgar Webster (Wood & Ivory, Limited, West Bromwich) is our Chairman; St. Greville Montgomery, Honorable Treasurer, and G. M. Callender, Honorable Secretary, and our committee being chosen from representatives in various parts of the country. We have at present a very good collection of bricks, tiles, etc.; among others I would mention specimens from the Don Pressed Brick Co., Toronto, various German makers, Spain, Belgium, Italy, etc., whilst we have been promised samples from Australia, India, Mexico, South Africa, and other colonies, and as we would like to have a good collection of American manufactures in the clayworking line, we would be very pleased to receive samples from any of your readers who will be kind enough to forward us specimens of their goods, to be exhibited here, duly marked with their name.

Apologizing for troubling you about this matter, and thanking you in advance for your kindness, I am, dear sir,

Yours very truly,
G. M. CALLENDER, Honorable Secretary.

P. S.—I need not say that we shall be only too happy to see any of our American friends if they will give us a call when they happen to be in this country.

How to Build Smokestacks.

Editor Clay-Worker:

I have gone over the December Clay-Worker with a great deal of interest. There is a vast deal of "meat" in it. One feature that interested me very much was the discussion on building smokestacks. Some years ago myself and other parties built two stacks, one for a boiler, the other for a down-draft kiln. The outsides of both were square. The boiler stack was built with a hollow wall for perhaps one-half the height. The kiln stack was built with a core. The brick forming the core were fire brick blocks, taking about four to each circle (flue, if I remember rightly, was about 36 inches diameter). These blocks were four inches thick. Header courses projected from the corners of the outside brickwork to steady the core. I have seen the flame going out the top of this stack (which was about sixty feet high), but never a crack in the outer brickwork. Building the circle of blocks saves a great deal of time and takes less mortar, of course. I have never paid much attention to the stack building here, where there are perhaps hundreds of them, but I have noticed very few defective ones.

A very beautiful stack is the one at the Weber Retort Works on the Raritan, above the city. This is a round stack, built of hollow brick imported from Germany. The stack, I believe, is 165 feet high, and is a landmark along the Raritan river. Even the mason was imported to build this, and 'tis said the one man built the whole stack, taking several months to do the work.

The different clay industries here in Jersey are quite busy, but now that the days are short, the work has been cut down, as is usual in the winter months. Ostranders have closed down for repairs, which will require several months. W. R. O.

THE CLAY-WORKER

Entered at the Indianapolis postoffice as second-class matter.

A Practical Illustrated Monthly Magazine, devoted to Brickmaking and allied Clayworking Arts and Industries.

THIRTEENTH YEAR OF PUBLICATION.

OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

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☞Subscribers when ordering a change of address should give both the old and the new address.

ADVERTISING RATES

Furnished on application. The CLAY-WORKER is unquestionably the most effective medium in its field, and character and circulation considered it is the cheapest. To insure insertion in current issue, advertising matter should be sent to office of publication on, or before the first of the month.

Correspondence on all subjects of interest to Clayworkers solicited. All communications should be addressed to
5 Monument Place.] T. A. RANDALL & CO., Indianapolis.

VOL. XXV. JANUARY 1896. No. 1.

CURRENT COMMENT.

Have you renewed your subscription to the Clay-Worker for '96? If not, gentle reader, NOW is the time. Don't put it off until you can think to get a bank draft, but just send us your check or postage stamps, or a two-dollar bill, and we will do the rest.

* * *

The Fire Brick Manufacturers are moving in the right direction. The report of the Convention in this issue indicates clearly that they appreciate social pleasures and know how to enjoy the good things of life. Also, that they are weary of laboring for glory, and propose to look more to the profit side of the business.

* * *

The Illinois Clayworkers' Association meets at Streator, Tuesday and Wednesday, the 21st and 22d. A good programme has been prepared, and the brethren at Streator, under the lead of genial Mr. Plumb, will see to it that all who attend the Convention are well entertained. If you enjoy a good time, don't miss the Streator meeting.

* * *

The various State Associations are soon to meet in annual convention. As will be seen by the programmes in our columns, ample arrangements have been made for the entertainment of all who will attend. These yearly gatherings are instructive, and therefore helpful. There is both pleasure and profit in them, so put your house in order and join the band.

* * *

Thanks to the hundreds of subscribers (if we were from Chicago we would say thousands of subscribers) who have promptly remitted for the Clay-Worker for '96, our "gold reserve" is now in a healthy condition. We can stand prosperity, and would therefore be very grateful to those who have so far neglected that little detail if they will take this gentle hint and send their yearly mite without delay.

THE TRADE OUTLOOK FOR 1896.

It is well to "take account of stock" at the beginning of the new year, and to compare assets with the inventory of the preceding year. But it is not less important to forecast the coming year, so far as we may be able, and to begin at once to make its possibilities, probabilities or certainties. These depend more upon individual plans and purposes than upon what is so often called "the times." He seldom succeeds who depends chiefly upon being carried along by the current, and yet a large per cent. of business men look more to "the times" than to their personal efforts for success. There is, after all, much less in the current of affairs than most men suppose. Sometimes even sluggards and blunderers reap an undeserved harvest because by some accident the tide has favored them. But the successful men of the world are those who "peg away," no matter which way the tide of affairs may set.

* * *

Eighteen hundred and ninety-six starts out propitiously to those who are not always looking for adversity. For several weeks the American people have indulged in the rare experience of talking war—big war with a big nation. It would be difficult to exaggerate the profound satisfaction this has afforded us. No one has supposed for a moment that there was the least danger of a war between this country and England on account of that little strip of territory about which there is a dispute, or any other possible question. We know each other too well, whether we love each other or not. And now comes a possibility of a war between England and Germany, and possibly between all Europe and Turkey. Well, what has all this to do with the year's brickmaking? Just nothing at all. But what of the gold and silver question, and the bonds and reserves? Will not these affect our brick industry? Not in the least, except so far as some of us choose to neglect brick-burning to look after the "burning question" of finance. But this is to be presidential election year. Will not that demoralize business? It never did, though sometimes it demoralizes a class of business men, while the real business man keeps right along, making it as much a part of his business to read, and think, and hear, and vote as it is to fire his kiln in its seasons.

* * *

As there is nothing in "the times" to forebode disaster, let us look at the signs which indicate a year of prosperity. First of all, there is every indication of an increased demand for the output of our manufactories. Perhaps there is no surer index to the demand than the books of the architect at this season of the year. From all quarters there comes the information that in no January for many years have the architects had in hand the plans and specifications of so many new buildings. These range from the humble dwelling to the costly sky-scraper, but they show the demand for material. Already in towns and cities which are to use paving brick the preliminary steps for street improvements for the next summer are not behind those of the most busy years heretofore. So we may conclude that the demand will be encouraging. Confirmative of this, we learn from a number of our advertisers of brick machinery that at no time in recent years have they had as many inquiries for machinery at this time of the year as now. This is corroborative of the information received from the architects. Brickmakers are not slow to foresee the local demand upon them, hence they are thus early preparing to meet it.

* * *

But what is the outlook as to prices? In a word, we may say it was never better. By this we certainly do not mean they were never higher. Good prices are always relative. Even the net profits of a year's output, measured by dollars and cents, do not always indicate the relative profitableness of the year. Not only must the cost of production constitute an important factor, but the purchasing power of the dollars must also be considered. There can be but one possible prevention to the profits of the coming year, and that lies within the control of those engaged in brickmaking. It is not to the credit of our craft that we have profited less by mutual co-operation than almost any other industry. There is among iron-workers and wood-workers, and all other industries but ours, such a tacit if not concerted agreement as to prices for goods of a given quality that the choice of the purchaser is determined by the quality or by some personal or accidental consideration, which cannot possibly be construed as a cut of prices. Why may not brickmakers in some way come to a similar understanding?

* * *

The time is ripe for concerted action toward the establishment and maintenance of reasonable prices. For several seasons low prices have ruled in almost every section of the country. Only in a few localities have fair prices been obtained the past season, and in almost every case this has resulted from local organization. Such examples of prosperity as are afforded by the brickmakers of New England are attracting the attention of the whole craft. Chicago is in line with a business-like organization that bids fair to lead the brethren of the Windy City from the Slough of Despond to the Peaceful Valley of prosperity. Prices have not been advanced unreasonably, but brick are no longer sold for less than the cost of manufacture. Good, hard builders bring $5.50 to $6 delivered, and the market is stable—a condition favorable to contractors and builders. The consumer, even, is benefited, because the entire community is more prosperous. These are facts that must influence clayworkers in all lines, and, we believe, portends a larger measure of prosperity. The outlook for '96 is hopeful.

WHAT MUST WE DO TO BE SAVED FROM RUINOUS COMPETITION?

Some weeks ago Mr. Homes, chairman of the Executive Committee of the National Association of Fire Brick Manufacturers, sent a letter of inquiry to those interested in the manufacture of fire clay and other products, asking for information and suggestions as to the best means to be pursued in organizing the business of the various branches of the fire brick industry looking to restraints in competition, and hence an increase in profit to those engaged in that business. Numerous replies were received giving advice and suggestions, but no definite action was taken. The following are a few of the replies:

OPINIONS OF REPRESENTATIVE MEN.

Mr. Walter S. Dickey, of Kansas City, says that the Western sewer pipe manufacturers have had an informal association, but have never been able to get any scheme which would satisfy all. He has attended many meetings of the associations, but there was always some fellow who would kick out of the traces. In one meeting, held at Akron, O., there was a proposition to tax all members per square foot of kiln area to provide for the maintenance of the association and its consequent train of inspectors. The refusal of one firm to sign caused the collapse of the scheme. The anti-trust law has embarassed those who wished to form trust organizations in many of the Western States. Another effort of organization was to bring together competing firms along lines of railroad. This scheme contemplated the selection of a committee, who would visit each plant, ascertain sales, and thus fix their percentage for the next year. Each company was to pay to the treasurer 20 per cent. of net sales, the treasurer to divide his accumulation monthly according to an established percentage, after deducting the cost of running the association. It was claimed that this scheme would prevent one manufacturer from cutting into another's territory and underselling him, as he would have one-fifth of his net receipts to pay into the association, all of which would not come back to him if he oversold his percentage. One or two members who would not go into this scheme defeated it. Another plan which failed was to consolidate two companies, and to incorporate their selling interest in a third. This would sell all the pipe of both concerns. This was to be a local organization of Kansas City. Mr. Dickey speaks well of this as a territorial plan. Say ten competing organizations should come together with a capital of $20,000, each producer putting in $2,000. The selling company makes contracts with each producer to buy a fixed percentage of the goods, determined by his manufacturing capacity and yearly sales. The producer binds not to sell to anyone but the central company, which takes orders, apportions them in a way to ship from the most convenient point. The price paid by the central company would be the nominal cost at works, and equal to all. It would distribute the products in proportion as the goods were furnished. Mr. Dickey says that this scheme has worked for over a year where there were two participants. Another plan mentioned was the formation of a large company to buy all Western sewer pipe plants from one big company, pay for the same in bonds and stocks, and manage the entire business. Mr. Dickey feels confident that if he could drop other business for six months or a year he could get Western sewer pipe manufacturers into an association which would pay handsomely. Mr. Dickey inclosed a clipping showing the proposed methods of a sewing machine trust. The object of the association is to combine all agencies in each city and town, and to dispose of all the different makes of sewing machines in the United States, there being no consolidation of capital whatever.

* * *

The Hon. George H. Barber, President of the Michigan Stove Co., ex-President of the National Stove Association, and President of the Board of Trade of Detroit, Mich., says: "I have always advocated, and do still, that there is everything in favor of an association of manufacturers organized on reasonable lines. The first thing necessary is the honesty of the various members. I believe in having the by-laws and agreements based on reason." Mr. Barber does not believe in selling cheaper than your neighbor just because you can produce cheaper. If one can produce 5 or 10 per cent. cheaper than his competitor, and yet merely meets his price, he can put a good profit in his pocket at the end of a year. He believes that if one can get 50 per cent. of the manufacturers to join an organization that it is of interest to become a member of it. He speaks of one organization of nine members who maintained a steady market for at least three years. Other manufacturers did not know of this association, but they did appreciate the steady market. Mr. Barber is one who does not believe that it was always necessary to have signatures to an agreement. A man's word ought to be sufficient. He further argues strongly in favor of association.

* * *

Mr. Luzard Kahn, of Hamilton, O., says: "Outside of a strong organization acting for and in behalf of individual manufacturers by absolute consent of the latter, there is no effective remedy against the evils of unlimited production and unlimited markets. Remedies of every description, and depending upon the good faith of the individuals, have been tried and found inadequate and impotent. Pooling, as I understand it, is carried on by allotment by other industries, and a division of profits made each six months. Percentages are based upon average sales. Prices and sales are fixed by executive committee acting through a commissioner, who is a salaried officer. Members give bond to the organization. Members continue to sell their own product at prices and terms fixed by executive committee only." Mr. Kahn makes a strong appeal in the following language: "Some manufacturers object to the surrender of the management of any branch of their business, and frequently refuse to participate in effective co-operative organizations on that account alone. If they, however, were to remember that under their management their business has gone from bad to worse, despite everything they were able to do in their individual capacity, it seems to me that in the face of impending calamity that otherwise commendable sentiment cannot help yielding. It should be remembered that under existing conditions of competition no house controls the commercial end of its business. The smallest and veriest disturber fixes the market for the largest concern, so that, without the central organization, to which objections are made, all sales are in fact controlled by outside influences. If that be true, it would be the part of wisdom to look the facts square in the face and lodge the commercial end of kindred industries in the hands of persons who shall exercise them for the mutual benefit of all."

* * *

George D. Dana, of St. Louis, Mo., ex-President of the National Stove Association, and President of the Excelsior Manufacturing Co., is a believer in local organization, and that more benefits can be derived from it than national association. He mentions the association of stove manufacturers of Hannibal, Quincy, Belleville and St. Louis, who are all competitors for the same trade. This organization proved to be popular, and continued four or five years. The general result of organization throughout the section has been beneficial, though not always entirely harmonious or compact.

* * *

Letters of encouragement, commendation and advice were received from a number of others interested in various trade organizations, including I. M. Justice, of Loudonville, O., Secretary Ohio Brick and Tile Association; J. W. Arbuckle, Secretary Indiana Tile Manufacturers' Association, Windfall, Ind.; G. C. Stoll, of Grant Park, Ill., Secretary Illinois Clayworkers' Association, and Alfred Day, of Steubenville, O.

THE SCIENTIFIC SCHOOL FOR CLAYWORKERS.

The school for clayworkers at Columbus is one of the most encouraging developments which has come to our practical, "hard-headed" manufacturers during recent years.

There are manufacturers who go along in their own selfish way, spending millions upon millions of dollars in blind individual experiments. The general interchange of opinion, the willingness to discuss facts when presented to a scientific institution like that at Columbus, will save hundreds and thousands of dollars to this country.

The millers of America wasted untold fortunes in individual experiments. Each one was trying to keep from the others what he was doing, and almost any moderate-sized mill spent enough money annually to carry on a school that would have been an incalculable benefit to the Nation.

This school at Columbus has come to the brickmakers exactly in the right time. They are now in a position to furnish facts, and the school is in a position to work them out and to make extensive experiments in the future unnecessary.

THEIR WORK NOT FINISHED.

We wish to take issue with the old members of the N. B. M. A. who say, "We old fellows don't amount to much anyway. The time is not far off when the old 'war horses' of the Association must step back." This is false sentiment. The old "war horses" are as much of a necessity to the Association as ever, and will be in the future as much as they have in the past. We want the new blood, of course, but we also want the "old war horses."

Before we have "deductions" we must have "demonstrations." We must have experiments. A friend of ours says: "It rarely happens that the merely scientific gentleman discovers anything. He looks around and sees what the clumsy fellows have been doing—fellows like Edison and other unscientific inventors. The Harvard College, in its scientific department, probably never made a discovery of practical value. An institute of technology deals not with the discovery, but with its history. One never expects to see a great inventor who has gone to a preparatory school say for four years, and from there to a college or scientific institution, and who after that takes a post-graduate course, and still be original—an inventor. He is a useful citizen, but not an inventive one.

"The results which have been attained by the old members of the National Association could have been attained in no other way. It could not have been done by the scientific man. The scientific man is afraid to do the things which have been done by his unscientific brothers. He lacks the courage, maybe, of ignorance. It is the business of the scientific man to gather together the facts which have been deduced by the old 'war horses' and to put them in academic or scholastic form, so that future generations may have a positive record.

"This is the history of nearly all manufacturing work. It is the history of science. The problems are worked out by men who are relatively without scientific education. Then the scientist comes along and tells why it is all true."

We do not know that we can subscribe to all of this, as stated by our friend above, but it is certain that there is a great deal of truth in it.

BRICK-PAVING HISTORY.

We sounded the warning several years ago. We said that the way in which brick for paving purposes were frequently being made, the careless way foundations were being prepared and the cheap material out of which foundations were being made in some localities were bringing to brick-paving history a heritage which it would take quite a while to live down.

There are brick pavements and brick pavements. The quality of the brick is better understood by the public and the brickmakers than formerly. In speaking of the public it must be understood that it is quite a factor in the brick-paving business. Public opinion goes a long ways. It is public opinion which allows one material or another to be used in the paving of streets. Public opinion, however, must not be followed too far, for the reason that the public is apt to favor the cheap thing. On the other hand, it expects it to be good. The catering to public opinion with respect to cheapness has caused many pavements to be laid on poor foundations, or practically no foundations at all, and the public, which does not discriminate too closely, says oftentimes, as the result of poor foundations, "We want no brick pavements in ours. Give us asphalt at its high cost, or wood, or other material, but no brick." While this opinion has not been general, it has been influential.

Nothing less than a good concrete foundation should be used for a brick pavement. It is the effort to cheapen in the foundation which has reflected through to the surface, and has caused the bad history which we must now acknowledge, explain the cause, fight and live down. We may take the best brick that ever was made for paving purposes, place it on a bad foundation, and the public will see but the surface and condemn the brick on general principles. The public does not discriminate closely. It estimates by surface results.

It is the business of those who are making brick to use their influence in the interest of good foundations for brick pavements. It does not do to say that we are in the business of making brick—there our responsibility ends. While the responsibility may end there, the brickmaker's interest does not end there. Good pavements, from whatever cause, are to his interest, and as a good foundation is necessarily a great factor on good pavements, then it is a part of the brickmaker's business to use his influence and to see that the brick are laid on the right kind of foundations.

Talk about it in a public way. Write about it in public prints. Make a noise. Let the public know that people who manufacture brick are not responsible for poor foundations. Then the public will demand good foundations.

Good second-hand machinery may be easily disposed of if advertised in our "Wanted, For Sale," etc., columns.

THE OHIO ASSOCIATION.

The Seventeenth Annual Convention of the Ohio Tile, Brick and Drainage Association Will be Held Feb. 12 and 13, 1896, at Columbus.

—PLACE OF MEETING.—

The meeting will be held in the Council Chamber, City Hall, opposite the Capitol. The Director of the Clayworkers' School issues the invitation specially and the officials of the State University generally to our Association to hold its meeting at the University. Our Executive Committee has decided to accept in part this kind invitation and to hold our last session at the University, where Prof. Edward Orton, Jr., will illustrate his paper on "Measurement of High Temperatures for Clayworkers" by the use of kilns fired with gas. This session will be interesting and highly instructive.

—HOTELS AND RATES.—

Neil	$3 per day
American	$2 per day
Schrader (European plan)	$1 per day and up

—RAILROAD RATES.—

As our Convention is to be held at the same time as the meeting of the Republican League of Clubs for the annual Lincoln banquet, our members will have the benefit of their very low rates.

—PROGRAMME.—

1. Enrollment.
2. Report of members on the year's work.
3. President's Annual Address.—W. B. McClure, Warsaw, O.
4. "Thirteen Years in the Tile Business."—F. Halbeisen, Erlin, O.
5. "Why I am Attending the Clayworkers' School."—E. E. Gorton, Columbus, O.
6. "The Importance of Water on Plant Production."—Prof. T. F. Hunt, Columbus, O.

6½. "From the Clay Bank to the Kiln."—J. A. Ebersole, Canton, O.

7. "Hollow Building Blocks."—Ed F. Darnell, Grove City. General discussion, led by J. W. Everal, Westerville, O.
8. "The Clayworker's Tribulation."—Wm. C. Wilson, Brice.
9. "The Need of Organization to Regulate Prices."—J. J. W. Billingsley, Indianapolis, Ind.
10. "Road Making."—J. W. Penfield, Willoughby, O.
11. "Paving County Highways."—Capt. Wm. S. Williams, Canton, O.
12. "Needed Legislation on the Drainage of Public Highways."—B. B. McGowen, Mt. Gilead, O.
13. "The Preparation of Clays."—W. A. Eudaly, Cincinnati, O.
14. "Improved Methods of Drying Brick."—W. D. Richardson, Cleveland, O.
15. "Measurement of High Temperatures for Clayworkers."—Prof. Edward Orton, Jr., Columbus, O.
16. Miscellaneous business.
17. Report of Secretary and Treasurer.
18. Report of committees.
19. Election of officers. Adjournment.

Note.—At the close of each address or essay all are invited to take part in the discussion.

Are you coming?

The Executive Committee has spared no effort in completing all arrangements and securing material for a programme which would insure us a successful Convention. We feel fully rewarded for our labors, and cordially invite all clayworkers and lovers of the ceramic art, including those whose genius has elevated clayworking, to join with us in our annual Convention, and there let us socially exchange experiences which shall be guide posts to prosperity. Are you coming?

W. B. McCLURE,
ED F. DARNELL,
I. M. JUSTICE,
Committee.

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BOOKS FOR BRICKMAKERS.

"BRICKMAKER'S MANUAL."—Morrison and Reep............................$3.00
"BRICKMAKING and BURNING."—J. W. Crary, Sr.............................. 2.50
"TABLE OF ANALYSES OF CLAYS." Alfred Crossley........................ 1.00
"VITRIFIED PAVING BRICK."—H. A. Wheeler, E. M......................... 1.00

Mailed, postage free, on receipt of price. All of them to one address for $6.00. Address

T. A. RANDALL & CO., Indianapolis, Ind.

We also fill orders for the English work entitled "THE MANUFACTURE OF GLAZED BRICK," H. Greville Montgomery, $2.00; and "PRACTICAL FARM DRAINAGE," J. J. W. Billingsley, which treats on the manufacture and use of drain tile. $1.00.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville, Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER, Telephone Building, ST. LOUIS, MO.

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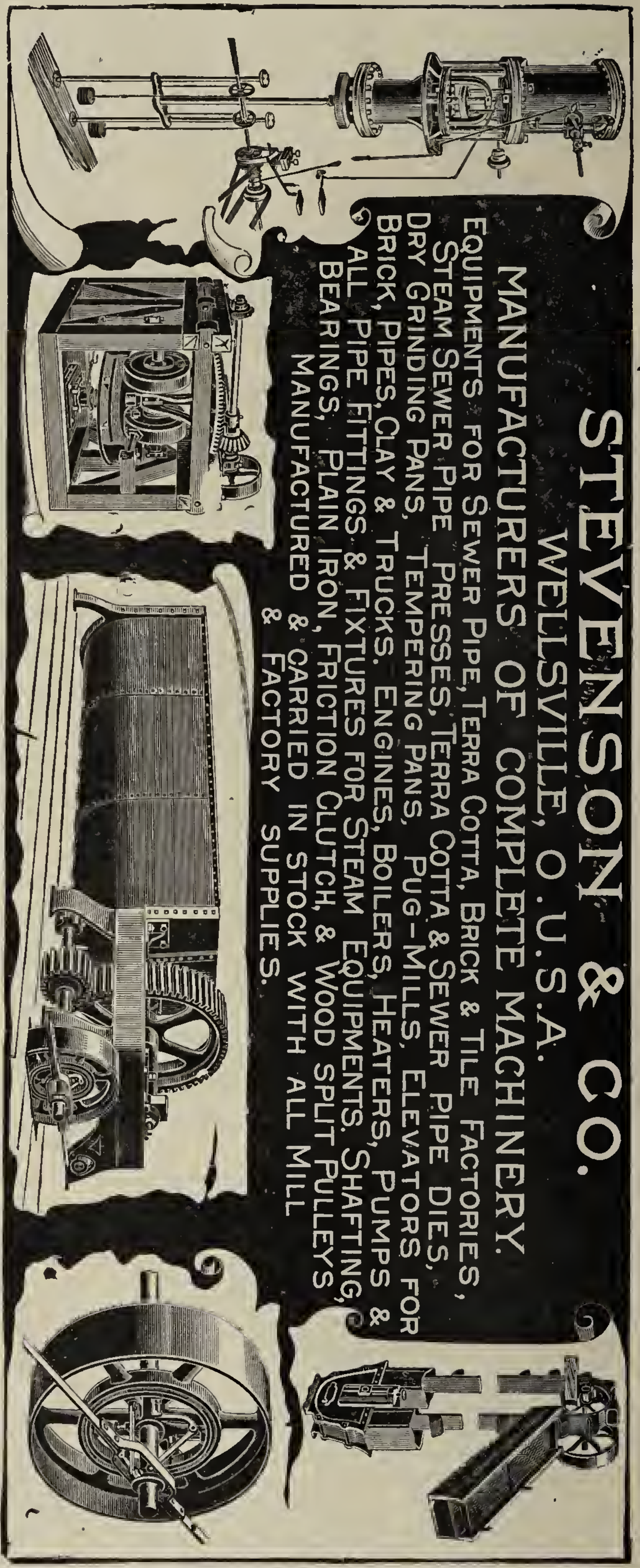
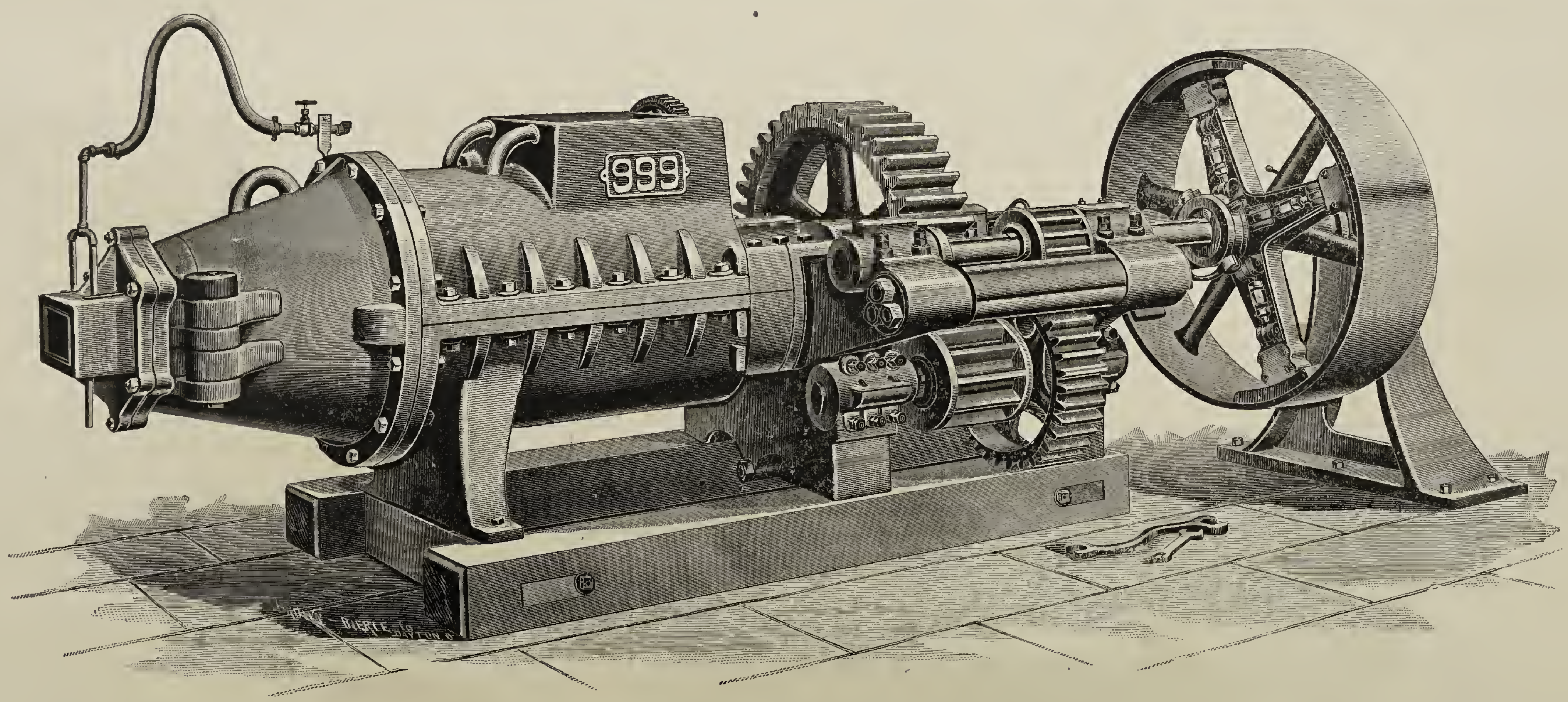


STEVENSON & CO.
WELLSVILLE, O. U. S. A.
MANUFACTURERS OF COMPLETE MACHINERY.
EQUIPMENTS FOR SEWER PIPE, TERRA COTTA, BRICK & TILE FACTORIES,
STEAM SEWER PIPE PRESSES, TERRA COTTA & SEWER PIPE DIES,
DRY GRINDING PANS, TEMPERING PANS, PUG-MILLS, ELEVATORS FOR
BRICK, PIPES, CLAY & TRUCKS. ENGINES, BOILERS, HEATERS, PUMPS &
ALL PIPE FITTINGS & FIXTURES FOR STEAM EQUIPMENTS. SHAFTING,
BEARINGS, PLAIN IRON, FRICTION CLUTCH, & WOOD SPLIT PULLEYS
MANUFACTURED & CARRIED IN STOCK WITH ALL MILL
& FACTORY SUPPLIES.

Speculation May be a Better Sounding Name than **Gambling,**

But it Costs Just as much; Don't Speculate in Inferior Brick Machinery.



Buy the **999** and you will get one that is **a Dead Sure thing every time.**

C. W. RAYMOND & CO., OF

DAYTON, OHIO, make it.

They also make some other things. Send for their Catalogue.

CALENDARS GALORE.

A flood of calendars always comes with the new year, and this season's crop is the largest we have ever harvested. In form, size and color they are as varied as a woman's fancies. The latest arrival is a work of art —high art—the principal feature being a lovely female figure suspended in the heavens and wearing a sweet smile and a wee fragment of the milky way. Beneath it is inscribed, boldly, "The Frost Manufacturing Co., Galesburg, Ill.," and we at first thought friend Harrington had captured Trilby while at Atlanta and was displaying her in a new pose. On closer scrutiny we find it is not Trilby, but Phoebe, a goddess of night, evidently, and we are consequently puzzled as to where Harrington found her, for we never knew him to go anywhere evenings, except to the Powwow. A pretty though odd conceit comes with the compliments of J. C. Steele & Son, Statesville, N. C. It is an allegory in colors. The "New South" brick machine is shown working in a snow bank. The idea conveyed is that these machines will work anywhere you put them. Next to our own homely slate, one of the plainest and most desirable calendars received is that of the Eastern Machine Co., New Haven, Conn. Its only ornament is a cut of the "New Haven" brick machine—a pleasing picture to those who use it, we judge from a line which reads, "Every machine is giving perfect satisfaction." In marked contrast to this is one bearing the imprint of J. L. Burnham & Sons, brick manufacturers, Milwaukee. It is executed in bright colors, gives a general view of their extensive works, and excellent portraits of J. F. and Clinton Burnham, who look more like prosperous bankers than humble delvers in clay. The Kentucky Construction and Improvement Co., Mayfield, Ky., contribute one of the handsomest and most appropriately decorated calendars of the season. A view of their clay bank, which makes a very pretty picture, is shown in a frame of small balls labeled "clay." They are miners and shippers of ball clay. A little gem of an art calendar and blotter combined comes from Charles A. Bloomfield, New York. It is composed of several sheets tied together daintily with ribbon. Upon the last leaf is printed the list of officers of the National Association of Fire Brick Manufacturers and the menu discussed by that body at their recent annual dinner. Another, equally cute and artistic, bears the card of Henry Gleason, the esteemed Secretary of the N. A. F. B. M. Both of these have found their way to our little sweetheart's boudoir. There are many others, too numerous to mention. We have received equally pretty reminders from the J. Downered & Son Co., dealers in molding sand, Zanesville; F. W. Silkman, dealer in minerals, clays, etc., New York city; W. E. Langenberg, manufacturer building and fire brick, Stevens Point, Wis.; the Clinton (Ind.) Paving and Building Brick Co., and the Menomonee (Wis.) Pressed Brick Co. The latter send a combination daily calendar and memorandum pad that is very useful. The demand for these in former years has been so great that they have determined to offer them to those not on their trade list at 25 cents a copy.

TRADE LITERATURE.

THE HENRY MARTIN BRICK MACHINE MFG. CO., Lancaster, Pa., has favored us with a copy of the 1896 edition of their illustrated catalogue of tempered clay brick machinery for both steam and horse power, including molds, barrows, trucks, tempering wheels, kiln castings, and all appliances required on a soft clay plant.

FREDERICKS, MUNRO & CO., Farrandsville, Pa., have out a new catalogue of fire brick, of which they make a large variety. Brickmakers who intend building new kilns should write them for a copy. This firm have also favored us with a very neat memoranda book.

C. W. RAYMOND & CO., Dayton, O., are mailing their sixteenth annual catalogue of brickyard supplies, a book of forty odd pages, in which is illustrated everything needed about a modern brick plant, from a drum hoist to a barrow. A large line of dumping cars are shown, as well as the customary assortment of molds, tempering wheels, trucks, etc., etc. Write them for a copy.

THE ST. LOUIS IRON AND MACHINE WORKS send us a neat little booklet telling of their "St. Louis Corliss" engine, which they claim has no superior for heavy duty. They also make the well-known Lion dry press brick machine, and will be pleased to mail a descriptive pamphlet to any of our readers.

W. D. RICHARDSON & CO., Cleveland O., have issued the third volume of their pocket edition Brickmakers' Library, which treats on repressing building and paving brick. They will mail you a copy free if you send them your address.

THE SUNSET BRICK AND TILE CO., Gonzales, Tex., have our thanks for an odd little memo. book, as has Byron E. Bechtel, Waterloo, Ont., for a pamphlet describing his centrifugal disintegrator and stone separator.

RODGERS, McDONALD & CO., New Lexington, O., have issued an excellent catalogue of their red and buff pressed brick, of which they make a large number of ornamental designs. A copy will be mailed free to architects and contractors.

THE FULLER ENGINEERING CO., Calvert, Tex., has favored us with a copy of a unique brochure entitled "A Good Thing," the text of which bears a remarkable likeness to that of the little book issued by the Clay-Worker a year or so ago under the same title. However, it tells in an interesting manner the story of their improved grates for brick kilns, which are good things for clayworkers, as stated in their ad.

Iowa's Brick and Tile Association will hold its annual convention February 5th and 6th, at Des Moines.

The penitentiary commissioners, Knoxville, Tenn., have contracted with W. F. Kizer & Co., of that city, to erect a large brickmaking plant on the prison farm and furnish the commissioners with 5,000,000, in the manufacture of which convict labor will be used. After this contract is filled the firm will pay a royalty for the clay used and continue the operation of the plant.

The death of Peter Fell, the pioneer front brick manufacturer of Trenton, N. J., occurred at his home in that city Dec. 18. Mr. Fell was born in Bavaria in 1824, and came to this country when nine years old. At a very early age he began work on a brickyard, and has continued in the business ever since. Mr. Fell leaves a widow and three children and a large circle of friends to mourn his death.

George Shafer, Superintendent of the Radford Brick Co., Tip Top, Va., sends in his year subscription and advises us that they will put in an eight-track standard dry kiln, besides adding two more kilns and a ninety-horse-power boiler and various other improvements. Mr. Shafer further says that trade in that section is very good, and they expect to make 7,000,000 brick in '96, and have a good demand for them.

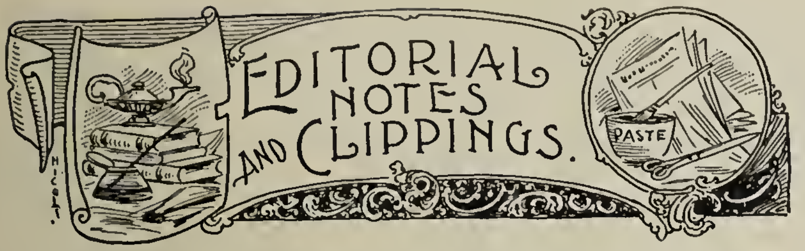
James Crowell, the brick-mold manufacturer at Walkill, N. Y., suffered a loss of $10,000 or more by the burning of his large mold factory, including a large number of molds which were almost completed and ready for shipment. There was no insurance on the plant. Mr. Crowell has made arrangements for convenient quarters in which to carry on his work until he can rebuild his plant, which he expects to do immediately.

S. A. Day, Francisco, Ind., writes that they have a vein of coal at that point which is overlaid with immense quantities of very fine shale clay, and as it is in such close proximity to the coal mine the cost of fuel for use in manufacturing this clay into vitrified paving brick would be very slight, and Mr. Day would like to form a company for the purpose of establishing a plant, and will be glad to correspond with prospective investors.

John Wild, of the firm of John Wild & Son., Toledo, Ia., in a letter enclosing $2 for the Clay-Worker, says: "Brick business was very dull last season in this part of Iowa to speak of, most of brick being used for wells, the dry weather causing a very large number of wells to be dug. Notwithstanding the hard times, we cannot get along without the Clay-Worker, and was very interested in your report of the Convention at Atlanta. I was in that city in 1863 at the battle of Peach Tree Creek, where I received a Minie ball just under my right ear, and then came out through my left cheek. I laid in the hospital there for six months. I wish I could have attended the Convention and seen the old landmarks."

OBITUARY.

Mrs. Lyda Potts, wife of Albert Potts, of the firm of C. and A. Potts & Co., died at her home, 1219 North Pennsylvania street, Indianapolis, Dec. 18, 1895. Mrs. Potts had attended a number of the National Conventions, and will be sadly missed by the ladies at coming meetings, for by her gentle, unassuming manners she had endeared herself to them all.



EDITORIAL NOTES AND CLIPPINGS.

Richard Trist is starting a new brick plant at Racine, Wis.

J. M. Davis is contemplating the establishment of a pottery at Vermont, Ill.

William Stead & Son, Waterloo, Ia., are in the market for dry press machinery.

Jewett & Reynolds, brick manufacturers of Buffalo, N. Y., have made an assignment.

Howarth & Taylor are erecting a vitrified paving brick plant at Edwards Station, Ill.

H. Baldridge, Stonington, Ill., has bought a half interest in the tile factory at Illiopolis, Ill.

A new modern brick plant, in which P. H. O'Brien is interested, is talked of at Brewer, Me.

Welton & Newman, Butler, Mo., have purchased the brick plant of Power & Bro. at that place.

The Industrial Brick Co. has been incorporated at Mount Vernon, Ind., with a capital stock of $6,000.

The Star Brick Co., Sciotoville, O., whose plant was recently burned, are again ready for business.

Saugatuck, Mich., is to have a new brick and tile factory. James Wyer and Jacob Palzer are interested.

Fritz Freese, Monroe, Wis., would like to correspond with manufacturers of tile machinery and represses.

The Stratton Brick Works, at or near East Liverpool, O., was destroyed by fire the 8th inst. Loss, $10,000.

J. A. Littrick, Loami, Ill., is in the market for second-hand machinery suitable for manufacturing stone ware.

A new firm, to be known as the Murphysboro (Ill.) Shale Brick Co., has been incorporated. Capital stock, $30,000.

James Johnson, an old and well-known brick manufacturer of London, Canada, died at his home in that city Dec. 26.

Solomon Banfill, of Bushnell, and William Ward, of Good Hope, Ill., contemplate starting a brickyard at Bardolph, Ill.

The Clinton (Ky.) Fire Brick Co. are making improvements that will enable them to more than double their present capacity.

Isaac Van Luven will equip his brick plant at Goshen, N. Y., with the latest improvements in the way of brick machinery in the spring.

John Snow, of Lowell, Mass., will probably operate the old Sawyer brickyard at Clinton, Mass., which has been idle for some time.

D. L. Flory, of the brick manufacturing firm of Hoover & Flory, of LaPorte, Ind., has established a brick plant at Fitzgerald, Fla.

The Sandwich (Ill.) Brick and Tile Co. have leased land at Plano, Ill., where they will put up a plant for the manufacture of brick.

D. S. Plummer, 12 West Chandler street, West Somerville, Mass., writes that he would like to receive prices and catalogues on dry press machinery.

Brick manufacturers looking for experienced help can get in communication with responsible parties by corresponding with those advertising in our Wanted columns.

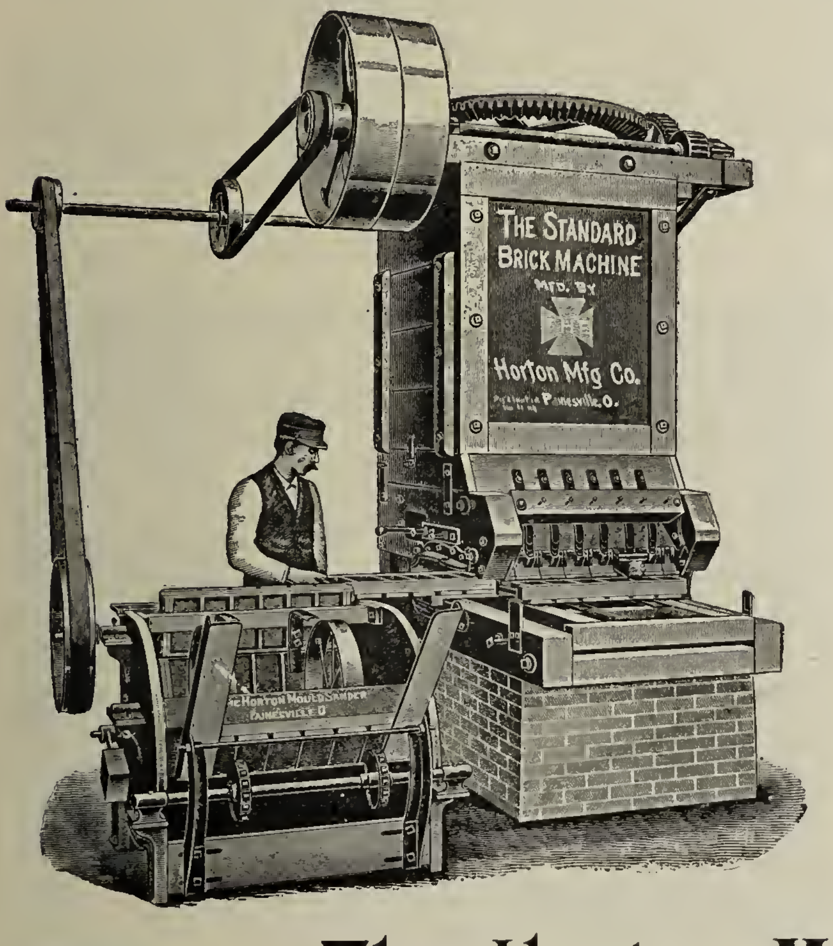
We are in receipt of a letter from H. Hogan, Erie, Pa., in which he says: "I am starting a new brick plant here, and as all the other brickmakers take the Clay-Worker, I would like to have you send it to me."

A. B. Ream, River Styx, O., sends in subscription for Clay-Worker and adds: "The Clay-Worker should be in the home of every brick and tile manufacturer in the United States. Good investments give good results."

Stucker & Coovert, Mt. Ayr, Ind., in a recent letter say: "Enclosed find $2 for the Clay-Worker for 1896. We are in the tile business more than brick, but consider your paper a good one and cannot do without it."

A $10,000 blaze occurred at the Steelton (Pa.) Brick Co.'s works the 20th of December, consuming the entire plant. All the machinery, engines, boilers, etc., are totally wrecked. The

IT WILL PAY YOU to examine the


THE STANDARD BRICK MACHINE MFD. BY Horton Mfg Co. Painesville, O.
THE HORTON MOULD SANDER PAINESVILLE O

Standard Brick Machine,

Horse and Steam Power.

Has been in use more than 10 years and is perfectly reliable in every way.

PUG MILLS, DISINTEGRATORS,
REPRESSES and SANDERS.
TRUCKS, BARROWS and MOLDS,
ENGINES, BOILERS and FRICTION
CLUTCH PULLEYS.

First-class supplies of all kinds.

Catalogue. The Horton Mfg. Co., Painesville, Ohio.

loss is about $15,000, with $5,000 insurance. The fire is supposed to be of incendiary origin. The plant will in all probability be rebuilt at once.

The Christy Fire Clay Co., St. Louis, Mo., advise us that they were awarded the gold medal and diploma of honor for their display of fire brick at the Cotton States and International Exposition, Atlanta, Ga.

The Kountz Bros. Co., of Harmarville, Pa., near Pittsburg, has orders which will run its plant all of next season. These orders are about one-half shale pavers and balance red foundation brick for the Pittsburg mills.

George O. Robinson, Bellaire, O., in renewing his subscription, says: "We find your paper the best that comes to the office, and could not get along without it. We have had a good demand this season, but prices are very low."

The Bloomington (Ill.) Pressed Brick Co. will remodel their present plant, and by the purchase of additional land and the addition of new machinery and appliances be in condition to turn out large quantities of paving brick in the spring.

The Wallace Manufacturing Co., Frankfort, Ind., have recently booked an order for a complete brick plant, consisting of Big Wonder, automatic table, two crushers, elevators, etc., for parties who are enlarging their works in Guatemala, Central America.

The brick works of J. S. Kunz, Cerro Gordo, Ill., was destroyed by fire the 29th ult. The entire plant, including the machinery, is a total wreck. Mr. Kunz is away from home, so the exact loss is not known, but it is estimated to be in the neighborhood of $4,000.

C. & A. Potts & Co., Indianapolis, since the first of the year have sold an outfit, consisting of engine, boiler, two disintegrators, pug mill, trucks and 120 molds, to the City Brick Co., Los Angeles, Cal. Mr. Potts thinks this is but an indication of the season's trade.

William C. Morrison, Washington, D. C., in a recent letter enclosing subscription for Clay-Worker for '96, says: "As long as I am in the brick business I want the Clay-Worker. I consider the last edition, giving the report of the Convention, worth a year's subscription."

William Slack, an employe at the Bolen Brick Works, South Zanesville, O., was fatally injured the 2d inst. He was working in the clay bank, when an immense part of the bank caved in on him, paralyzing his lower limbs, breaking his left arm and dislocating his right wrist.

The people of Gosport, Ind., would like to see a brickyard established at that point, as a number of brick buildings will be erected the coming season, and brick walks will be laid quite extensively. The Chronicle, the leading newspaper of the place, offers free advertising to the brick industry.

The large plant of the Patton (Pa.) Clay Manufacturing Co., which was fast nearing completion, was completely destroyed by fire on Dec. 29, including all the machinery and appliances, which had not yet been used, entailing a loss of from $8,000 to $10,000, most of which will fall on the contractors and the machinery manufacturers, as the plant had not been turned over to the company. The origin of the fire is unknown. Rebuilding of the works will commence at once, and the plant, which was to have been completed in a few weeks, will not be ready for operation for two months.

William G. Brown, a brick manufacturer of Ipswich, Mass., died at his home in that city Jan. 2. Mr. Brown was sixty-six years of age, and had lived in Ipswich all his life. He was a thorough business man of a generous and charitable disposition, and the town of Ipswich will feel his loss keenly.

A. A. Matteson, Treasurer of the Purington Paving Brick Co., Galesburg, Ill., died at his home in that city the 5th inst. Mr. Matteson was also director and Vice President of the First National Bank. He was a man of fine natural abilities, and through his death Galesburg loses one of her most enterprising and public-spirited citizens.

George F. Cotton, Table Rock, Neb., has issued a call to the brick manufacturers of Nebraska, as follows: "A brickmakers' convention is hereby called to meet in the city of Lincoln, Neb., at the Capital Hotel, Tuesday, Jan. 21, 1896, 2:30 p. m., for the purpose of organizing a State Brickmakers' Association and transacting such other business as may properly come before the convention." This is signed by George F. Cotton, of Table Rock, and Henry Gereke, of Norfolk. Mr. Cotton advises us that he and Mr. Gereke have written personal letters to each brick manufacturer in the State of Nebraska, and feel very sanguine of a successful meeting.

FOR SALE—One 50 horse power engine, one 16 horse power engine, brick and tile machines of different kinds. Will be sold very cheap if sold soon. [1 2 d] B. F. TOWNSLEY, Aledo, Ill.

FOR SALE—$3,000 buys plant, capacity 20,000 daily. Shale is mined free and dumped 200 feet from dry pan. Brick costs $3 per M on car. 1 1 c Address RANDOLPH & BEETS, Marceline, Mo.

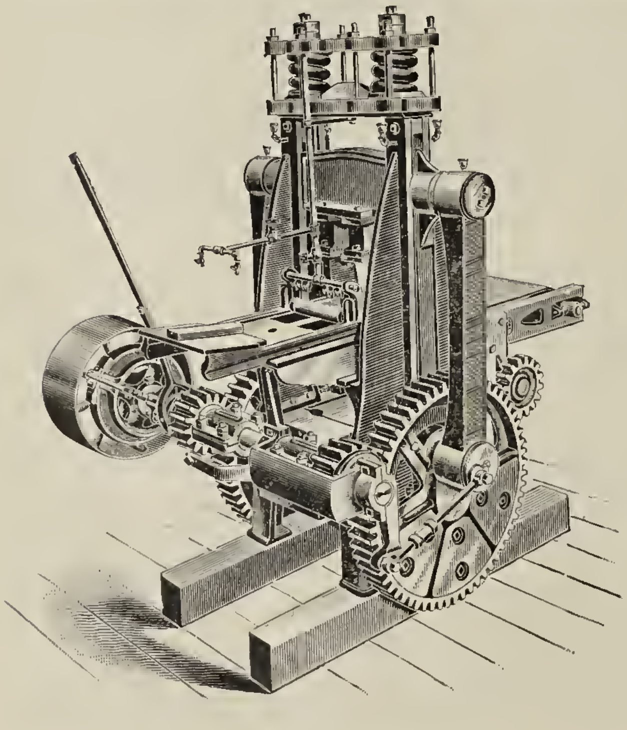
FOR SALE—Whole or half interest of brick plant in gas belt. Free clay. Gas at nominal cost. Good local demand. Address
1 1 d "H," care Clay-Worker.

WANTED—A situation as superintendent by a man of 12 years experience in one of the best known pressed brick companies in the United States. Address "J. H. A." care Clay-Worker.

OWING to the death of our Mr. Blaffer, Jr., we offer our well located plant in the city of New Orleans and known as the Riverside Brick Works, either for sale or rent. The property is located on the Mississippi river in the growing and fast improving portion of the city, and is completely equipped with a E. M. Freese & Co., Galion, Ohio, stiff mud outfit, a 10 track Wolff's Chicago Steam Dryer with necessary cars etc., together with sufficient steam and engine capacity, kilns, tools, appurtenances and supply of clay. Communications from parties with necessary references as to their responsibility entertained by
J. A. BLAFFER & SON,
1 1 d Foot of Austerlitz Street, New Orleans.

BRICK PLANT FOR SALE.

A large brick plant in Illinois, thoroughly equipped for the manufacture of sidewalk tile, drain tile, paving and building brick, with excellent railroad facilities; a population of 60,000 people within four miles of location. Machinery consists of Engines, Boilers, Dry Pans, Screens, Pug mill, Crusher, Brick Machine (with automatic cut-off), Repress, Iron Clad tunnel drier and cars, ten down-draft kilns, (capacity 60,000 brick each). Has been running only four years. Will be sold for one-fifth actual cost, or half interest will be sold to practical brickmaker, who will take actual management. Address
1 1 d "BRICK PLANT," care Clay-Worker.



LEADER MANUFACTURING Co
DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.
SEND FOR PRINTED MATTER.

7,000,000

Street Paving Brick.

Office of THE GALESBURG PAVING BRICK CO.

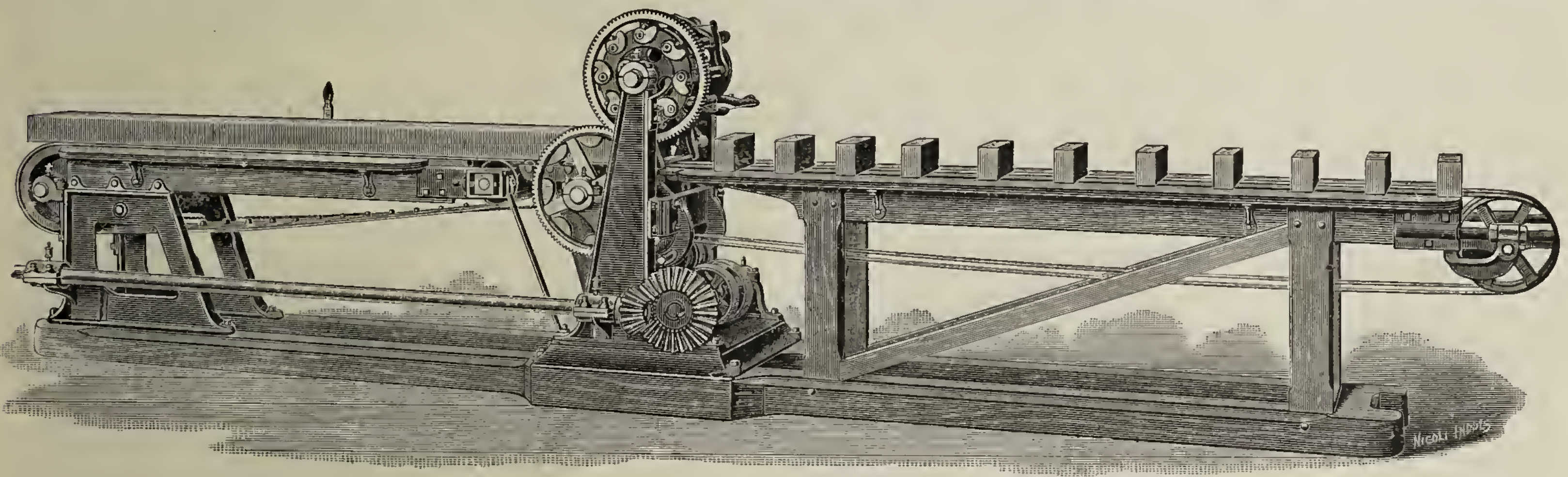
Galesburg, Ill., November 1, 1895.

The Wallace Manufacturing Co., Frankfort, Ind.

Gentlemen:—Thinking you would like to hear how we are getting along, I wish to state that the Big Wonder machine is doing splendid work. We made over 7,000,000 brick this season without a break of any kind, or a cent of cost in repairs except for augers, and from all appearances will keep on right along.

Wishing you every success, we remain,

THE GALESBURG PAVING BRICK CO.,
H. Haigh, Supt.



Cunningham's Automatic Rotating Side Cut Brick Cutter.

Office of STREATOR TILE CO.

Streator, Ill., January 2, 1896.

The Wallace Manufacturing Co., Frankfort, Ind.

Gentlemen:—We are not running our factory now, but will say that when we closed down, now more than a month since, your Cunningham's Automatic Side Cut Brick Cutting Table was doing excellent work.

Hoping to see you at the Illinois Clayworkers' Association this month, I am,

Very truly yours,
STREATOR TILE CO.,
Per F. Plumb.

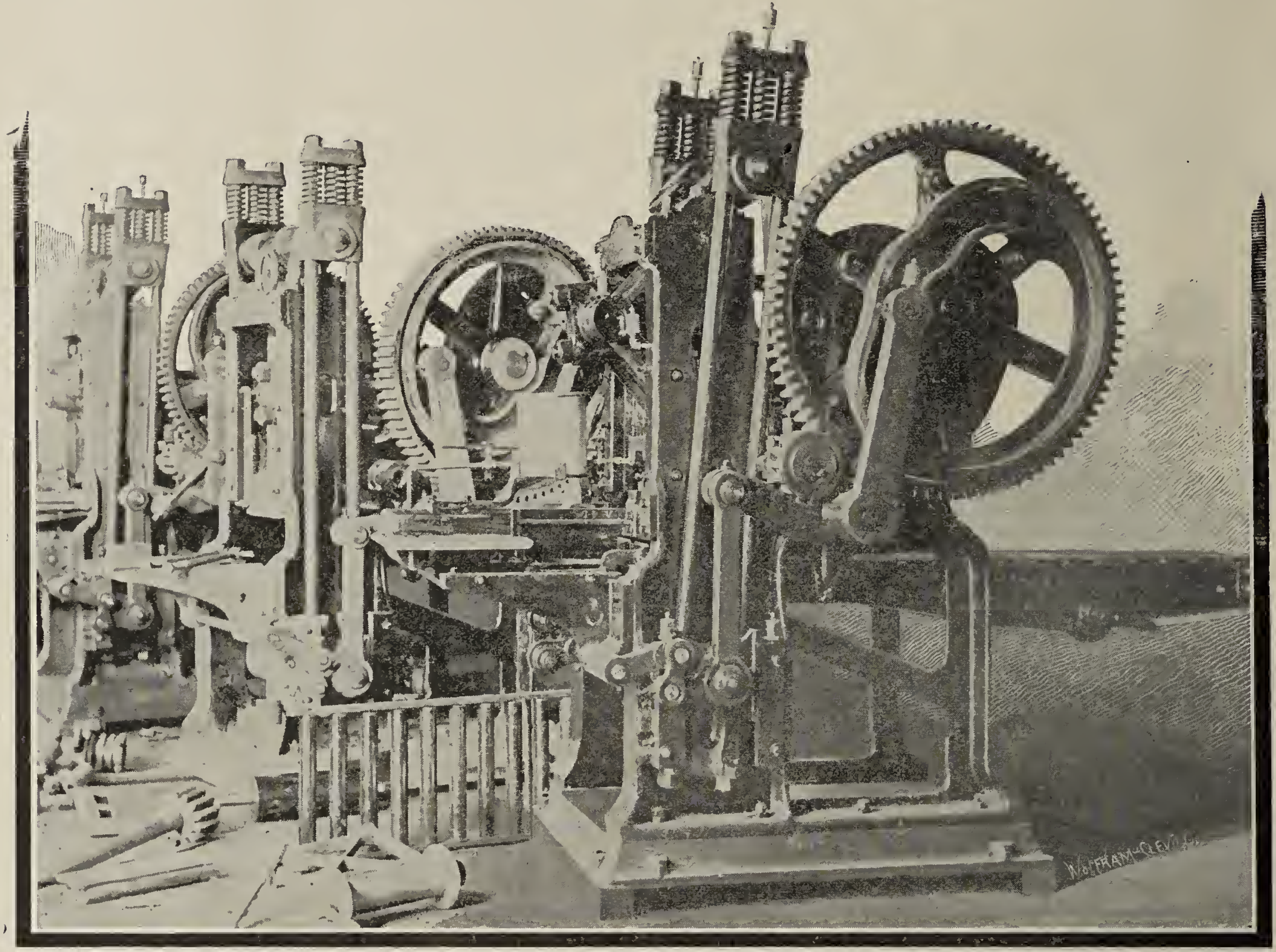
What more convincing argument do you require than the testimonials of these, the leading paving brick manufacturers, that the Big and other Wonder Brick Machines, Cunningham's End and Side Cut Automatic Brick Cutters are not excelled either in high grade material and workmanship, quality of product, capacity and ability to turn out **MILLIONS** of brick without cost for repairs

The Wallace Mfg. Co.,

CATALOGUE FREE.
See back Inside Cover Page

FRANKFORT, INDIANA.

The Richardson ✳ ✳ Double Pressure Repress.



Building RICHARDSON REPRESSES AT THE EXCELSIOR IRON WORKS, CLEVELAND.

Not a very clear picture, but one that shows the demand for a superior machine for repressing brick.

Furnished on trial to intending Purchasers. Send for details.

* * *

W. D. Richardson & Co.,

809 Cuyahoga Building, ——CLEVELAND.

P. S.--Do you know that you can improve the quality and increase the quantity of your brick by using the RICHARDSON SHAKING SCREEN and the RICHARDSON AUTOMATIC HOPPER and FEEDER?

Die Thonindustrie-Zeitung.

A leading Ceramic weekly of Germany. Circulates throughout the world. An excellent advertising medium for manufacturers of clayworking machinery.

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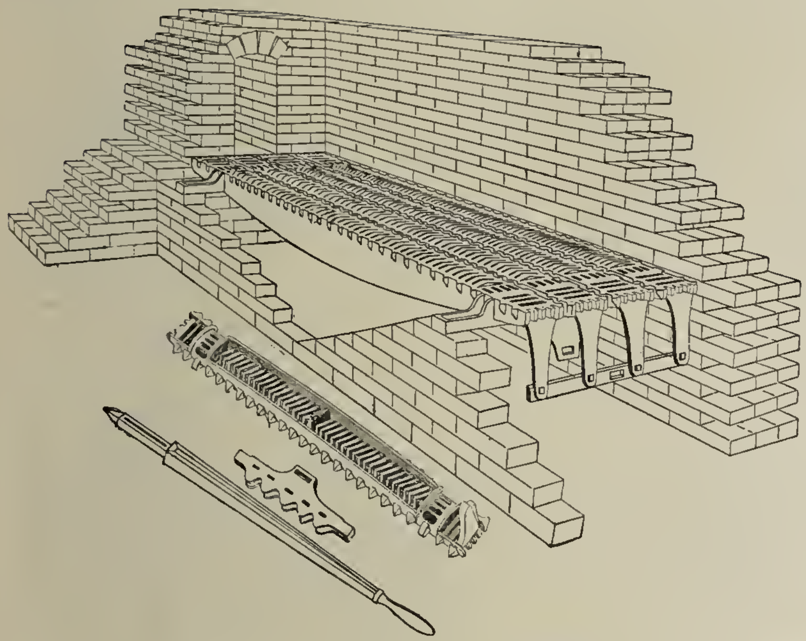

A Rocking Grate for the Clayworker.

Our Grates give greatest economy of fuel. Cold drafts through furnace are greatly reduced. Why not make cheaper brick?

A good thing: Our Art Catalogue.
Write us.

The Fuller Engineering Co.,

Engineers, Founders and Mechanics,
Builders of Oil Mills, Gin and Brick Machinery,
CALVERT, TEXAS.

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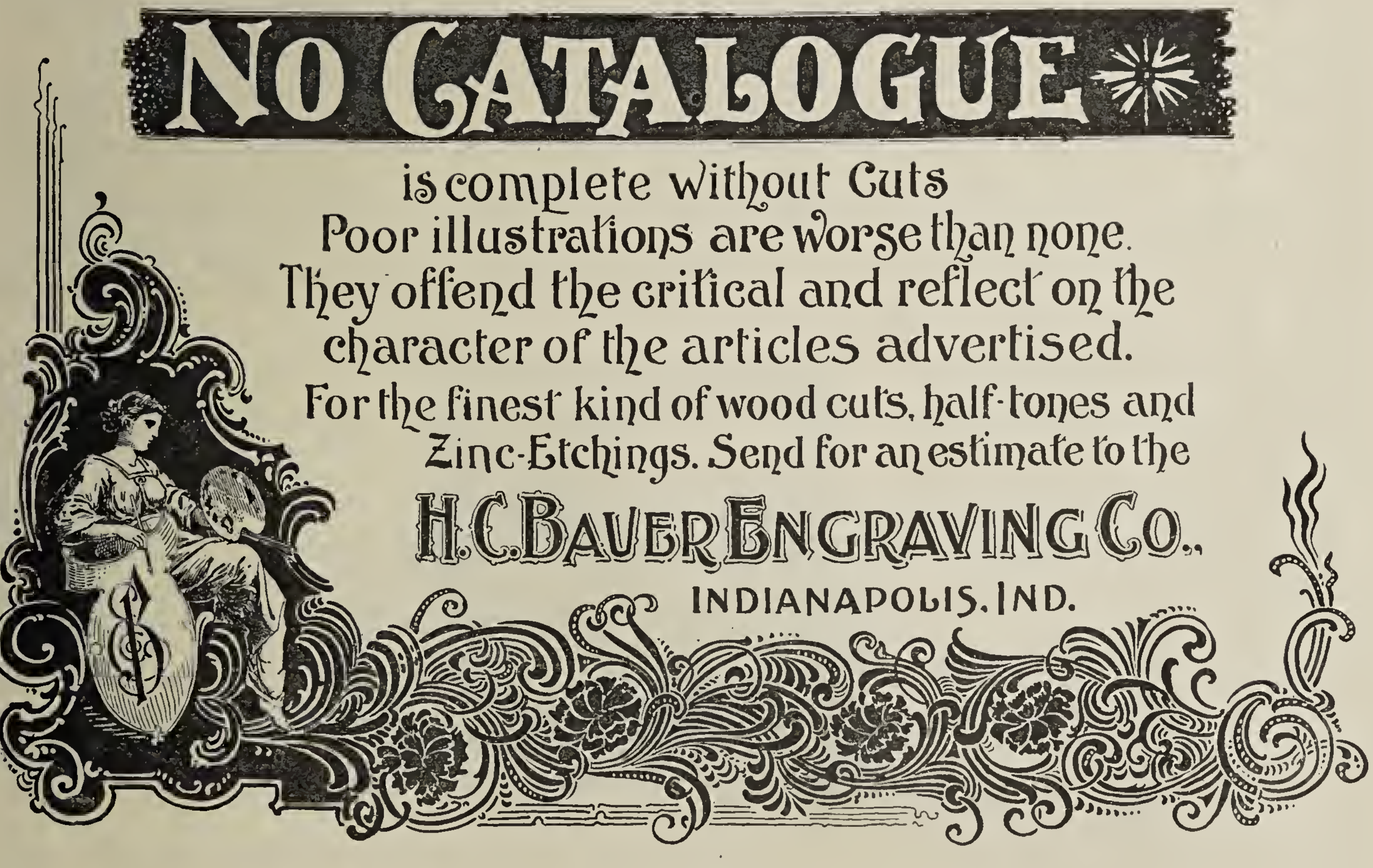

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Poor illustrations are worse than none.
They offend the critical and reflect on the
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For the finest kind of wood cuts, half-tones and
Zinc-Etchings. Send for an estimate to the

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INDIANAPOLIS, IND.

FOR SALE, WANTED, ETC.

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WANTED—To buy presses and machinery of some dry-press plant. Selling out for want of proper clay. Address
SMITH,
111pm Care of Clay-Worker.

FOR SALE—One of the best brick plants in the gas field. Capacity, 30,000 per day. Address JOHN H. WRIGHT,
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11d Indianapolis, Ind.

WANTED—By practical brickmaker and machinist, situation as superintendent, either dry press or stiff mud process. Fifteen years' experience; best of references. Address BOX 77,
11d Care of Clay-Worker.

WANTED—Position as general manager or superintendent of common press or paving brick plant, using up or downdraft kilns. Twenty years' experience. A 1 references. Address EXPERIENCED,
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FOR SALE—Drain tile works. One good, ten-horse engine, one Penfield steam plunge machine; also 1,500 pallets, lot of extras. Good reason for selling. A bargain. Address C. S. SPEESE,
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WANTED—One Auger Brick Machine with board delivery cutting table attached. Capacity 20 to 25 M. One crusher, same capacity. New, or second handed in good repair.
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FOR SALE—Fire clay for buff brick, sewer pipe and tile; also plenty of shale rock for paving brick; ten miles from Pittsburg. Can be shipped by rail or river.
H. C. FOREMAN,
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CAPITAL WANTED—I have thousands of tons of fine shale, in my way. I want vitrified brick plant to utilize it. Fuel practically free and markets good. If you want to invest write to
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FOR SALE—Dryer of Iron Clay Dryer Company, of Chicago, including cars, etc. All in good order. For sale at one-third original cost. Excellent chance for some plant with clay that will stand steam drying. HARDEEVILLE BRICK CO.,
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WANTED—Situation as foreman or burner by a practical brickmaker, of twenty-two years' experience in setting and burning of ornamental press brick, stiff mud, etc. Can give the best of references. Address A. C., Care of Clay-Worker.
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FOR SALE—I offer to a practical and competent pottery man only, a one-half interest in a well-established pottery at Los Angeles at a reasonable valuation. It consists of a well-equipped plant, including a first-class twenty-foot kiln, crusher, forty-horse boiler and engine, etc., and is turning out a very high grade of white slipped stoneware, as well as red ware and fire brick. Oil is used for fuel at a cost of 50 cents per barrel at the works, which is equivalent to about $1.75 per ton for coal. Ware sells for 8 and 9 cents per gallon in Los Angeles and San Francisco, with a freight rate to the latter place of 30 cents per 100. The business is on a good basis, but it was acquired by reason of money advanced, and I have no time to attend to it. This is the only stoneware manufactory here. Only a thoroughly competent man need apply.
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Fire-brick manufacturers desirous of taking up this important branch of the business are requested to communicate with advertiser, who has had charge of the largest silica brick works in England. Address SILICA,
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WANTED—A situation with a large brick building firm or brick manufacturer. Address R. E. LIVESEY,
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WANTED—2,000 running feet "T" rail, in fairly good condition. Must be reasonable in price.
HARDEEVILLE BRICK CO.,
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I HAVE a well-established and paying roofing tile plant, and I wish to add to it architectural terra cotta or some other ornamental clay product. Wish only to hear from a person who has some capital and a great deal of experience. I will furnish two-thirds the capital required, besides the use of my plant, which is sufficiently large and well equipped for any purpose, provided I can get the right man. Address
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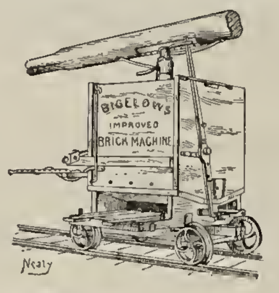

One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

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AN ACTUAL "PULL" Brick Dried In 8 Hours Safely At no Cost.

Explains For Fuel or Power. More Fans, Less Pipes, Exhaust Only.

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Send for Testimonials. Street Cars pass the Door.

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Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years. Write for prices.

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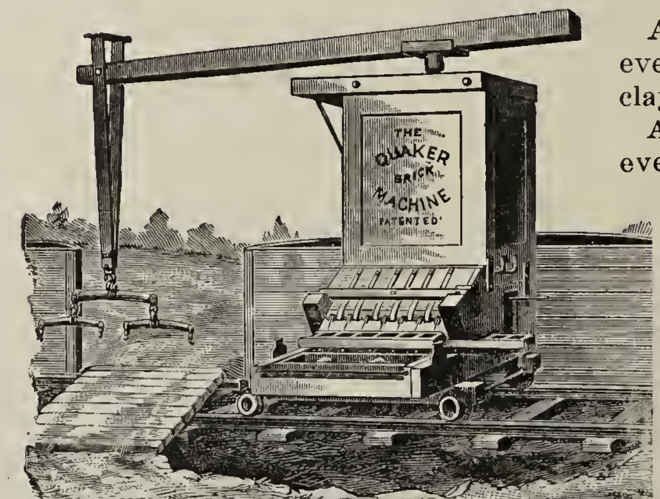

Also supplies and machinery of every character pertaining to the clayworking business.

A simple, practical, reliable every day, all round Brick Machine, either steam or horse power, at a reasonable living price to suit the times. We have it. No experiment. Over 1,000 in use all over the country.

We cannot give testimonials and particulars in a small advertisement, we simply ask you to write us for catalogue, prices, facts, etc. It will cost you nothing.

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SOFT CLAY BRICK MACHINE

Until You Have Investigated Ours.

Send for Photo. **W. E. TALLCOT & CO., Croton-on-Hudson, N. Y.**

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Tests of the Strength of Materials

Of all kinds made by experienced and competent experts. . . . . .

ST. LOUIS, MO.

All the United States Timber Tests made at this Laboratory.

Tests of Paving Brick a Specialty.

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MAKES THE FINEST BRICK in the WORLD.

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Improved Lion Brick Press.

New Catalogue on application.

Complete Brickyard Machinery.

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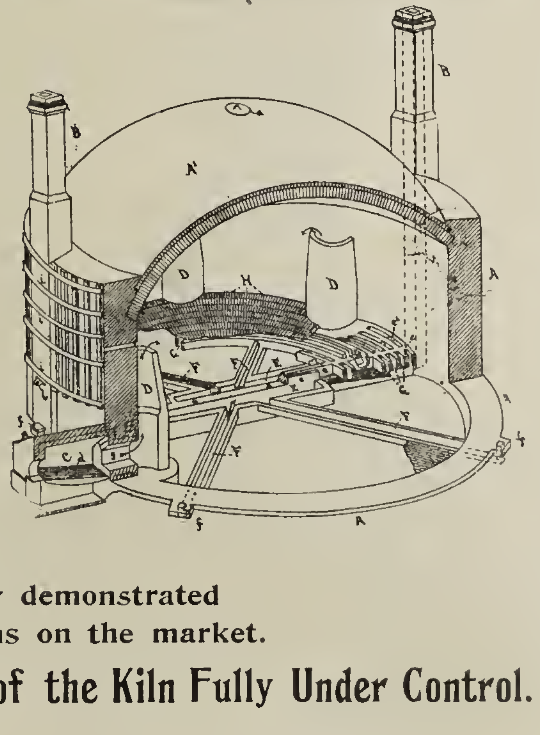
BURNING MADE EASY

BY USING

Holman's Down Draft Kiln.



Cheaply and easily built, and Fully demonstrated to be one of the most perfect kilns on the market.

. . . . All Parts of the Kiln Fully Under Control.

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FOR SALE—At a bargain, only pottery in city of 30,000 people. No other within 100 miles. Also 80 acres of clay and shale. Address
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PARTNER WANTED—With $10,000 or $15,000, to manufacture brick. First-class established plant; soft and stiff mud; good market at Newport News, Norfolk and Hampton for five or six millions yearly. Address R. M. BOOKER, Hampton, Va.
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FOR SALE—One 8-foot grinding pan, with engine to drive it, complete and good. One Martin brick plant of 25,000 daily capacity, with engine, boilers, dryer, etc., complete. Sacrifice.

THOMAS P. CONRAD,
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WANTED—To purchase about 150 good second-hand brickmakers' wheelbarrows; must be in good order, strong and durable, cast iron or steel wheels. Also six good second-hand platform rail cars, with double trucks at each end, of 2 feet gauge. Also a large size wet pan for crushing clay; must be in good order and cheap.

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FOR SALE—Second-hand machinery. One large four-mold Eureka dry press brick machine, but very little used. One No. 2 Worrell dryer, quite new, an excellent machine for drying clay of all kinds. One large Ross disintegrator, very little used. Five tubular boilers, 16 and 18 feet lengths, 5 and 6 feet diameter, with all fittings complete. One 6-foot Startevant blower. About 20 7-foot disc fans. One straight-line steam engine, size of cylinder 14x14, excellent order, about 100 horse power. Eight 15-foot lengths of 2 15-16-inch shafting, in fair order. One Atlas patent cut-off engine, 125 horse power, 12x15 cylinder, in excellent running order. One small-size Raymond repress, in fair condition. All the above will be sold at low prices.

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We have purchased the Broadway Brick Works, of this city, and have for sale the engine, boilers, pump, shaftings, pulleys, belting, brick machines, disintegrators, screens and elevators, pipes, doors and frames, bearings and all grate bars to fit up four complete kilns. Also wheel scrapers, brick trucks, wheelbarrows, and about 5,000 feet of light rails and miscellaneous tools. We will sell the entire plant, whole, or in part. Let us hear from you if you need anything in the above line, and we will give you low prices. Address SCOELLHORN-ALBRECHT MACHINE CO.,
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FOR SALE—One twenty-horse power stationary engine and boiler, one Brewer tile mill, dies from two to eight-inch, belts and pulleys. Machinery good. Address,
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FOR SALE—Oil tank, cheap. Made of 3-16-inch best tank steel, heads 26-100-inch, diameter 6 feet, length 28 feet; manhole on top, extra plates on bottom. A bargain. Address WM. R. FALL,
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Advertiser who is accustomed to the management of large fire-brick works and is thoroughly experienced in every detail of the business is open to re-engagement, either at the present time or in the spring, as manager or superintendent. The best of testimonials as to character, ability and successful management. Address
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OUR New Patent Disintegrators.
One 24-inch Disintegrator.
One 30-inch Disintregator.
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One 40-inch Disintegrator.
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One 60-inch Disintegrator.
We also have two Disintegrators of different makes.
One Shale Breaker.
One 6x6 Upright Engine.
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One pair 14x14-inch Marine Engines.
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Two pair Mining Engines.
One Duplex Steam Pump, 6-inch suction, 5-inch discharge.
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Also big lot of smaller Pumps.
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One Portable Engine and Boiler on wheels.
Eight Stationary Boilers, different sizes.
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200 various Ornamental Die Plates.
A big lot of Large Pipe, Valves, etc.; also Shafting, Pulleys, Hangers, Belting and Supplies of every description.
For particulars, prices, etc., apply to
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Perfection Steam Tunnel Dryer.

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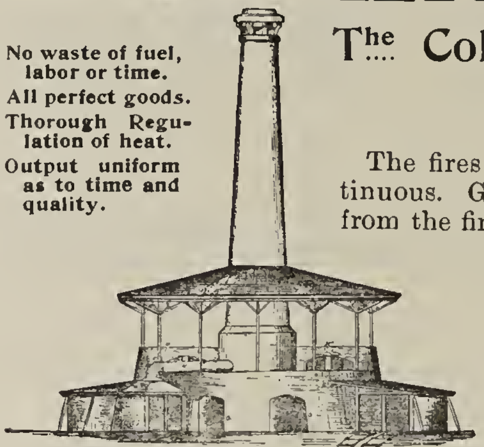

No waste of fuel, labor or time.
All perfect goods.
Thorough Regulation of heat.
Output uniform as to time and quality.

The Columbian Pottery and Brick Kiln.

The fires remain in one division ONLY and are continuous. Goods move on a ROTATING FLOOR to and from the fires. Radiating heat and spare heat are used for drying and heating air for combustion.

A perfect and reliable factory Winter and Summer. Kiln and dryer combined. The best kiln for vitrifying Paving brick and glazing

Full information on application.

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NEW DISCOVERY KILN.

Patented April 13, 1886, June 12 1888 Nov. 1891.

More Than 1,000 Now Stand as Monuments of Fame to its Inventor

It is neat, compact, durable, easy to handle, constructed on scientific principles. Has been improved and now burning almost everything made from clay, such as Sewer Pipe, Vitrified Pavers, Etc., to Pottery and finer wares. Built any size up to 100,000. In short it leads the way.

Reward For Information of infringements.

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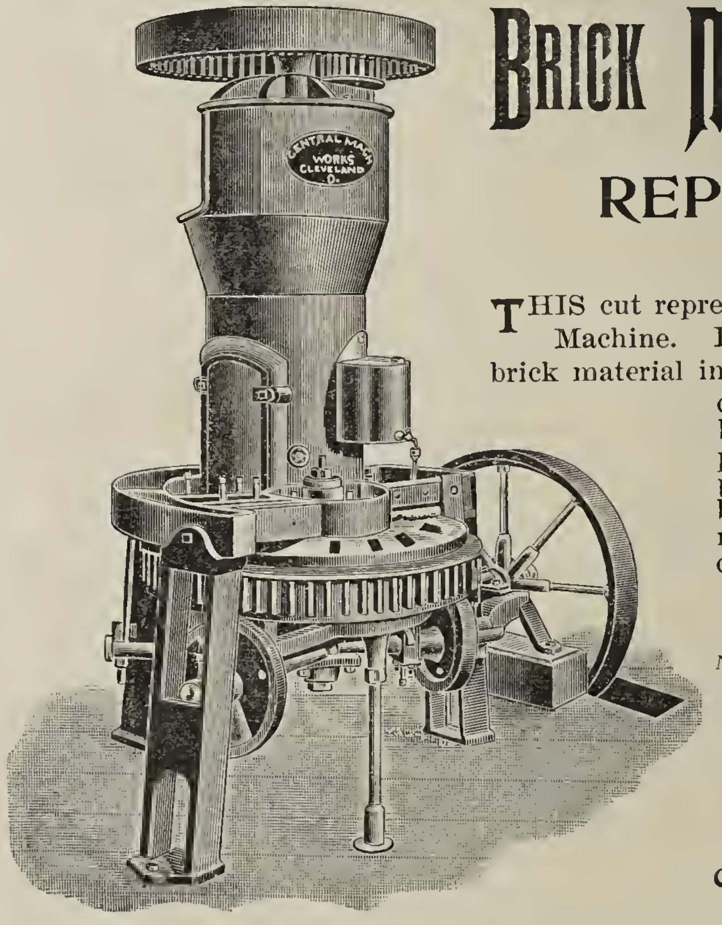
E. M. PIKE, Patentee

CAPT. G. H. ETTLA, Agt. Marietta, Pa. } **Chenoa, Ill.**

BRICK MACHINES AND REPRESSES.



CENTRAL MACH WORKS CLEVELAND O.

THIS cut represents our Stiff Mud Brick Machine. It will work any kind of brick material including fire clay, shale or common clay right from bank without the use of a pug mill. Each brick is pressed separately and can be haked 7 or 8 high, or repressed right from machine.

Over 500 in operation.

Send for price and circulars

Manufactured by

CENTRAL MACHINE WORKS,
226-236 Abbey St.
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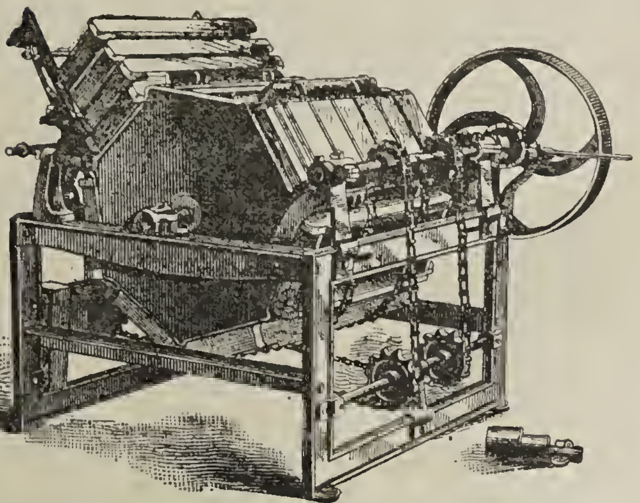
NOTICE—We furnish all supplies and repairs for any make of the "Sword" Brick Machine.

CHAMPION Brick Mould SANDING MACHINES.

This cut represents the latest improved Champion. No belts, apron or gearing. Simple, strong, and Serviceable.

A. H. NEWTON,
Manager and Sole Agent,
HAVERSTRAW, N. Y.

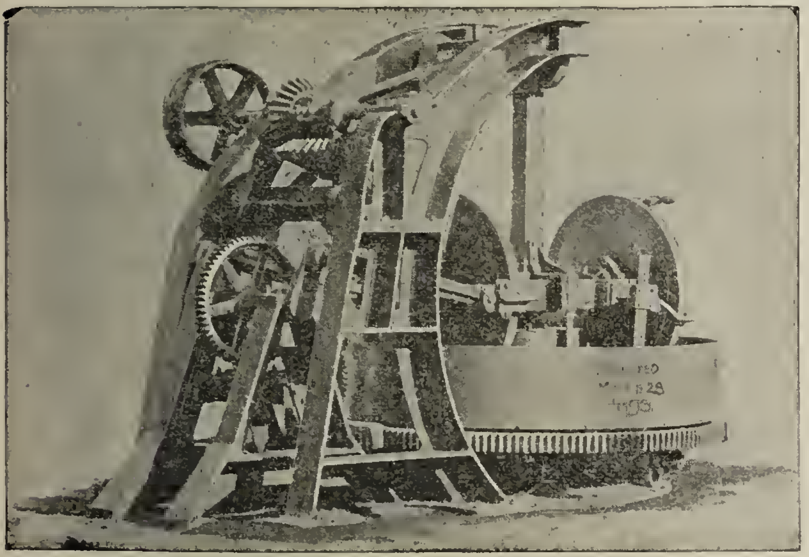


NEW FACTS.

The United States Circuit Court held at Utica, Dec. 3rd, 1895, overruled and dismissed the Plea filed by James A. Buck in my action against him for infringement. The Court gave Buck 20 days to file an answer and if not filed in that time judgment will be entered against him in my favor. If answer is filed the Court gave me the further privilege of taking my testimony at once and as soon as completed to renew my motion for a preliminary injunction restraining Buck and his agents from making, selling or using Champion Brick Mold Sanding Machines during the pendency of the action.

Is it safe for brickmakers to enter into any contracts with a man who for nearly two years has been fighting off a patent suit on technical points and afraid to meet the case upon its merits and now is driven in a corner where he is liable to be tied up before he can deliver any machines for 1896.

Something New. Look it Up.



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IMPROVE your factories by getting the best instead of the cheapest. . . .

Inquire for the VAUGHN PRESS and DIES, for any and all kinds of machinery for clay goods. Write us for description and prices.

The TURNER, VAUGHN & TAYLOR CO.

We also make Dry and Wet Pans, Iron Screens and Elevators, and a general line of Clayworking Machinery.

Cuyahoga Falls, O.

4000 TO 5500 (Gallons of Water per hour.)

BY HAND-POWER.

Pumps, Hand-power Pumps,

(LOUD'S PATENT.)

These Pumps are simple, durable and low-priced.

A large capacity and easy working pump for **Brick Yards, Water Works, Sewer Contractors, Foundation Builders, Miners, Quarries** or whereever it is desired to raise a *large quantity* of water by *Hand-power.* The pump has large valves (*accessible by hand*) and will pump water containing *sand, gravel, mud, sewage matter, etc.,* without *choking* or any *perceptible wear.*

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THE UNION HARDWARE CO.,
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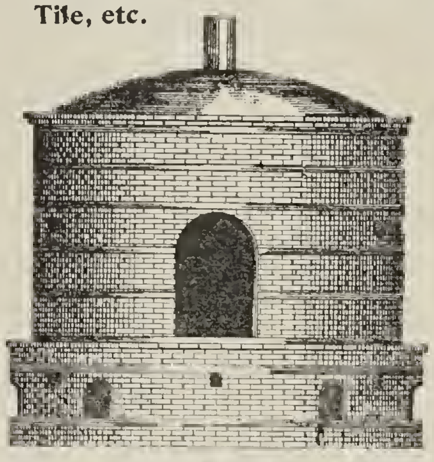
AN IMPROVED KILN

For Burning Terra Cotta, Brick, Tile, etc.



Muffled Kilns for Terra Cotta, etc., a specialty.

WE have had many years experience in building terra cotta, brick and tile kilns of different kinds and can guarantee successful and satisfactory results **being practical Kiln Builders. Our terms are reasonable.** Write for particulars stating character and capacity of kilns desired.

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Brick-Glazes

ready prepared to burn successfully in all kiln-systems, we furnish for every kind of material.

In general use in Germany!

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Germany.

ALBANY SLIP CLAY.

We have a large bank of a superior quality of SLIP CLAY. Price very low by barrel or carload. Best of reference as to quality. Address

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Ready Made Cutting Wires,

Always give Satisfaction.

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152 State Street,
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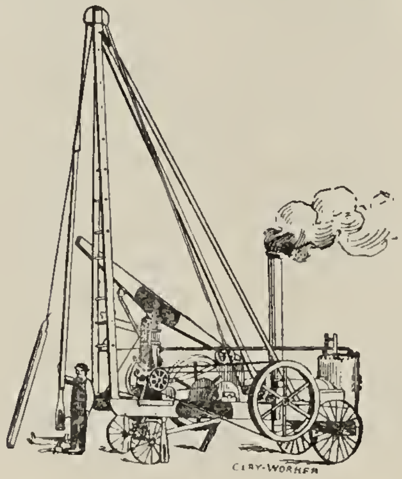

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Artesian Wells of any Diameter,
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Tanks, Etc.

Outfits for Clayworking plants a specialty. Get Prices.

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Besides making Vitrified Stone sewer Pipe we manufacture and keep in stock a full line of

Fire Brick

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Also Headquarters For

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OFFICE & FACTORY: Cor. Elm & Water Sts.
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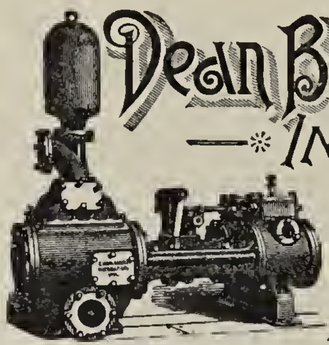

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—INDIANAPOLIS, IND.—

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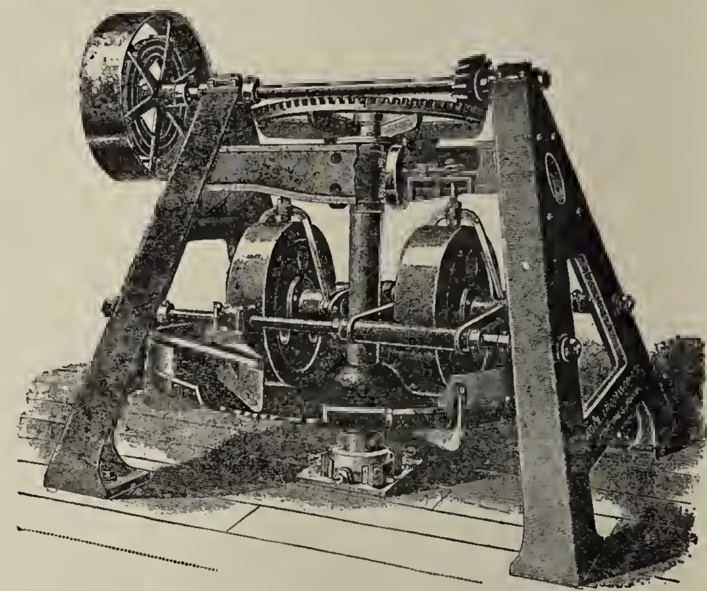
HORIZONTAL AND VERTICAL PUMPS.
Best Design & Workmanship.
PRICES REDUCED Send for CATALOGUE.

OUR NEW 9 Ft. IRON FRAME DRY PAN

SEND for catalogue and read up on our patented features of this machine. Our motto in its construction and design is

"NOT HOW CHEAP, BUT HOW GOOD."



EAGLE IRON WORKS, Des Moines, Ia.

EAGLE BRICK MACHINE.

Steam and Horsepower.

THE BEST MACHINE IN THE MARKET.

The Horsepower Machine will make 17,000 to 20,000 brick per day; the Steampower Machine, 25,000 to 30,000.

These machines are sold on their merits, guaranteed to do first-class work.

Brick moulds for hand and machine a specialty.

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Manufacturer,
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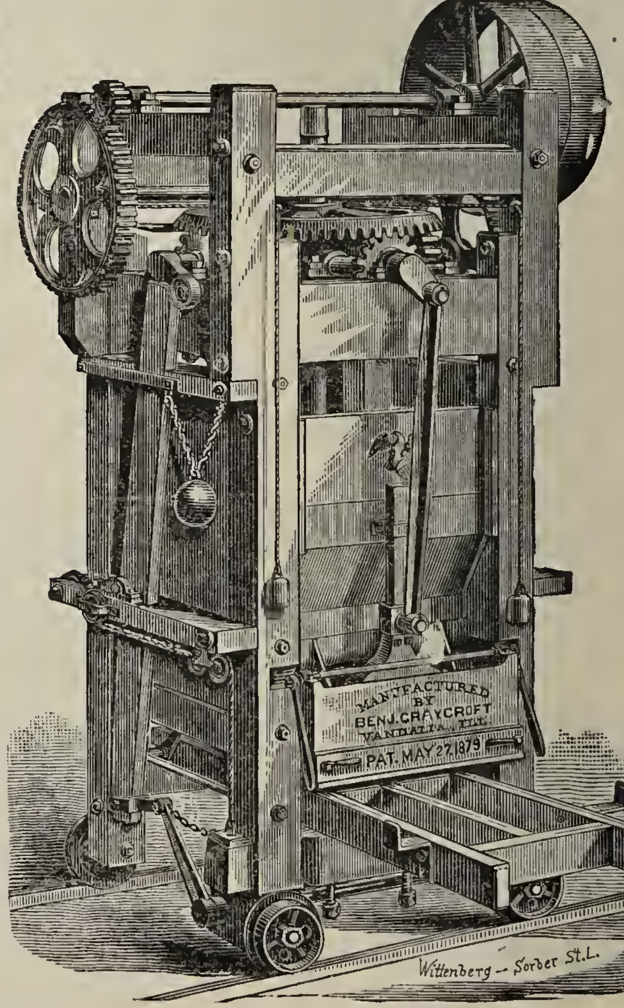
C. J. CRAYCROFT, Fresno City, Cal., Gen'l Agent for Pacific Coast.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PAT. MAY 27, 1879
Wittenberg — Sorber St. L.

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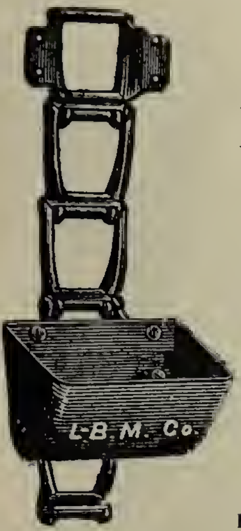

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Any length,
Any capacity,

For Handling all Classes of
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Continuous Pan Conveyors,
Curved Slat Conveyors,
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CLAY,
COAL,
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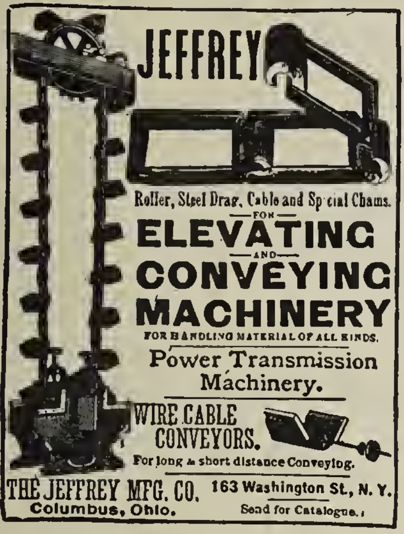
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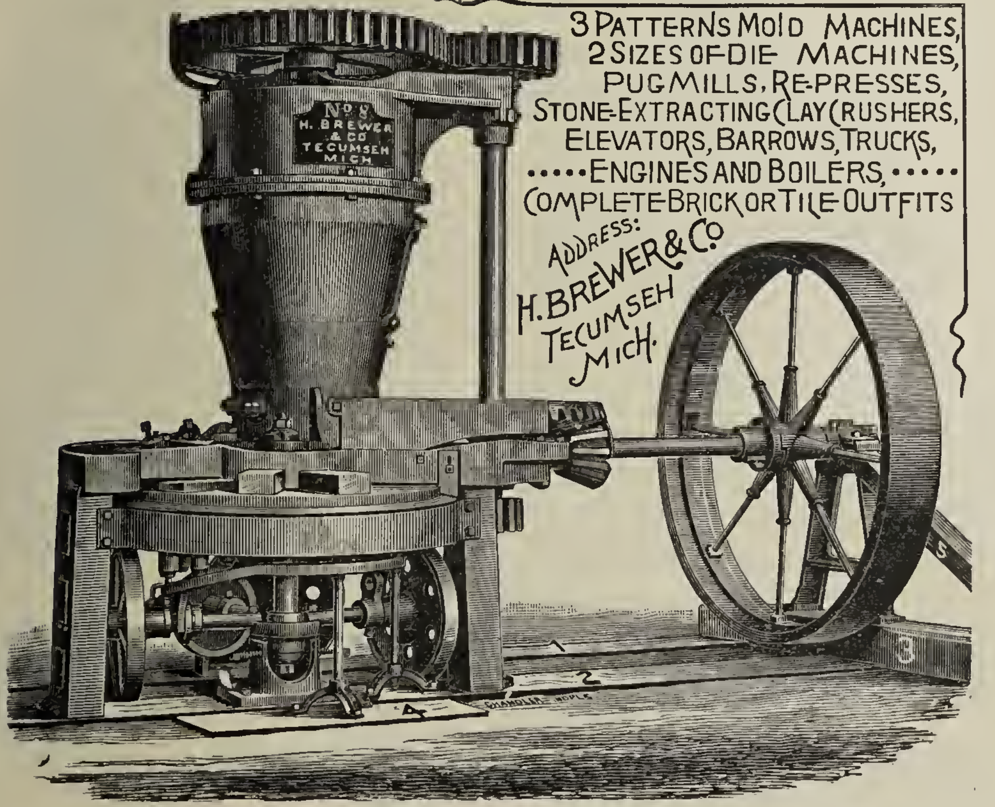
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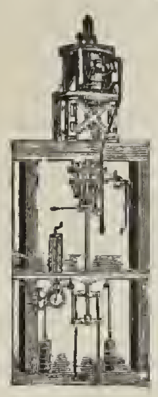

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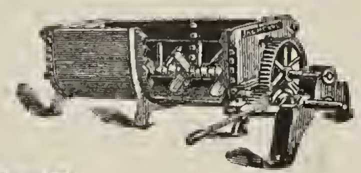

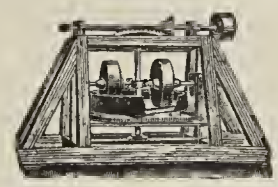

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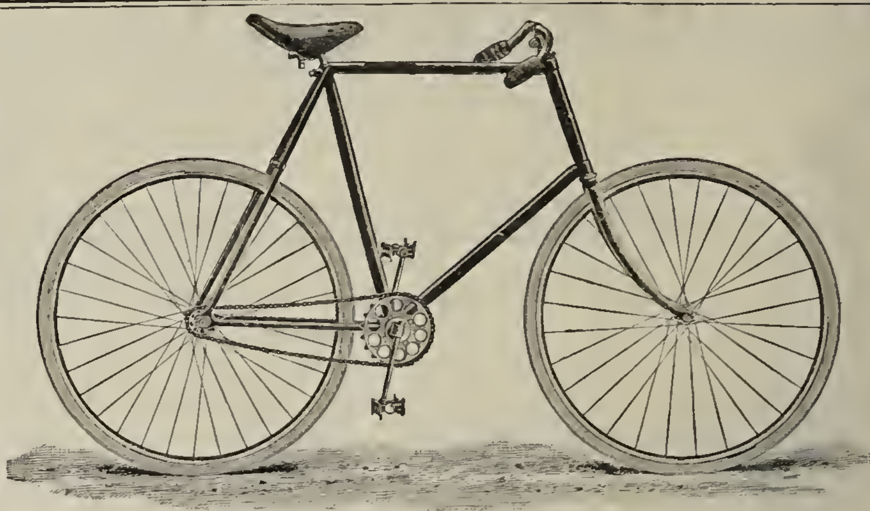

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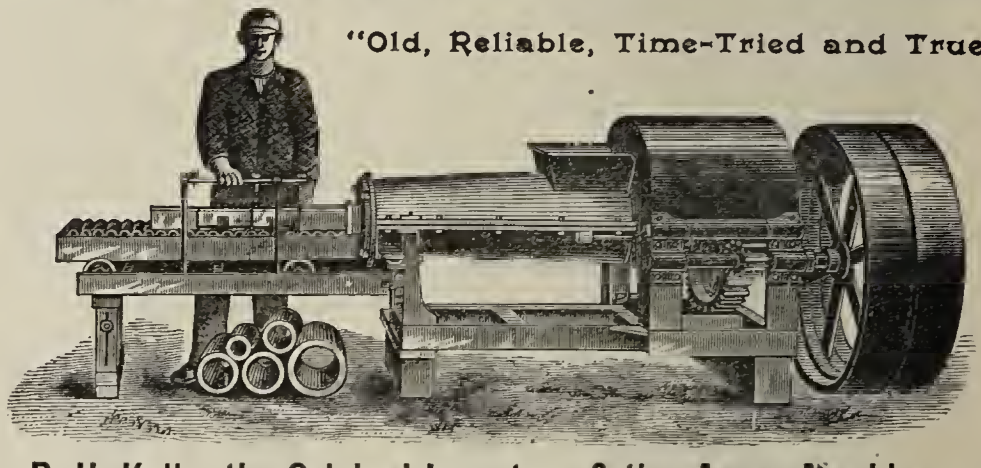

P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

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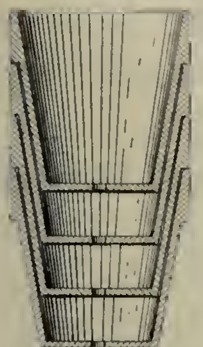
Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.



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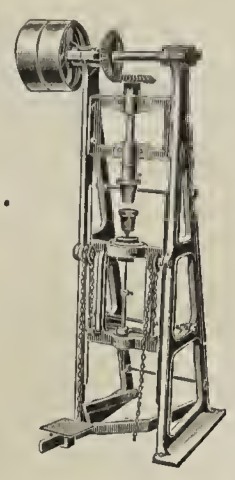

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Under the very Latest Improved Grant-Murray Patent.

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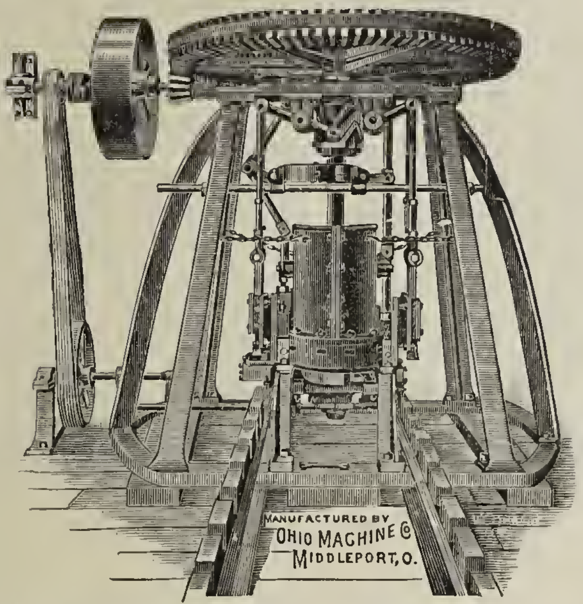

OHIO MACHINE CO.,

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We manufacture the Grant & Murray Patent Repress Brick Machine, pressing 4 brick each revolution and 40,000 per 10 hour day.

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BUCK'S NEW CHAMPION

Brick Mould Sanding Machine.

Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.

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For full particulars and discription address the patentee

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DRAKE'S STANDARD MACHINE WORKS
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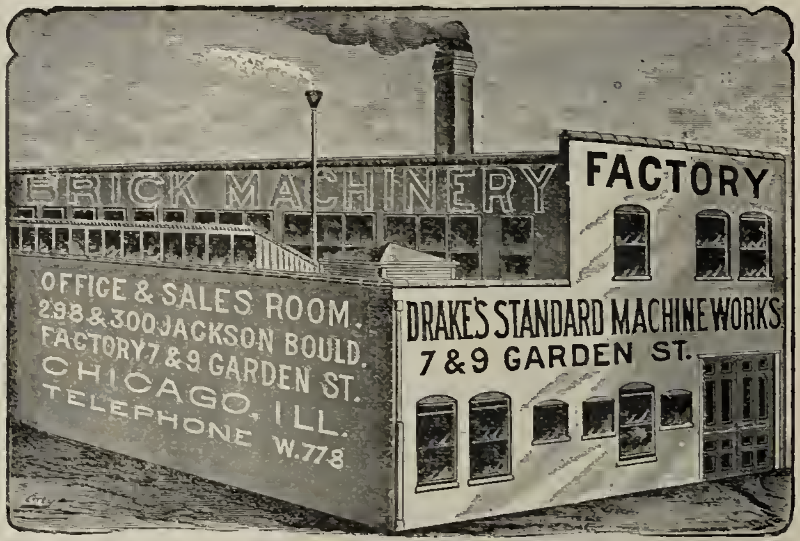

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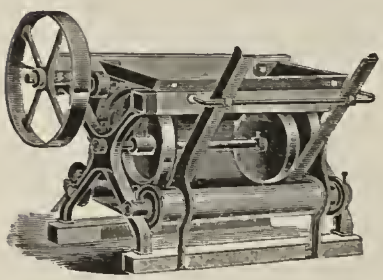

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HAS no sprocket wheels, chains nor gear to wear and break. There is less wear on moulds than when the work is done by hand. The work is better done, they are

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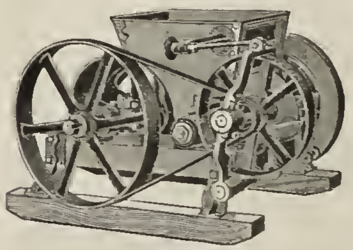

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6 Sizes. Capacity 25,000 M to 150,000 M.

ARE the only machines made that will work any clay direct from the bank, and not choke or clog from hard, dry or wet, sticky clays. They are well built, of good material and will do the work claimed.

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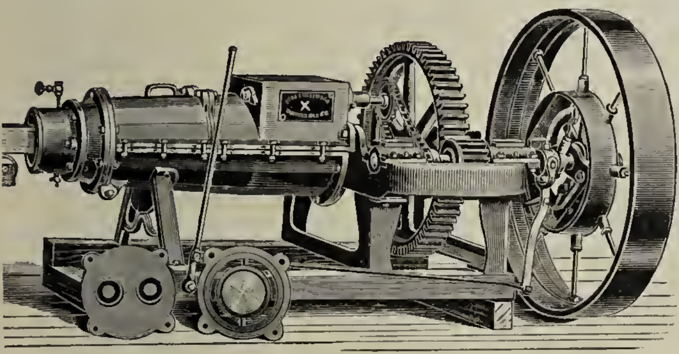
Is built on Scientific principles and is the most practical and economical machine on the market. Satisfaction guaranteed. We have a large number of testimonials like the following from Col. Norris, Central, S. C.:



CENTRAL, S. C.,
October 14, 1895.

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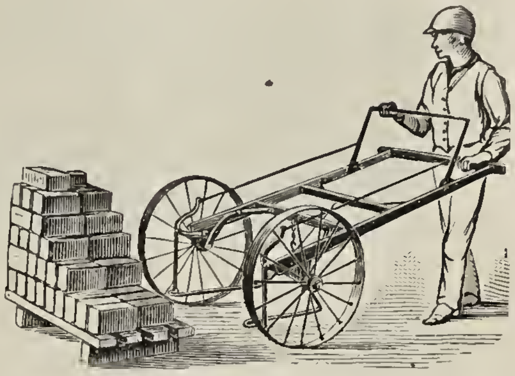
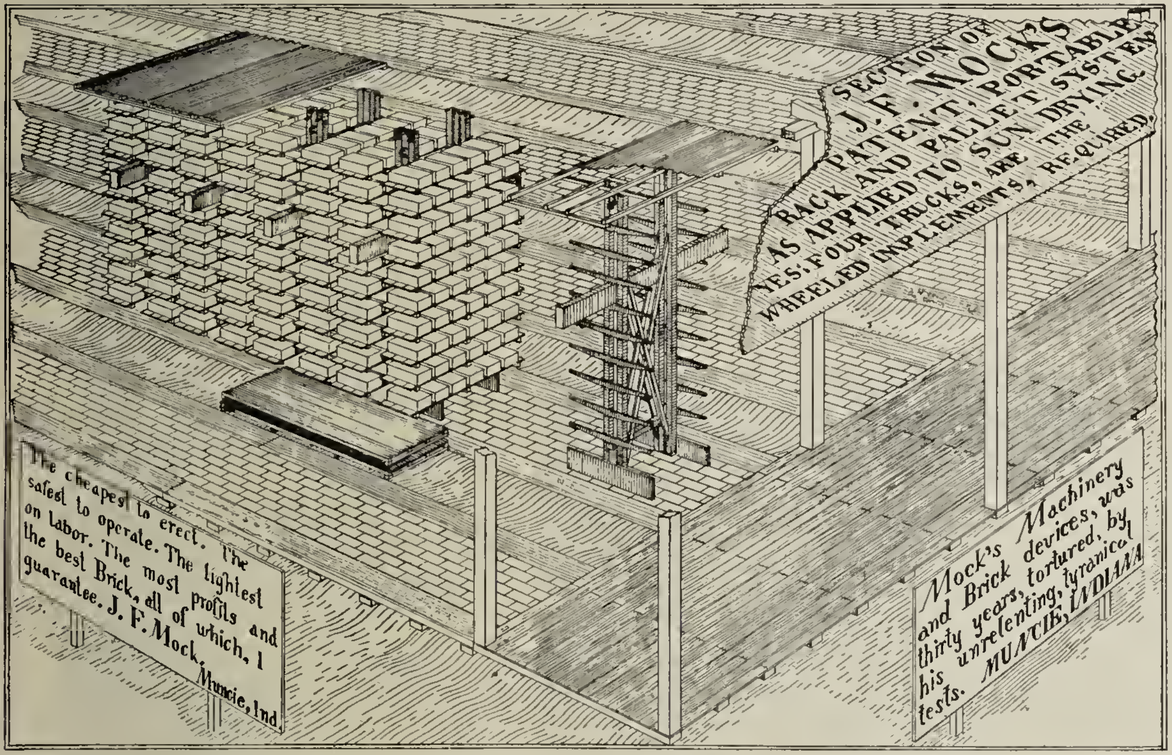


Please write for prices and catalogue. **J. C. STEELE & SON, Statesville, N. C.**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...ES. FOUR TRUCKS, ARE THE WHEELED IMPLEMENTS REQUIRED.
The cheapest to erect. The safest to operate. The lightest on labor. The most profits and the best Brick, all of which, I guarantee. J. F. Mock, Muncie, Ind.
Mock's Machinery and Brick devices, was thirty years, tortured, by his unrelenting, tyranical tests. MUNCIE, INDIANA

I,
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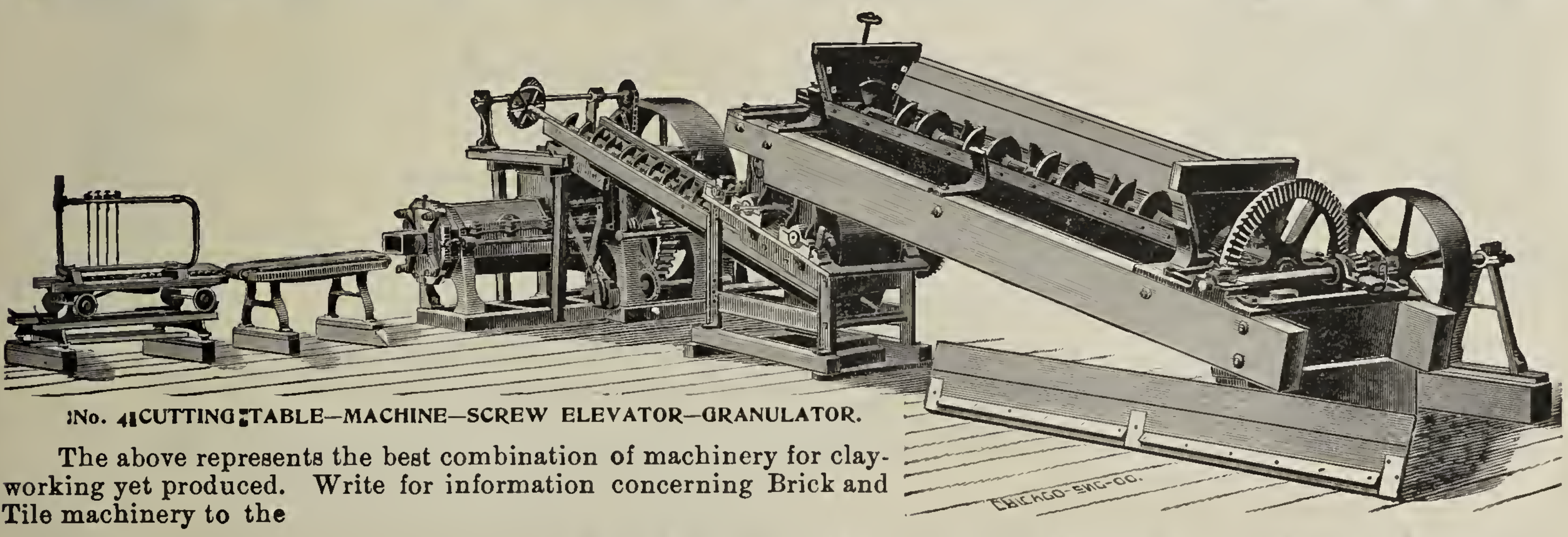
Muncie, Ind.,

Patentee and
Manufacturer of

The Mock Portable Rack and Pallet System

Do hereby agree with all responsible parties, to equip with sufficient Trucks, Racks and Pallets, to thoroughly test the efficiency of my System at My Own Expense, and if I fail to establish the proof of my claims; (the cheapest to erect, the lightest on labor, the safest to operate and the most profits,) I will remove same from premises and repair and make good all damages incurred by the test. JAMES F. MOCK.

ADRIAN BRICK AND TILE MACHINE CO.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The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

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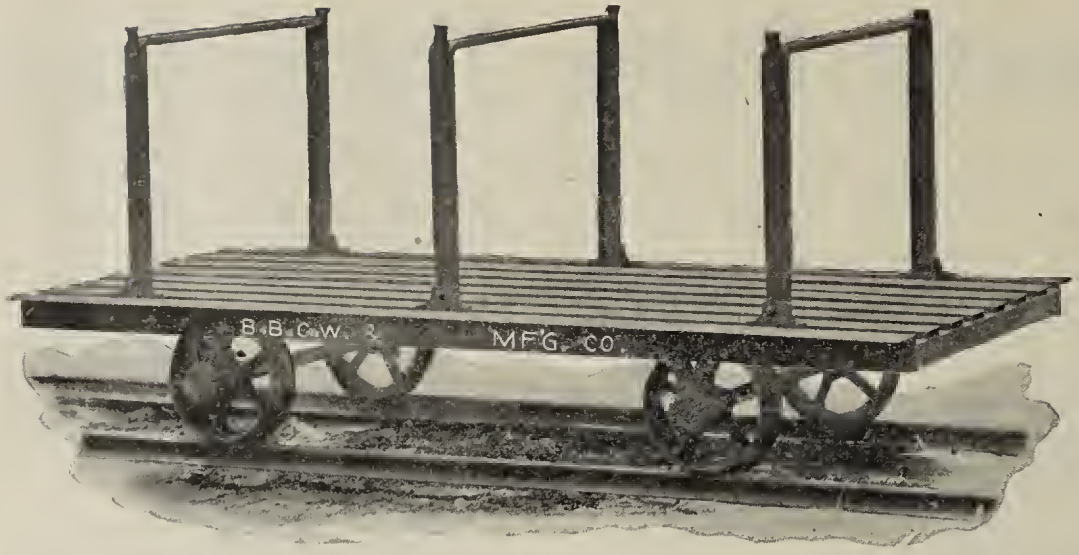

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Approved Appliances for

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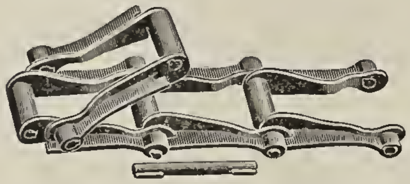
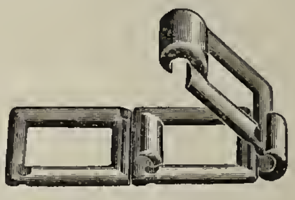


Mey Detachable Chain Belt, Pat. Feb. 7, 1888.



64 to 68 Columbia Street, BUFFALO, N. Y.

THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker.

It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.

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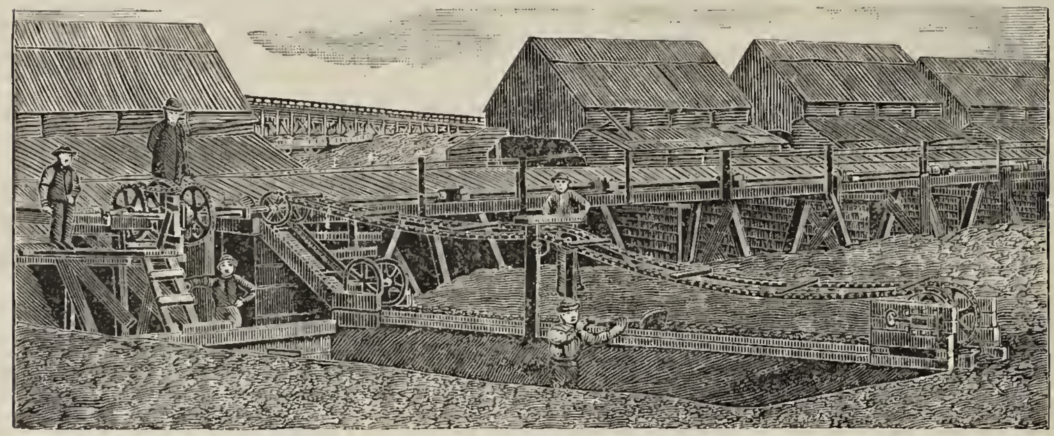

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Fire and Red Brick Presses all sizes.

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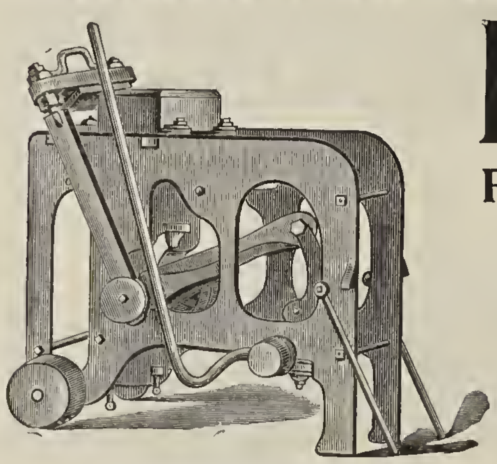

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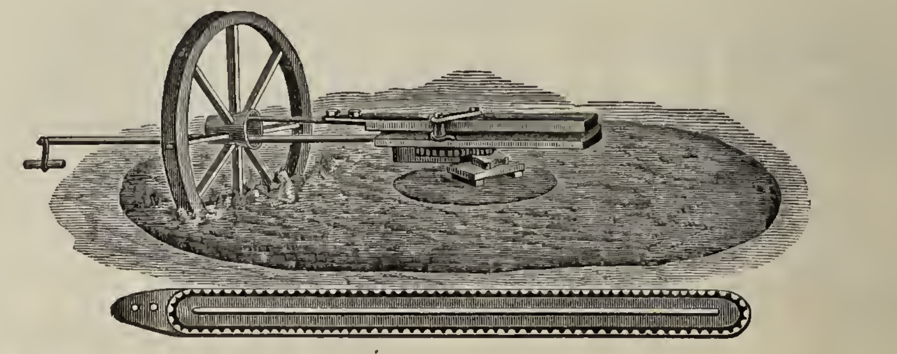

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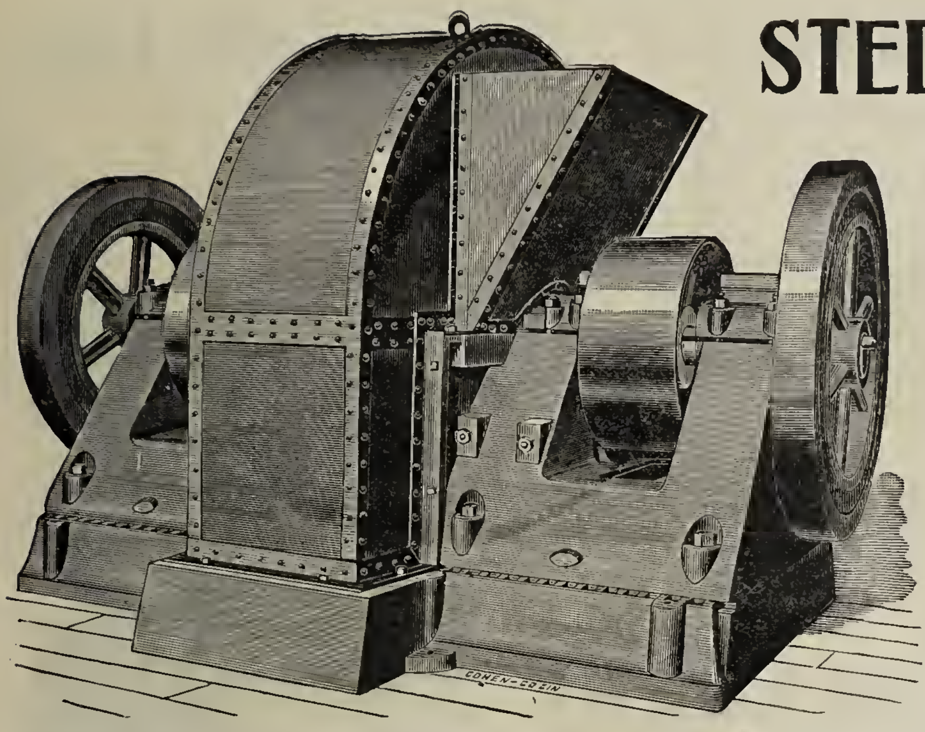

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For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

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THE STANDARD BRICK MACHINES

MANUFACTURED BY

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We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

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THE BEST!

For carrying all kinds of brick. Over 15,000 in use. It will pay you to inform yourself fully.

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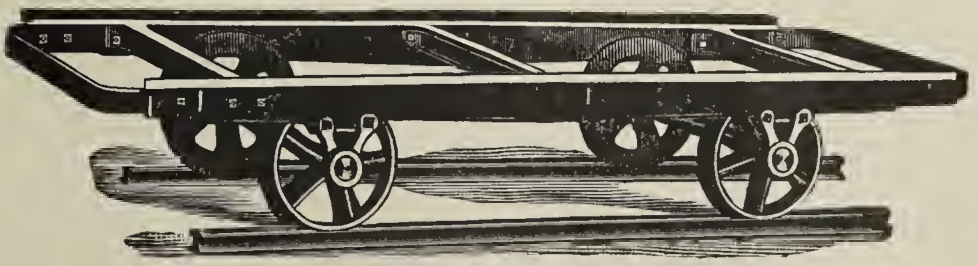

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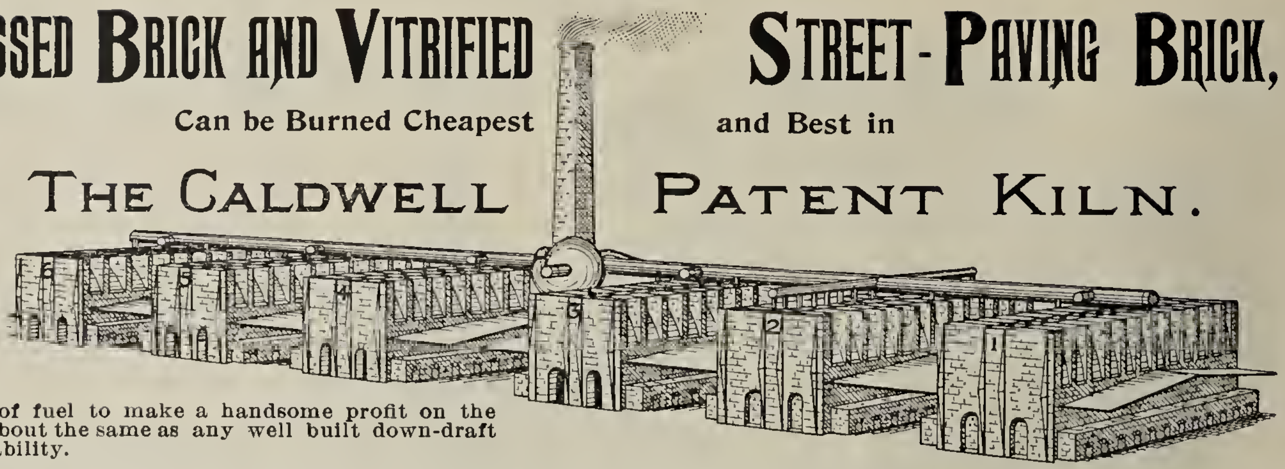
FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.



Down-draft and Continuous combined.

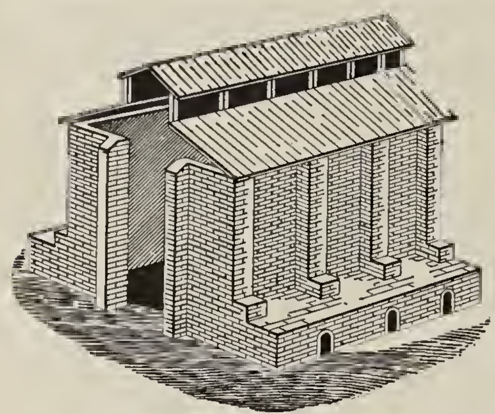
All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., ***Minneapolis, Minn.***

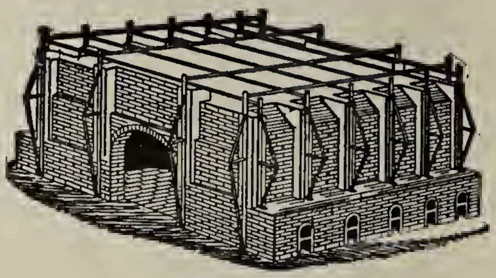


Up-Draft Kiln.

LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Down-Draft Kiln.

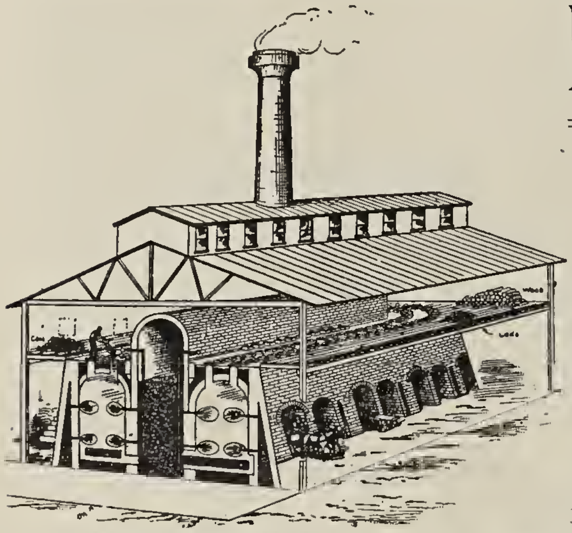
Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,913 Indiana Ave., ***Kansas City, Mo.***

Firestone's Continuous Kiln and Dryer.



THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.
No soft or Salmon brick.
No yards or sheds needed.
It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

Vitrified Paving Brick

Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Wheeler. Mailed free on receipt of price, $1.00.

T. A. RANDALL & CO., Publishers,
INDIANAPOLIS, INDIANA.

ALSIP'S

LATEST IMPROVED DOWN AND UP DRAFT KILN

It Has Been Thoroughly Tested, and Every Kiln is Giving Perfect Satisfaction.

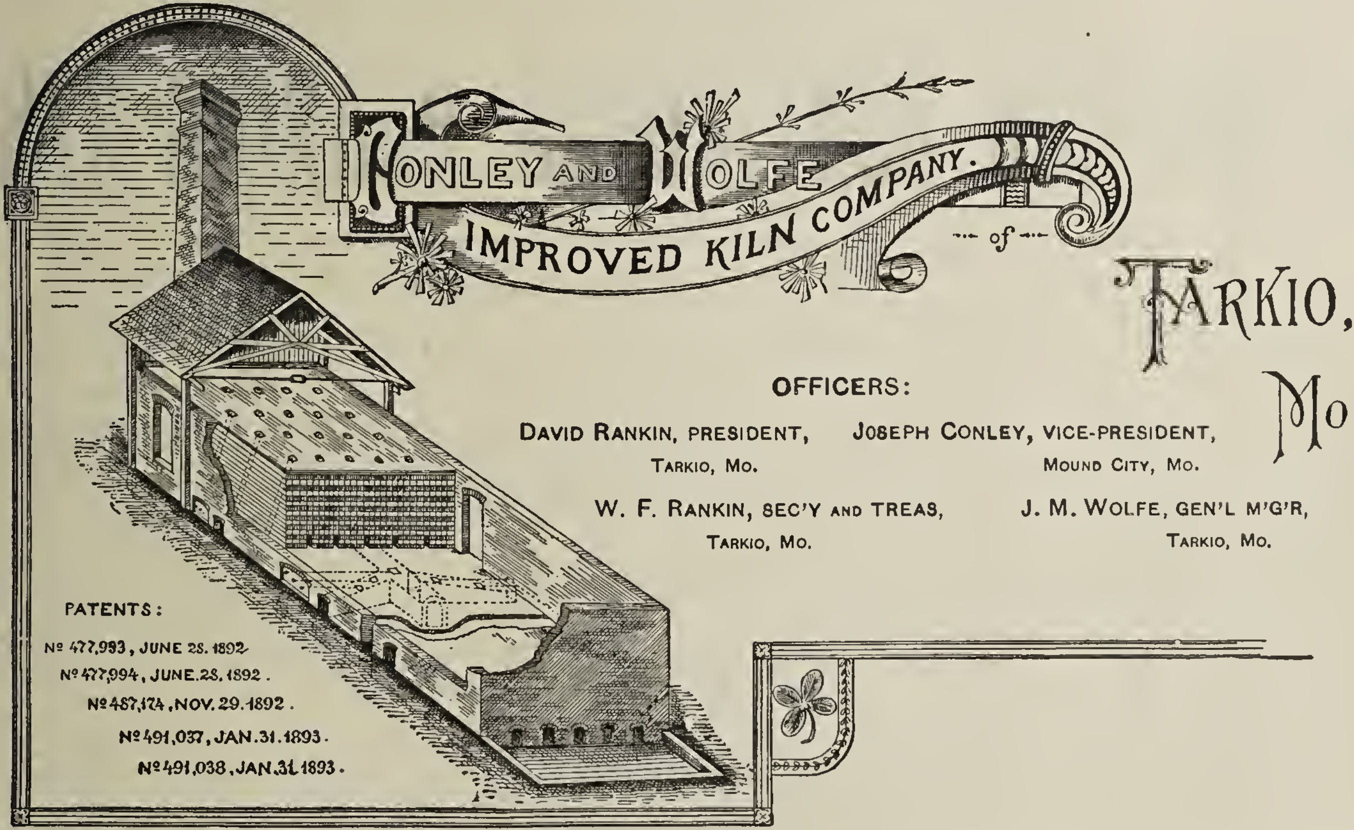
Why take any chances when you can buy a kiln that will burn the ware uniform from top to bottom, from side to side, and from end to end? This is just what the Alsip Kiln does.

It will save **time, labor** and **money,** if you will thoroughly investigate our Latest Improved Kiln before deciding on any kiln.

For descriptive circular and further information, address

Wm. & S. H. Alsip,
MENARD, ILL.

[Mention the Clay-Worker.]



OFFICERS:

David Rankin, President, Tarkio, Mo.
Joseph Conley, Vice-President, Mound City, Mo.
W. F. Rankin, Sec'y and Treas, Tarkio, Mo.
J. M. Wolfe, Gen'l M'g'r, Tarkio, Mo.

PATENTS:
Nº 477,993, JUNE 28. 1892.
Nº 477,994, JUNE. 28. 1892.
Nº 487,174, NOV. 29. 1892.
Nº 491,037, JAN. 31. 1893.
Nº 491,038, JAN. 31. 1893.

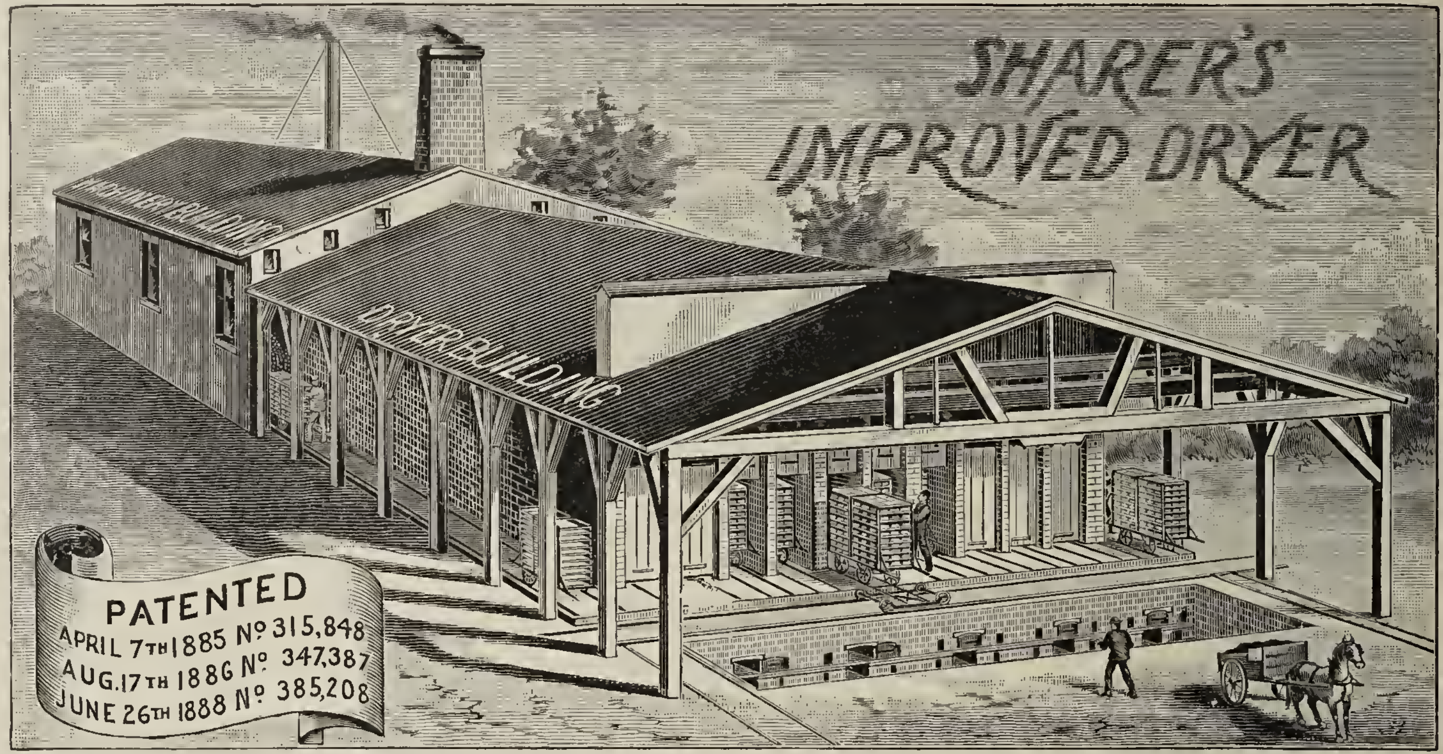
THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ **YOU NEED THIS KILN.** ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.


SHARER'S
IMPROVED DRYER
MACHINERY BUILDING
DRYER BUILDING
PATENTED
APRIL 7TH 1885 No 315,848
AUG. 17TH 1886 No 347,387
JUNE 26TH 1888 No 385,208

COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address **GEO. W. SHARER,** 2224 Tioga St., **Philadelphia, Pa.**

NOTICE TO BRICK MANUFACTURERS.

The RADFORD CONTINUOUS BURNING SYSTEM

IS by far, ahead of all other systems of burning all kinds of building material, and it does not cost more than one-third of other Continuous Kilns to build it. Radford does not make as much noise as other Kiln men, but he gets there all the same.

Before deciding to building Continuous Kilns send for particulars to

Wm. Radford,

1512 Seller Street,
FRANKFORD, PHILADELPHIA.

Testimonials.

Ft. DODGE CLAY WORKS.

L. A. Thorson, *Secretary.*

Fort Dodge, Iowa, October 17, 1894.

Wm. Radford, Atlanta, Ga.

Dear Sir:—We have now used your Monarh Continuous Kiln for nearly two years and are pleased to state that it works perfectly satisfactory. We have burned building brick, paving brick, and also drain tile successfully, and very, very cheaply. Will further state that so far there has not been one dollar's worth of repairs done or needed on the kiln.

Wishing you much success, we are respectfully yours,
FT. DODGE CLAY WORKS, L. A. Thorson, Sec.

Wm. A. Hancock, *Pres.* T. P. Perkins, *Vice-Pres.* H. L. Grant, *Sec.*

Office of SOUTH RIVER BRICK CO.,

Manufacturers and Dealers in SOUTH RIFER PRESS BRICK.

Works located at Norton, Ga., E. T. Va. & Ga. R. R.
Office, 3 Constitution Building; Telephone 506.

Atlanta, Ga., October 31, 1894.

This is to certify that Wm. Radford built us a 10 Chamber Kiln this past summer. The kiln is built of common brick inside and out. We have burned around about 14 times Khe kiln is in as perfect condition now as when finished, so far as we can see. With proper attention of the burners the kiln will burn 95 to 98 per cent. hard brick. The kiln is giving good satisfaction and it does all that is claimed for it. The saving of coal is $1.25 per 1,000. We don't believe it has any equal; it can't be too highly recommended.

SOUTH RIVER BRICK CO.
(This kiln cost $3,405, all complete.) W. A Hancock.

McCAY & COMPANY,

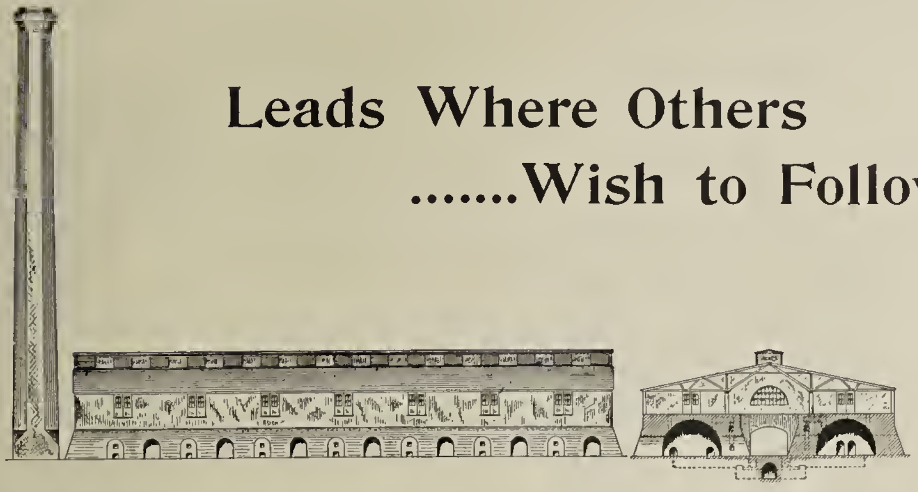
Manufacturers of ALL KINDS OF BUILDING BRICK.
Yards: Oxford Pike.

Frankford, Phila., July 31, 1895.

This is to certify that Wm. Radford has altered our —— Continuous Kiln, taught us to set and properly burn it, and we can highly recommend him to any fellow brickmaker who desires to construct a Continuous Kiln. Mr. Radford has demonstrated that he thoroughly understands the construction and burning of Continuous Kilns, and no one will err who engages him for that purpose.

Very truly, McCAY & CO.

Haigh's New System of Continuous Kiln,



Leads Where Others ....Wish to Follow.

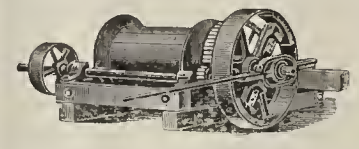
Several other kilns are being changed to this system of side firing. Everyone that has been to see and note results, are enthusiastic over its simplicity and the character of product obtained.

Let me ask you one question: Why pay $2 00 per M for fuel when less than 40 cents will do the same work? Its worth considering in these days of close competition.

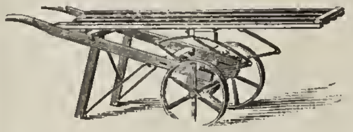
Cost of Construction, Labor in Burning and Repairs, are all in proportion, lower. For further information, address

H. HAIGH,
Galesburg, Ill.

If You Want Supplies



Friction Winding Drums.
Spur or bevel gear to suit any location.



Trucks for Brick or Tile.
One or two wheels.

Brick Moulds.
Made from the best cherry, either for Hand or Machine.

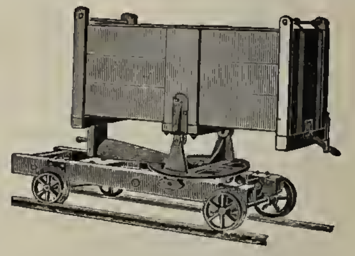
Of Any Kind

Which are made from the best material, and the best workmanship, and at prices far below any, we can give it to you.

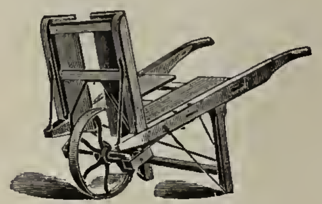
• • •

We manufacture all our goods therefore know what grade of material is used in their construction. You buy from the manufacturer and save all commissions.

• • •



Dump Cars.
Side, bottom or revolving dump. Having chilled wheels, standard car boxes.



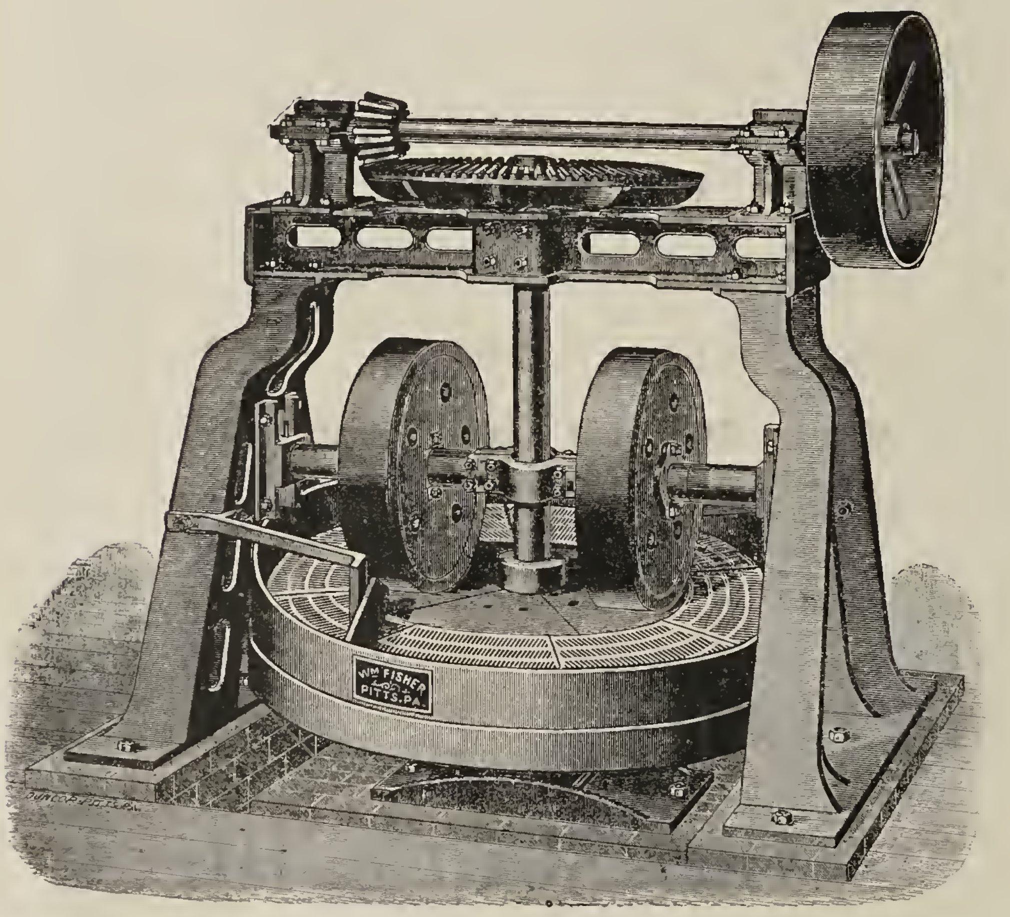
Brick Barrows.
With or without springs.

G. & A. POTTS & CO.,

420-428 West Washington Street, (Old National Road,) *INDIANAPOLIS, IND.*

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets.
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers. Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter. for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

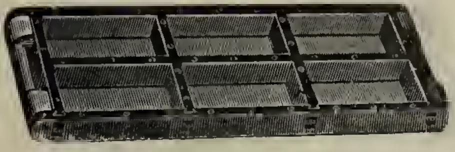
ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

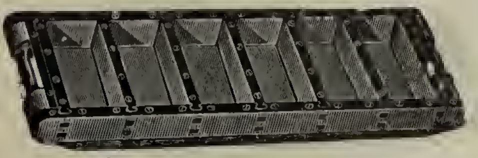
ARNOLD'S BRICKYARD SUPPLIES.

••They are the BEST that are Made.••

3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call *Specials*, that are better and cost more. If you get these you will know you have **the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

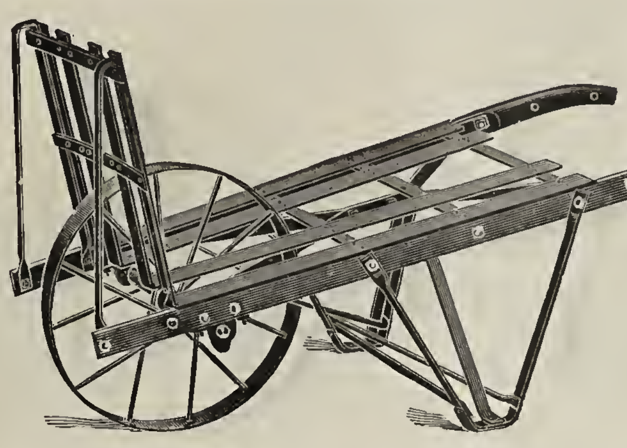
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

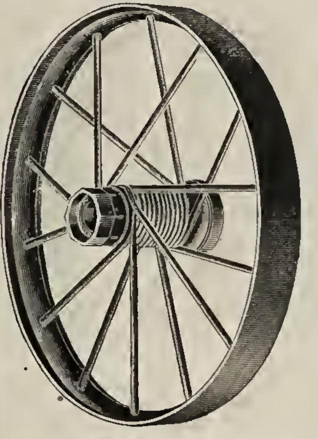
All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable**. 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.





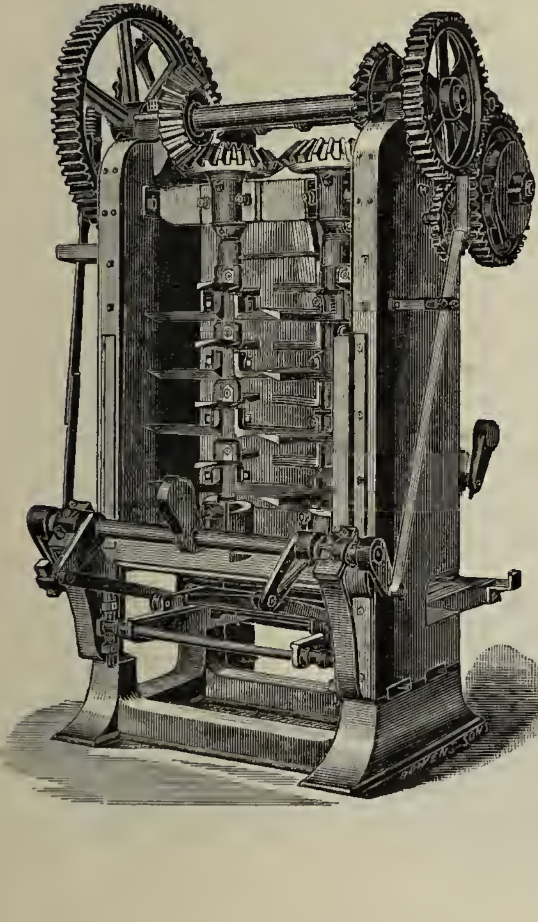
METAL WAGON WHEELS

MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The **strongest** wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced. Circular and prices sent on application. Address

The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

THE DUPLEX

Is the Standard of All Soft Clay Brick Machines.



◆

It is made entirely of iron and steel, thus being very Strong and Durable, Simple in Construction, and makes a much stiffer brick than can be made with any other soft clay machine.

◆

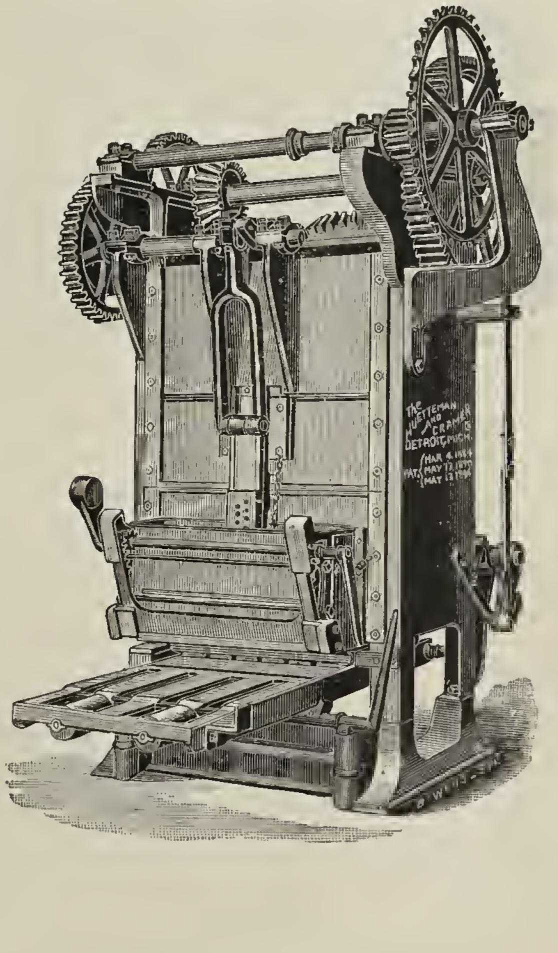
Write for Catalogue . .
. . . and Prices to

The Huetteman
& Cramer Co.,

Manufacturers of the Duplex Brick
Machine and general outfit
for brickyards,

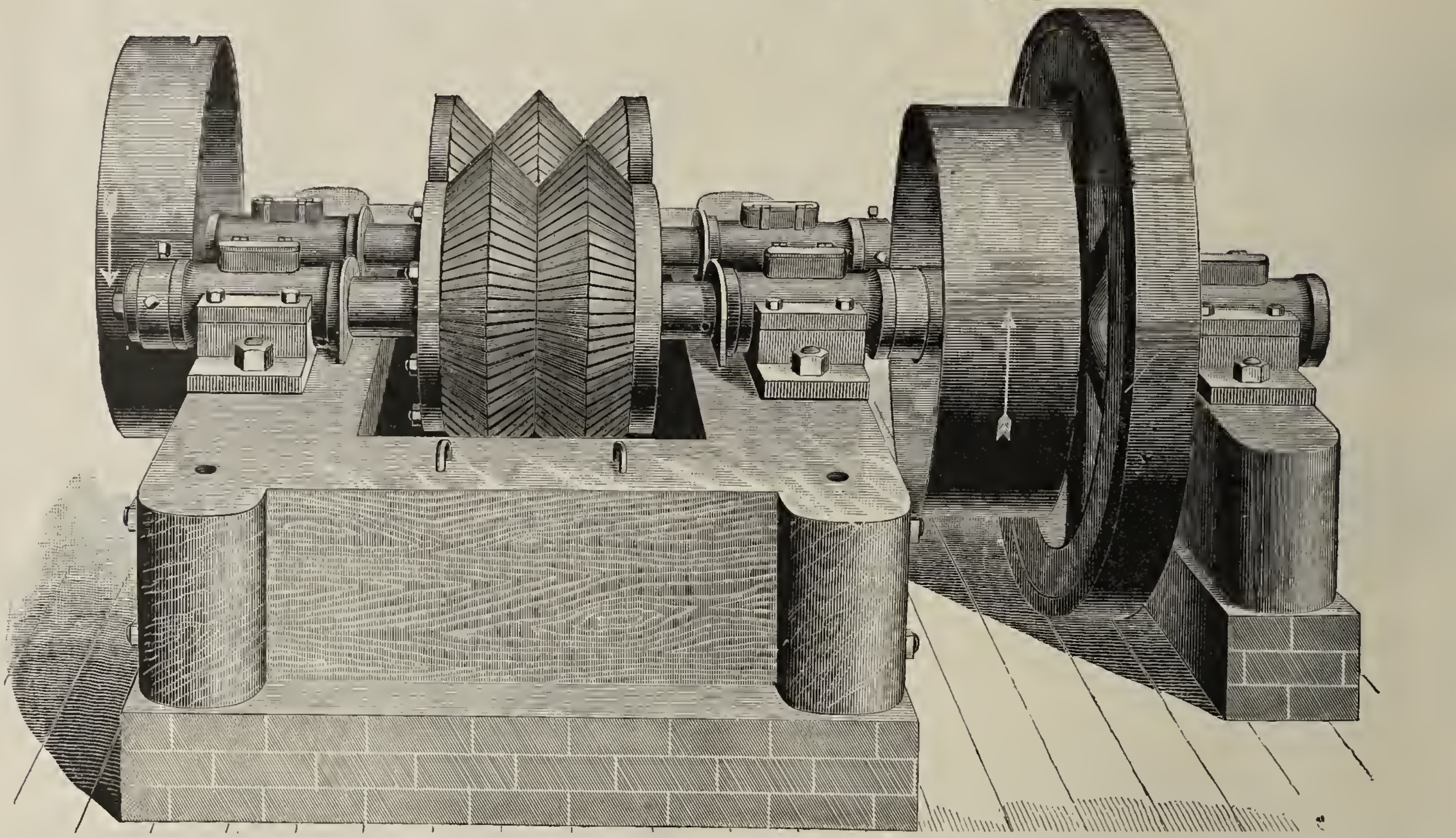
12, 14 & 16 Sherman St.,

DETROIT, == MICH.



NEWELL IMPROVED CLAY PULVERIZER

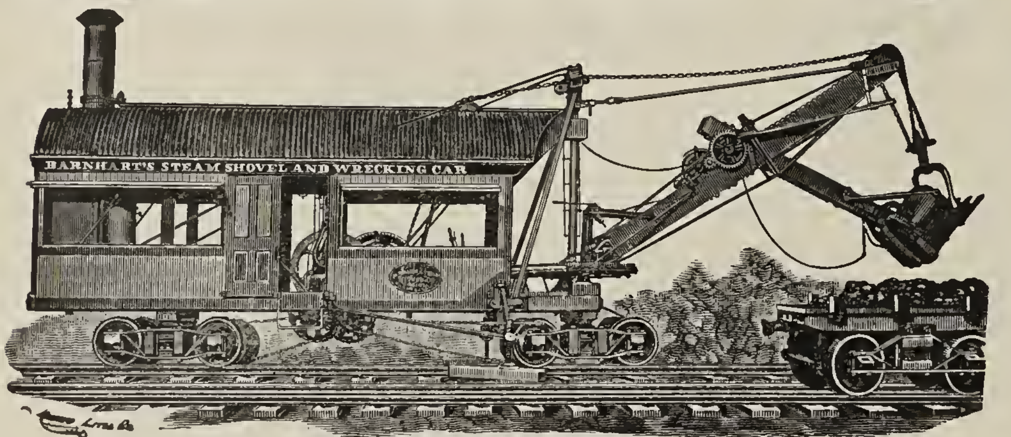
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building 26 Cortland and 21 Dey Streets, **New York, U. S. A.**

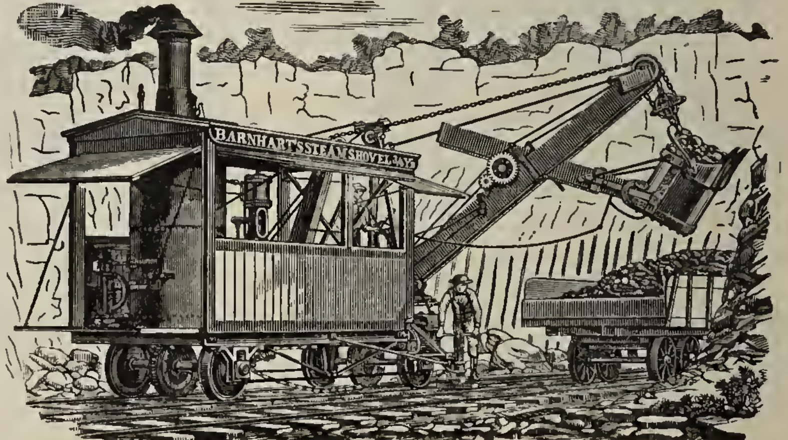
STEAM SHOVELS FOR BRICKYARDS.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

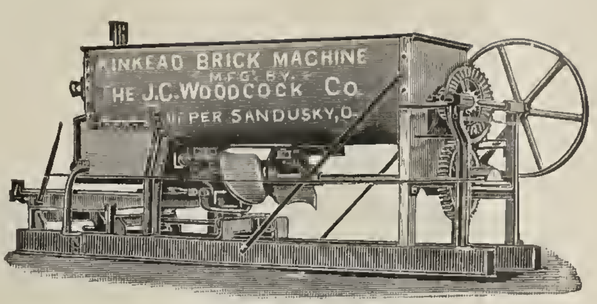
Our large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brick yards of Chicago. We have in and around Chicago, about twenty of these machines of different sizes. We also have men elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work. Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,
603 West Center Street,
MARION. . . . OHIO.



STYLE C—¾ YD

A Good Brick Machine:

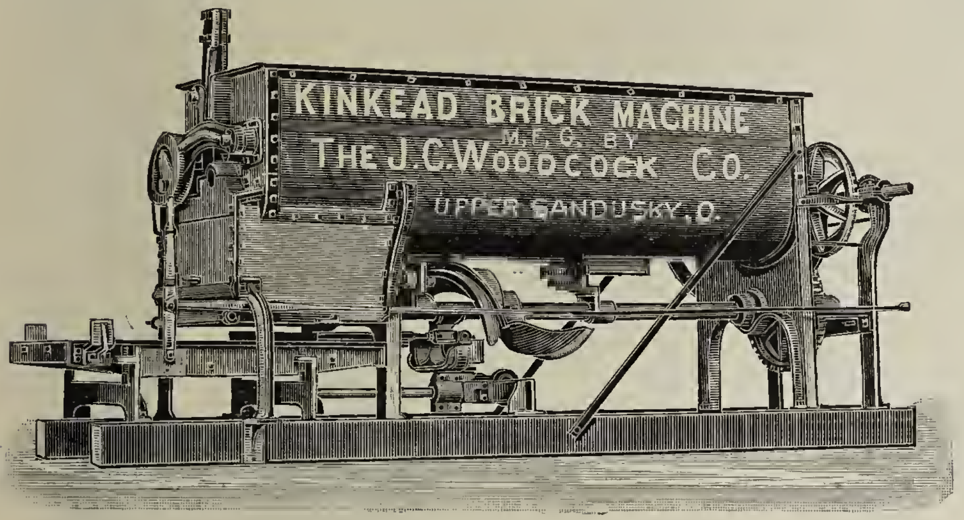

KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Rear View.

One that's Strong enough to withstand the severe strain of working stiff clay.

One that's Durable and will not only make good brick under favorable conditions but will make good brick under the varying conditions incident to brickyard work.

One that's Cheap because it is simple in construction and never breaks down or gets out of repairs but will turn out a desired quantity (30 to 50 M) every day, six days in the week is well nigh "worth its weight in gold." **We** offer it to you at a much lower price and also a line of excellent.


KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Front View.

Brickyard Supplies:==

Brick Moulds, Trucks and Barrows, Elevators, Pug Mills, Etc.

All warranted to be first-class and on reasonable terms.

Dont fail to get our prices.

**The J. C.
WOODCOCK CO.,
Upper Sandusky, Ohio.**

"LEVIATHAN."

"Upon Earth There is not His Like."

* * *

The T. B. Townsend Brick and Contracting Company.

ZANESVILLE, OHIO, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. BURTON, Secretary and Treasurer.

* * *

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

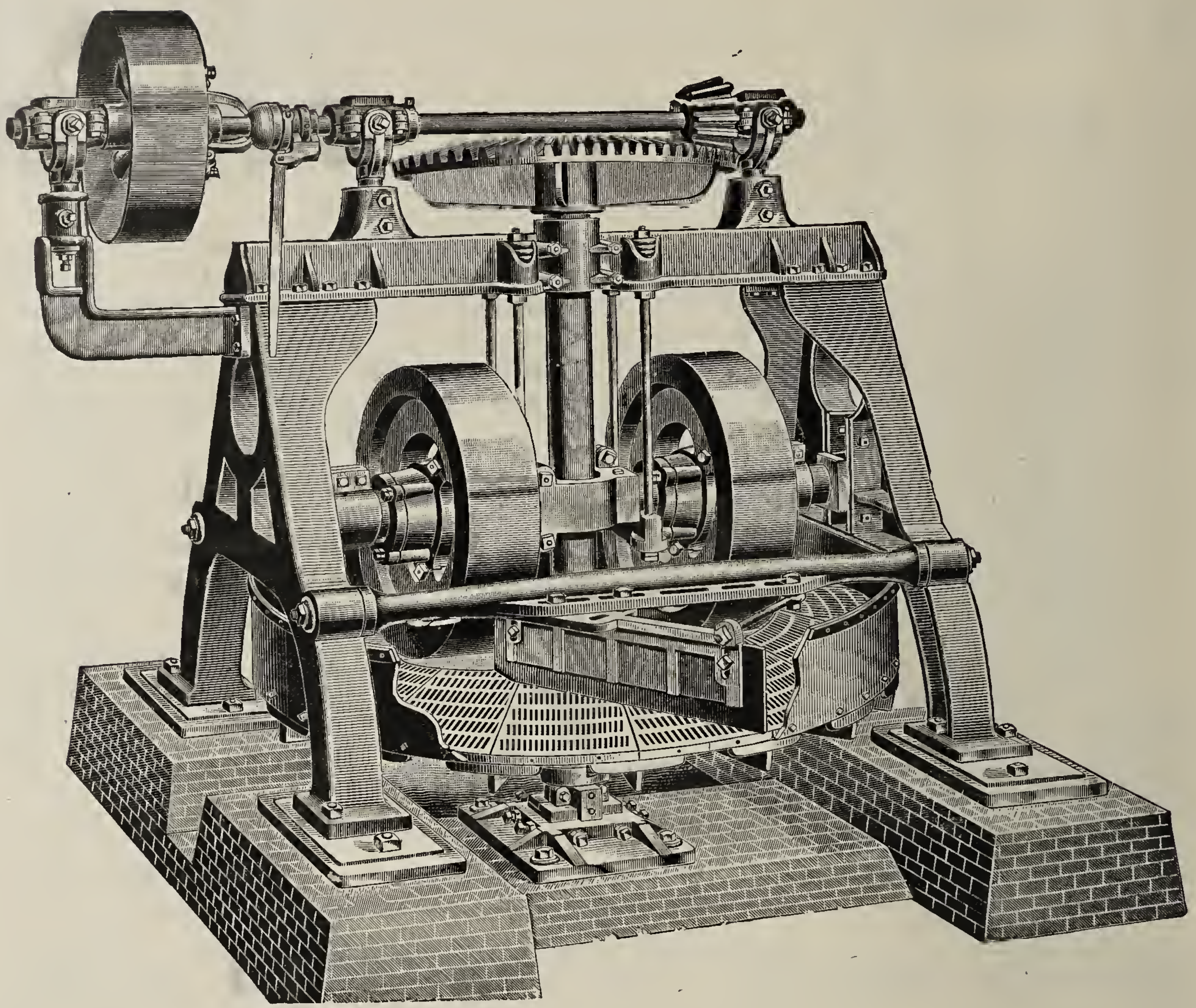
Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

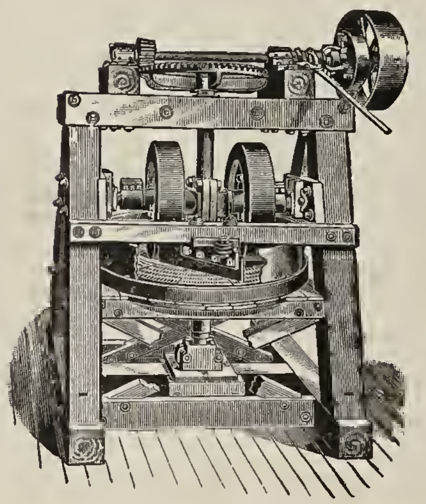
248 Randolph St., CHICAGO, ILL.

PHILADELPHIA:
1219 Carpenter Street.

BOSTON:
120 Pearl Street.

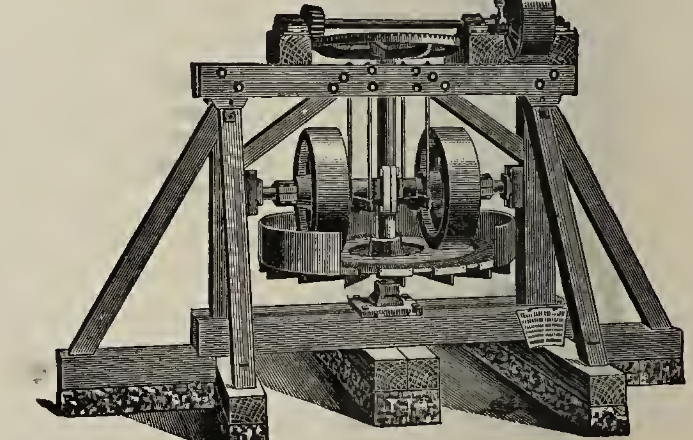


OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



......SEND FOR NEW ILLUSTRATED CATALOGUE......

FROST ENGINE CO., Galesburg, Ill.,
U. S. A.

J.W. PENFIELD & SON.
WILLOUGHBY, O.

A Prosperous New Year

BE YOURS IN '96.

To Ensure Prosperity

You may perhaps need some new machinery to improve your ware, reduce cost of production, increase your output, or do away with annoyances now experienced in the operation of your plant. . . . . . .

If so, our New Catalogue, a handsome volume of over 200 pages, is free for the asking. It will be found a veritable text-book of modern clayworking appliances, and will give you a valuable insight into modern methods of clayworking by all the leading processes. . . . .

Our experience of 40 years, as manufacturers and users of clayworking machinery, is at your service. It will pay you to give us a hearing.

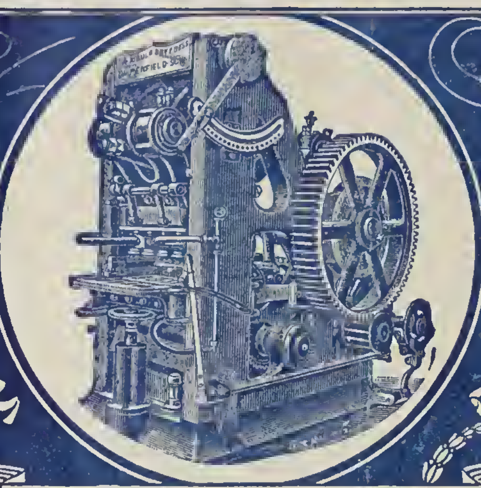
J. W. Penfield & Son,
Willoughby, Ohio, U. S. A.

Clayworking Machinery.

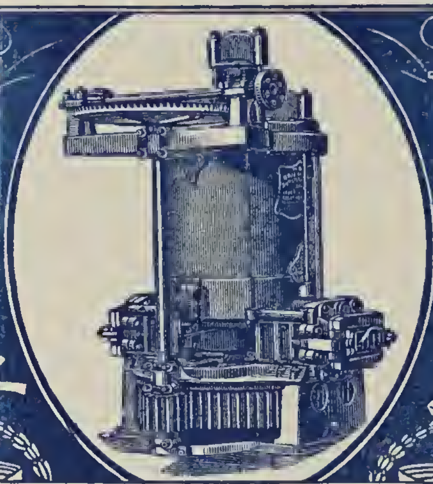
J.W. PENFIELD & SON
WILLOUGHBY, O.

J. W. PENFIELD & SON.
WILLOUGHBY, O.

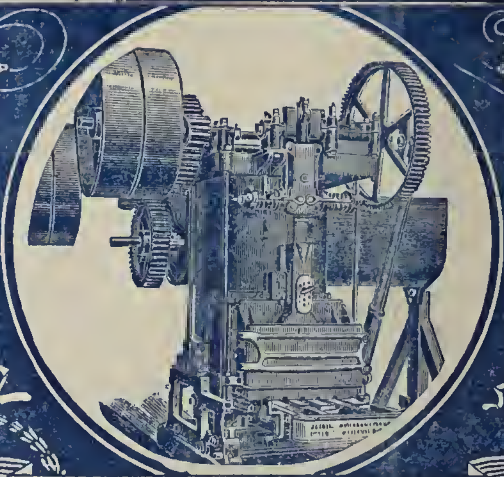
CLAY-WORKING MACHINERY



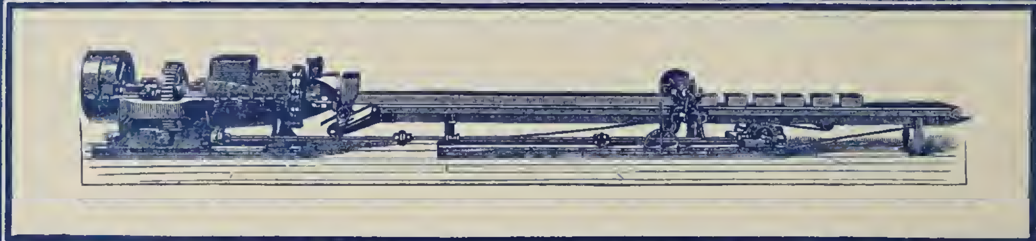
DRY PRESS BRICK MACHINES



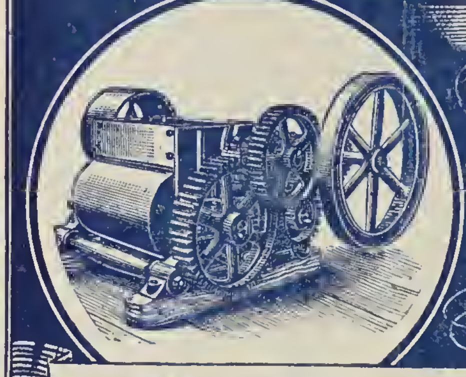
PLUNGER BRICK MACHINES



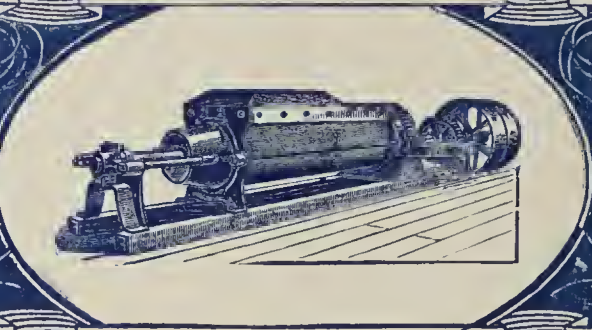
SAND-MOLDING BRICK MACHINES



AUGER BRICK MACHINES

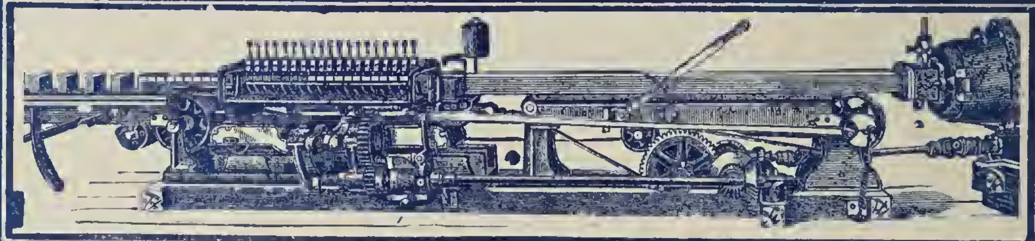


CLAY CRUSHERS

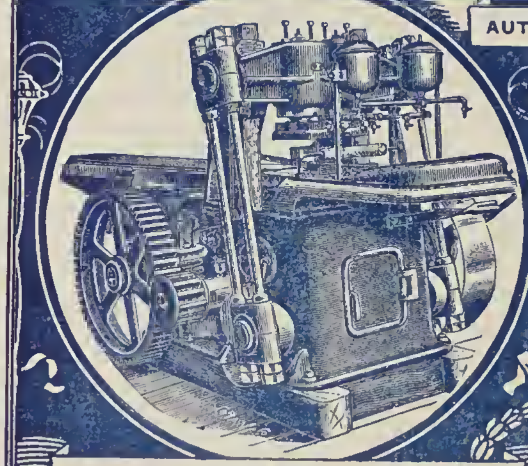


PUG MILLS

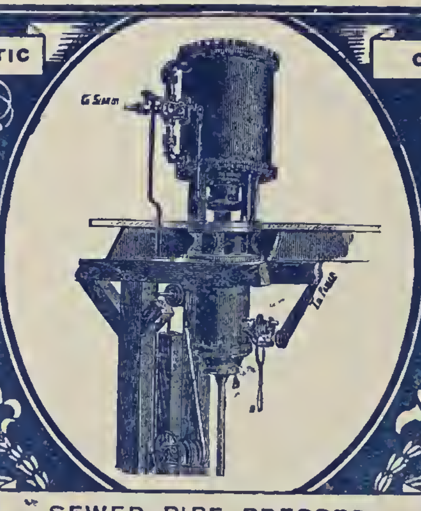
DISINTEGRATORS



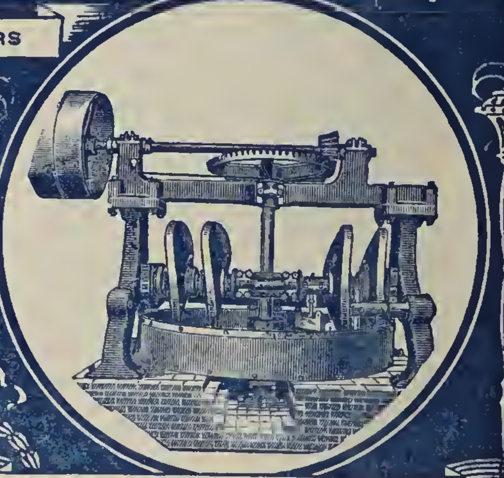
AUTOMATIC CUTTERS



BRICK REPRESSES



SEWER PIPE PRESSES



DRY PANS, WET PANS, ETC.

J.W. PENFIELD & SON, WILLOUGHBY, O. U·S·A·

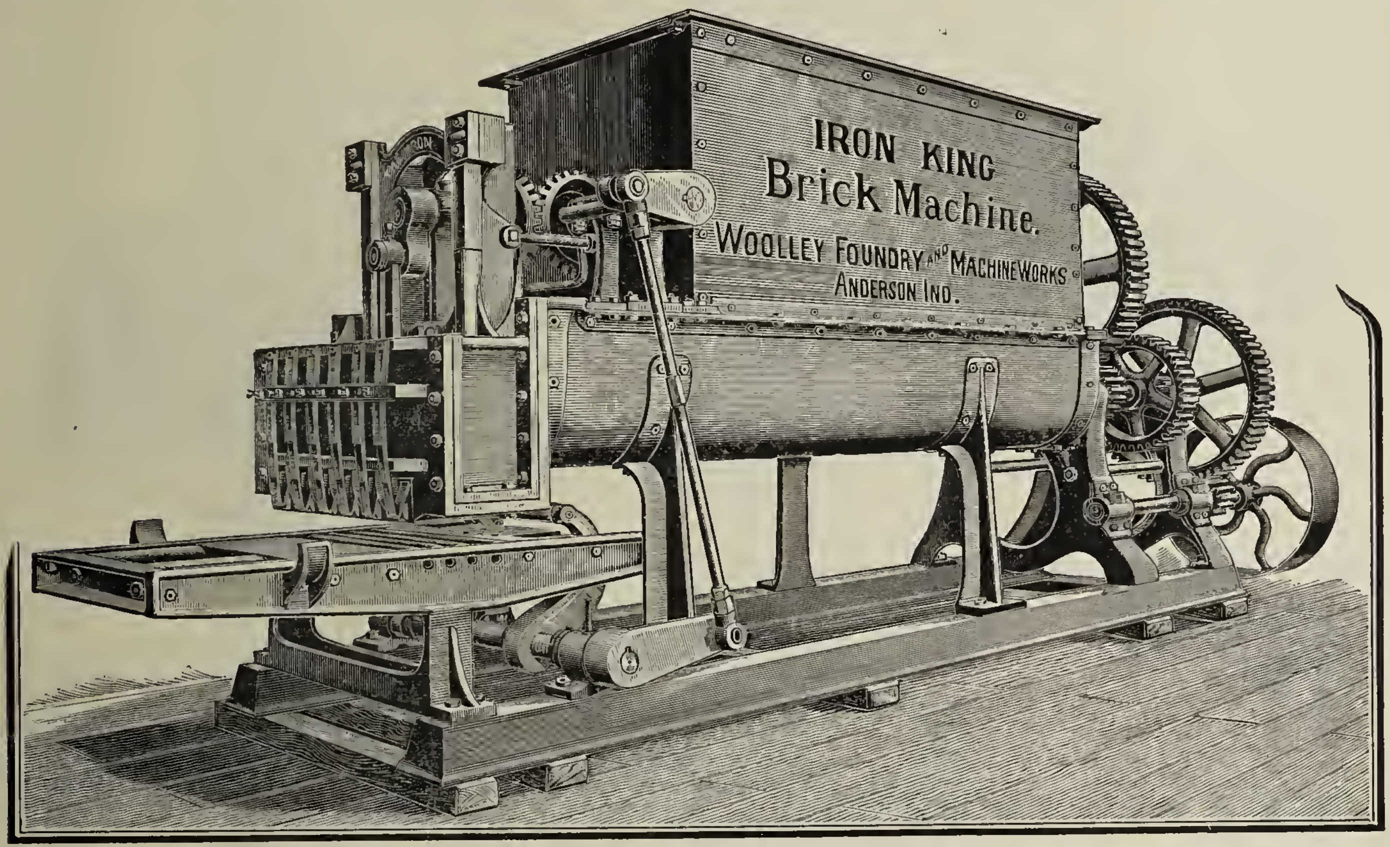
J. W. PENFIELD & SON
WILLOUGHBY, O.

Great Strength

Is a necessary factor in all Brickmaking Machinery, but that is not all that is required. To be effective a Brick Machine must have mechanical features that enable it to perform its work regularly though under varying conditions. In other words

The Successful Brick Machine

Is constructed on scientific principles. That is the kind of a machine we offer. **The IRON KING** is what its name implies —a monarch of strength. It is no experiment but has demonstrated great capacity and endurance in real every day brickyard use. It makes good brick without any hitches or break downs, and molds them so stiff they bear handling.


IRON KING
Brick Machine.
WOOLLEY FOUNDRY AND MACHINE WORKS
ANDERSON IND.

The Iron King....

Does this not merely by "main strength and awkwardness" but by virtue of peculiar methods of construction by which the clay is thoroughly tempered or pugged and then subjected to greater pressure than in any other machine using a sanded mould.

Brickmakers who want the best soft clay machine, and remember the best is the cheapest, are requested to investigate the merits of The **IRON KING**. It has many.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

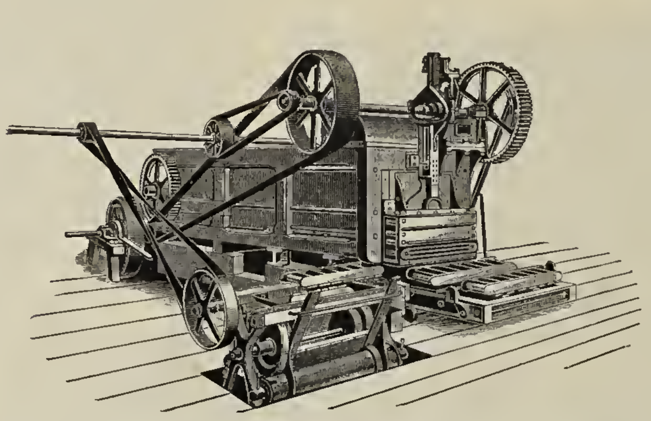
* * *

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

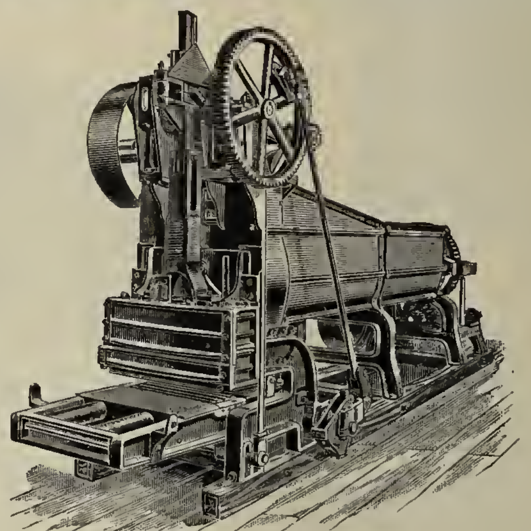
THE POTTS Horizontal Stock Brick ...Machines.

These machines have replaced a great many Vertical Machines and extra Pug Mills. They have never failed to do more and better work.



No. 1 WOOD FRAME PUG MILL, IRON FRONT and TABLE.
Over 250 in Actual Use.

The No. 1 Machine will make **more and better** brick than can be done by any machine on the market.



No 2 ALL IRON.
15 Sold the Past Season.

The No. 2 Machine has the reputation of being the best built on the market, it is without a doubt the **largest, heaviest and strongest** machine ever offered the trade.

Any person contemplating making sand mould brick will do well to investigate the merits of the above machines.

Remember that it is not always the cheapest, which is the best.

We manufacture a full line of Clayworking Machinery and Brickyard Supplies.

C. & A. POTTS & CO.,

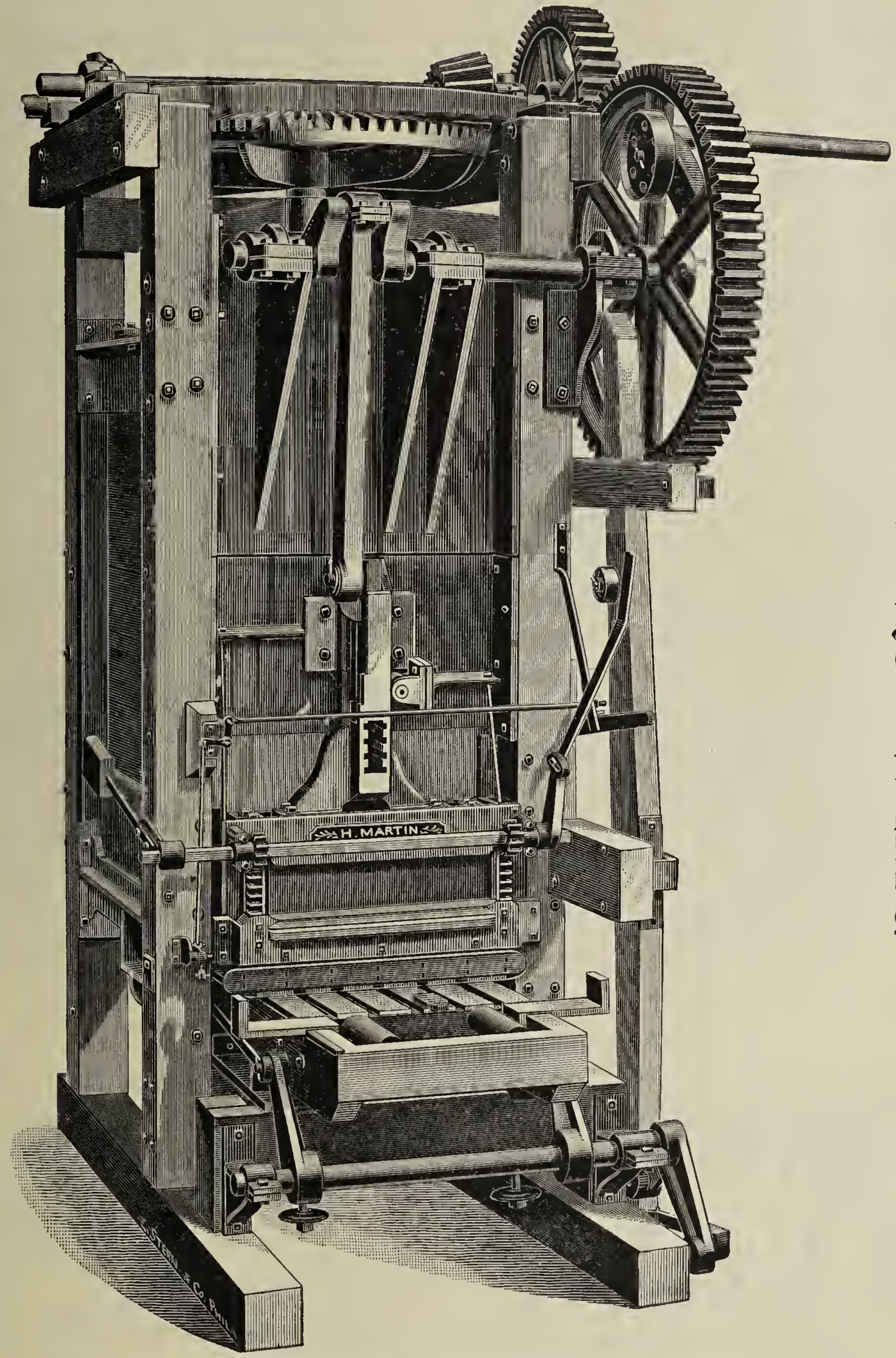
420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.

Simplicity, Strength and Durability

Are the Characteristics of

STANDS SECOND TO NONE.

IT HAS BEEN TRIED AND FOUND TO SUPPLY ALL THE REQUIREMENTS.



MARTIN'S LETTER "A."

The Henry Martin Brick Machine Mfg. Co.,
Incorporated.
LANCASTER, PENN.

WE'VE QUIT

......USING WOOD

In the construction of our

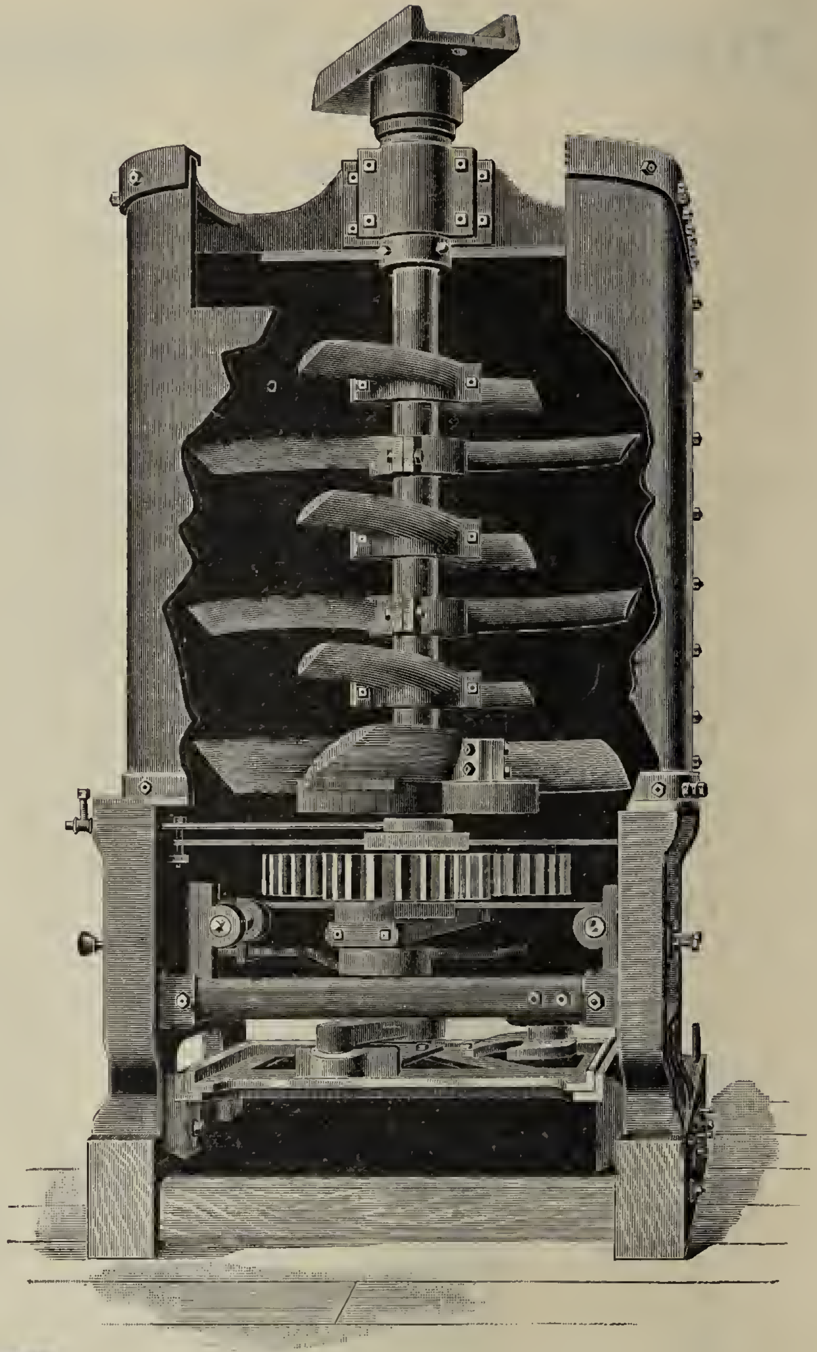
QUAKER

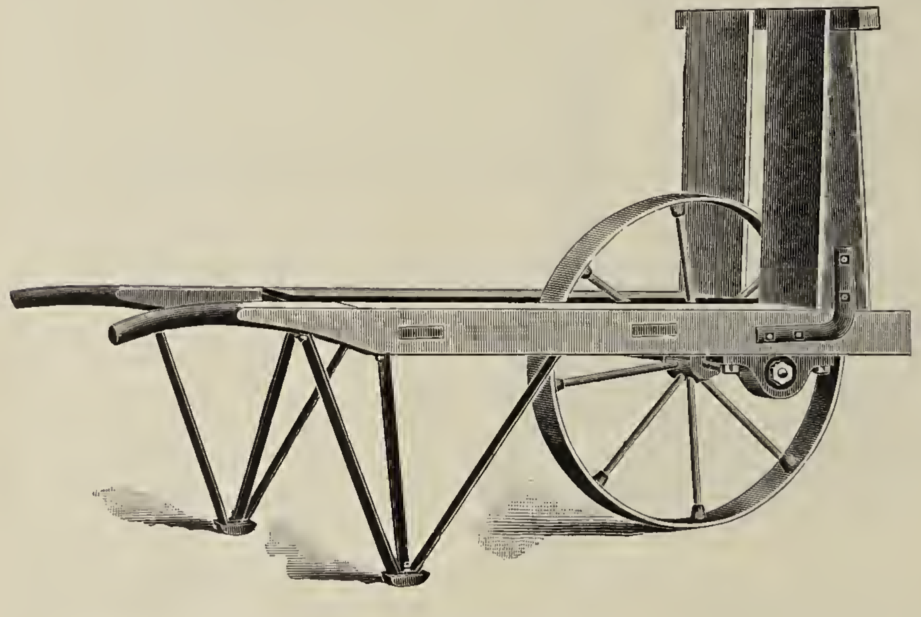
Brick Machines.

Two Styles:
Horse=Power.
Steam=Power.

(Horse-Power can be changed to Steam-Power whenever desired.)

PRICES NO HIGHER THAN BEFORE.





Ball-Bearing Brick Barrow

A user writes: "Send four more. There's a fight every morning among the hands, as to who shall have it, and then he wheels 15 per cent. more brick than any of he rest."

DROP
A CARD
IN THE SLOT
AT YOUR P. O.
FOR CIRCULAR.

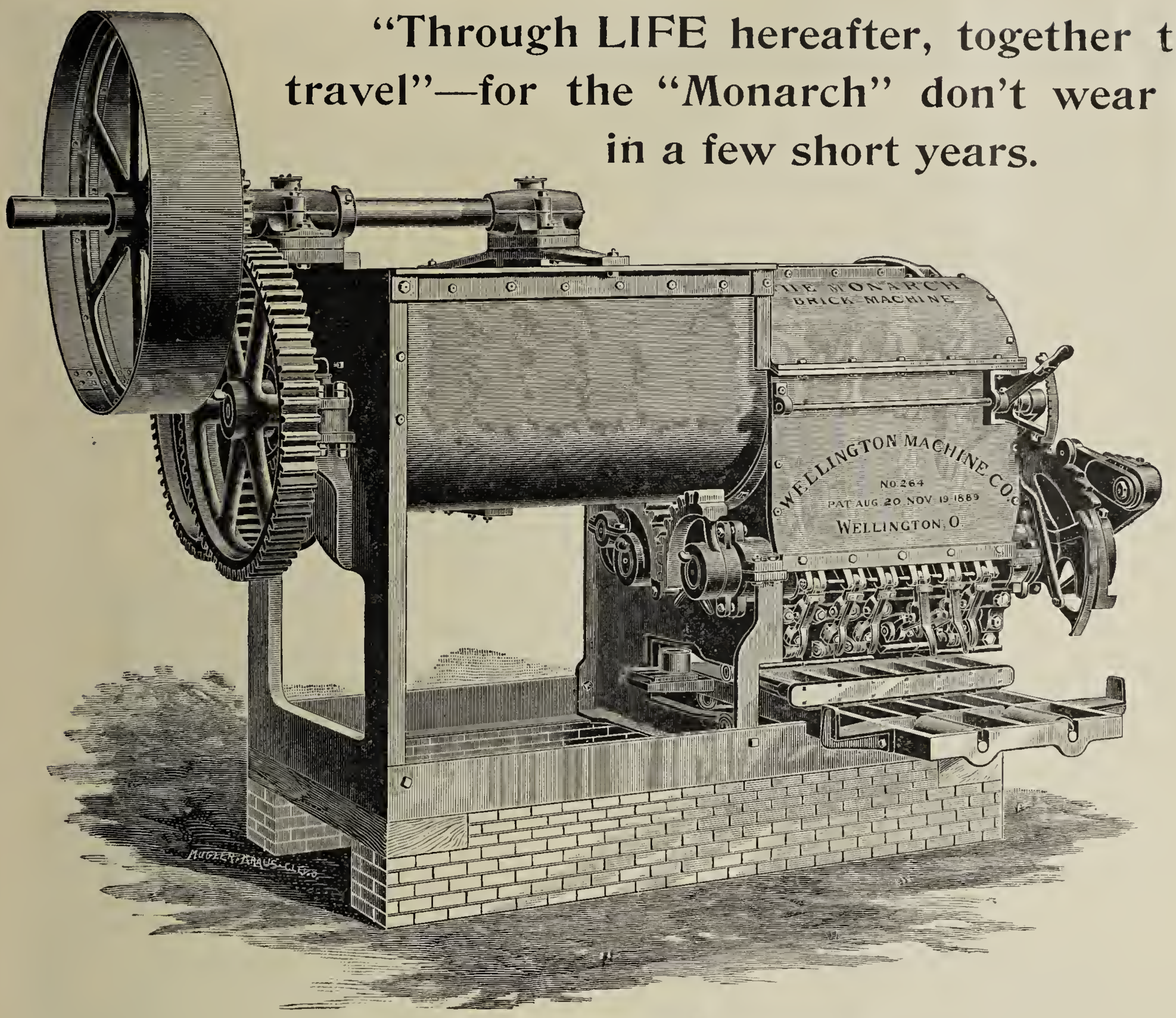
WE ALWAYS DEVOTED

Especial attention to supplies, etc., and have the largest line, and we think the best goods.

The Wellington Machine Co.,

Wellington,
Ohio.

“COMRADES”



“Through LIFE hereafter, together they travel”—for the “Monarch” don’t wear out in a few short years.

AND

The Akron Fire Brick Company	Akron, Ohio.
McCausland Bros	Akron, Ohio.
Edward Reid & Sons	Ashtabula, Ohio.
William Harrison	Cleveland, Ohio.
The Eaton Brick Company	Eaton, Ohio.
John A. Hoesman	Hartwell, Ohio.
Rowland, Mulcahy & Co	Mansfield, Ohio.
Belmont Brick and Tile Company	Martin’s Ferry, Ohio.
Thompson Bros	Painesville, Ohio.
D. B. Chambers	Sandusky, Ohio.
Pilloid Lumber Company	Swanton, Ohio.
A. E. Macomber	Toledo, Ohio.
Frank E. Tracy	Toledo, Ohio.
Joseph Gates	Toledo, Ohio.
John T. Chambers & Co	Blair Station, Pa.
C. M. C. Harper & Co	Boston, Pa.
A. A. Thompson	Carlisle, Pa.
H. C. & W. G Price, Jr	Chester, Pa.
Pfeffer & Co	Gettysburg, Pa.
Tobias Bros. & Co	Hamburg, Pa.
E. H. Snvder	Hanover, Pa.
Joseph Hart	Hollidaysburg, Pa.
Joseph E. Rapp	Norristown, Pa.
Simon Kline	Reading, Pa.
John Sullivan, Fifty-second and Market	Philadelphia, Pa.
W. and J. Francis & Co	Pittsburg, Pa.
Brownfield & Boyle	Uniontown, Pa
Brush Bros	Buffalo, N. Y.
J. F. Stengel	Buffalo, N. Y.
Jewett & Reynolds	Buffalo, N. Y.
Thompkins & Smith	La Salle, N. Y.
Niagara Brick Company	Niagara Falls, N. Y.
Callahan & Doyle	Utica, N. Y.
Kilkenny & Davis	Utica, N. Y.
George F. Weaver’s Sons	Utica, N. Y.
A. L. Hatch	Central City, Iowa.
J. M Crabill	Clarinda, Iowa.
Wickham Bros	Council Bluffs, Iowa.
Newman Bros	Des Moines, Iowa.
The Franklin Brick Company	Marion, Ind.
B. W. Bennett	Muncie, Ind.
F. Lehman & Co	Chicago, Ill.
Citizens’ Coal Mining Company	Lincoln, Ill.
Wisconsin Red Pressed Brick Co	Menominee, Wis.
Cook & Brown Lime Company	Oshkosh, Wis.
Missouri Reform School	Boonville, Mo.
Skoog & Johnson	Springfield, Mo.
Monarch Brick Company	Los Angeles, Cal.
Sacramento Transportation Company	Sacramento, Cal.
C. B. Oldfield	Norfolk, Va.
Wallace House	Hanson, Mass.
Hart Bros	Northfield, Minn.
Dalton Bros	Hopkinsville, Ky.
Monroe Brick Co	Monroe, La.
M. Butler	Houston, Tex.

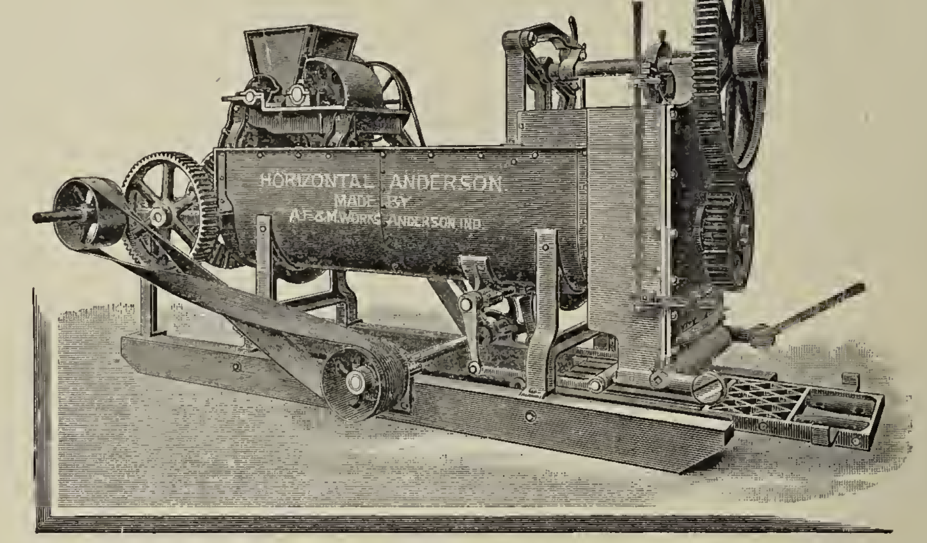
The WELLINGTON MACHINE CO., - Wellington, Ohio.

A New Departure in Brick Machinery

THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY;** simple in construction and durable.

This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.


HORIZONTAL ANDERSON.
MADE BY
A.F.&M.WORKS ANDERSON IND.

W. H. HOOVER,

General Building Brick.

LAPORTE, IND., September 25th, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind,

Dear Sirs:—As foreman of the Hoover & Flory brick yard, I wish to add my testimony in regard to the merits of your "Horizontal Brick Machine." I have been in the brick business for fifty years and have examined a great many machines, and feel confident that yours is unexcelled for simplicity, durability and perfect product.

Would cheerfully recommend it to all purchasers and extend an invitation to all to call and see ours in operation.

Yours truly, ROBERT PHILLIPS.

OFFICE OF

J. A. DALY,

Contractor and Builder,

And Manufacturer of Brick.

NEVADA, MO., April 24th, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.

Gentlemen:—I have been from home, hence the delay in answering your letter. I must say the old brick machine you sold me "is out of sight," it has never skipped a cog or lost a day.

Yours respectfully,
J. A. DALY.

SHELBYVILLE, IND., September 1st, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.,

Gentlemen:—We are getting along fine and think we have the best machine there is.

Respectfully,
JONES & VANNOY.

W. H. HOOVER,

General Building Brick.

LAPORTE, IND., September 25th, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.,

Dear Sirs:—The Brick Machine we purchased of you last July gives perfect satisfaction in every point. It has been in operation since the 26th day of July and we have turned out from 28,000 to 35,000 brick per day, and could have turned out more if we could have handled them. Before purchasing your machine we looked at a great number of other Brick Machines but decided on yours, and are not sorry that we did so. We would advise any one contemplating the purchase of a first-class Brick Machine to give the "Anderson Horizontal" a thorough investigation. We have had no trouble in regards to repairs or break downs since we started.

Yours truly,
HOOVER & FLORY.

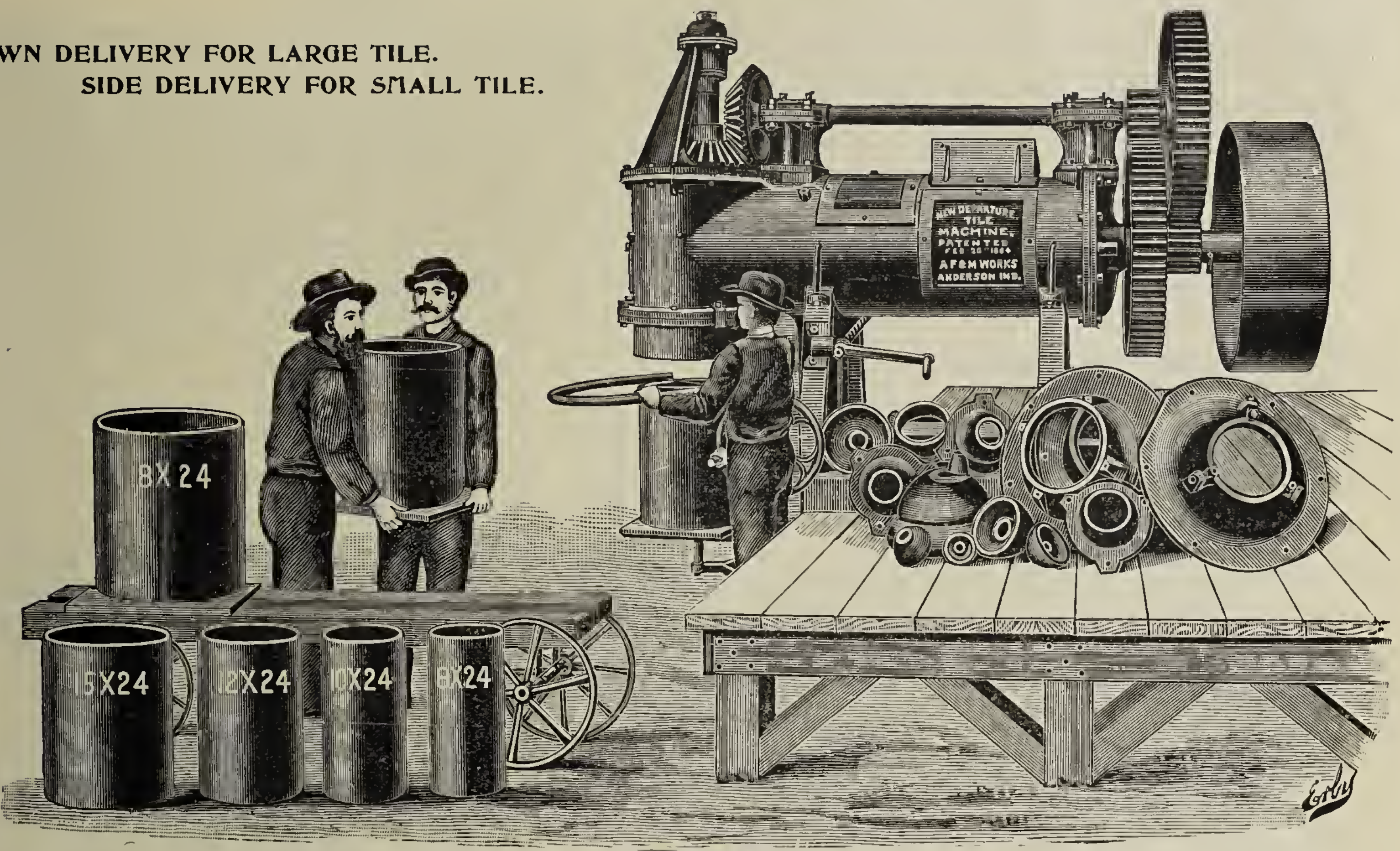
* * *

For full information relative to the Horizontal Anderson Brick Machine, write to

The Anderson Foundry and Machine Works, = = Anderson, Ind.

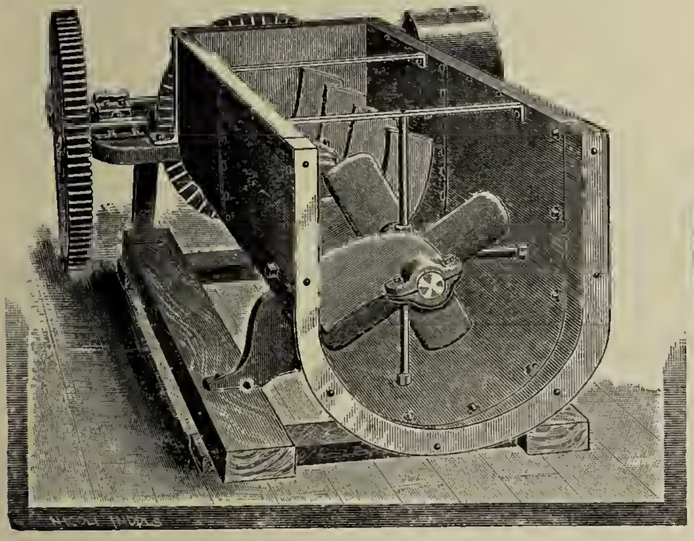
New Departure Tile Machines,

DOWN DELIVERY FOR LARGE TILE.
SIDE DELIVERY FOR SMALL TILE.


NEW DEPARTURE TILE MACHINE. PATENTED FEB 20 1894 A.F.&M WORKS ANDERSON IND.
8X24
15X24
12X24
10X24
8X24

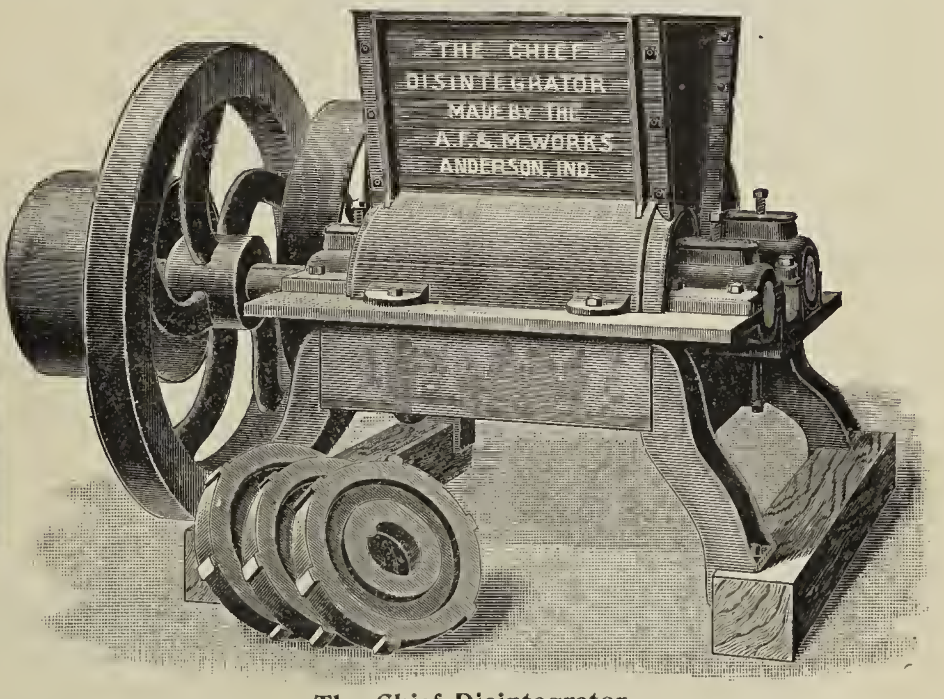
THE GREATEST ON EARTH.

We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inche in diameter in a manner that defies competition.



End View of Pug Mill.

◆


THE CHIEF DISINTEGRATOR MADE BY THE A.F.& M.WORKS ANDERSON, IND.

The Chief Disintegrator.

Write for full description. Address

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.

New Automatic Brick Cutter.

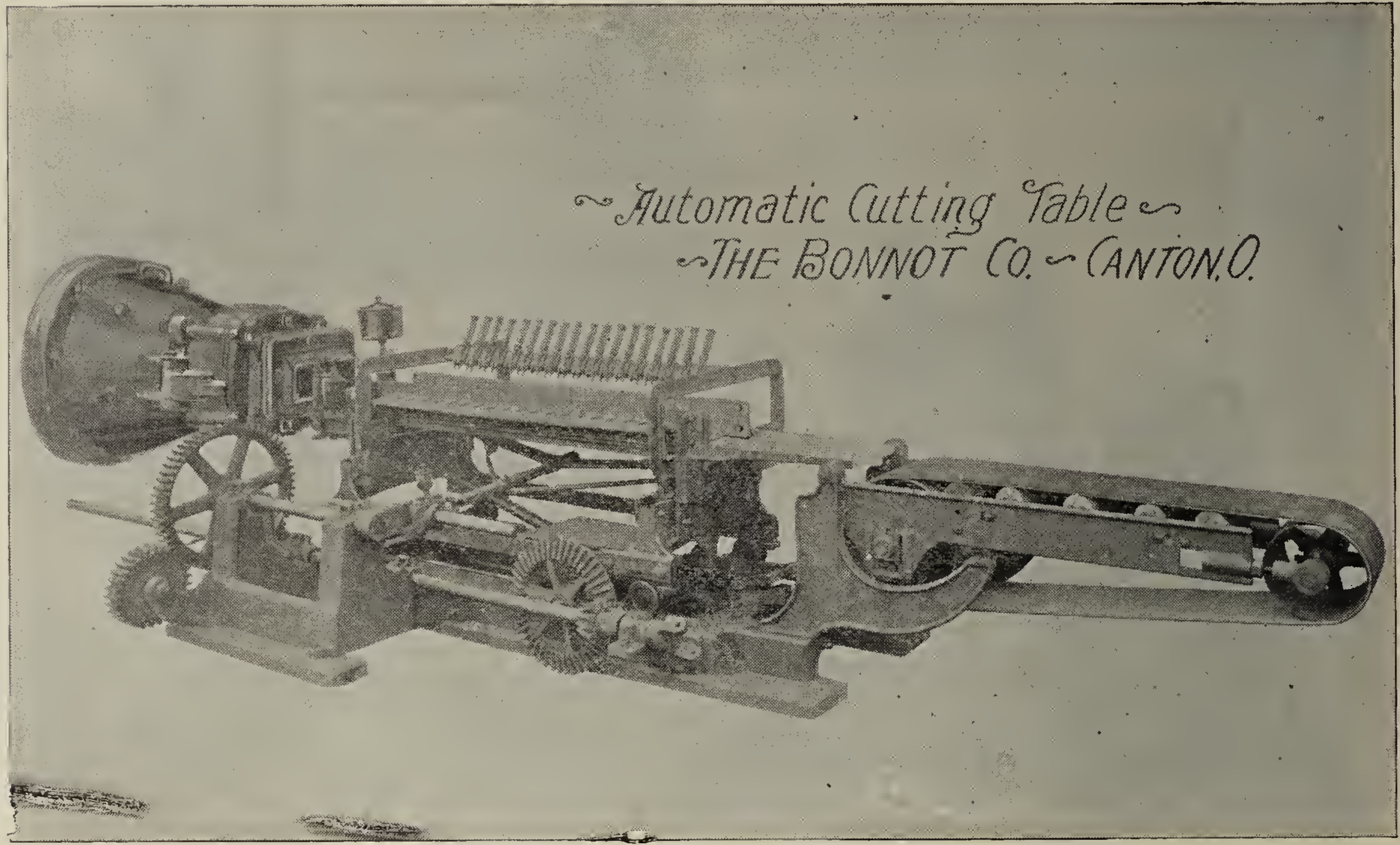
LAST BUT NOT LEAST. Has less Parts but Greater Capacity and Efficiency.

Introduction.

We have just completed an automatic cutter which embodies new ideas and has advantages that can only be obtained by the peculiar arrangement of parts that compose the entire machine.

The general appearance is very similar to other machines of this kind, but a careful examination of our cutter and the positiveness of its movement will convince the practical brick manufacturer that we have eliminated all the objectionable features characteristic of other automatic cutters, and that we have an extremely simple machine, with working parts accessible, and the necessary adjustment for making quick changes in cutting brick of different sizes.

Our cutter is not an experiment, as it has been thoroughly tested, is in actual operation at the present time, and is giving entire satisfaction.



Construction.

This machine has three separate parts, viz., the cutting table, measuring belt and off-bearing belt. The cutting table mechanism and the measuring belt are self-contained, being attached to a heavy cast-iron base, making it rigid, thus preventing any of the parts from getting out of line. Rigidity and perfect alignment of parts are absolutely necessary to produce a perfect cut and an easy-working table.

The frame for off-bearing belt is very neat and strong, being made of angle steel. When very long we use two drums for driving off-bearing belt.

A Novelty.

We have the only table which has the measuring belt between the brick cutter and the off-bearing belt. The advantages of this arrangement are:

First—The column, upon leaving the die, passes over and between the lubricating rolls, then over the polished plates; this gives the bottom of the column of clay a smooth, glossy surface, which prevents it adhering to the measuring after being cut. This insures two perfect edges to the brick. When the measuring belt is located between the die and cutting table, the column comes in contact with the belt before being lubricated; it sticks to the belt to such an extent that it is necessary to use a scraper to keep the belt clean. This spoils one edge of the brick and shortens the life of the belt.

Second—The brick are all exact in size, as our cutter does not offer enough resistance to swell or upset it.

Third—The off-bearing belt can be run at right angles or any desired angle with the measuring table.

Fourth—The measuring belt is but four feet in length. It is fastened to supports by hinges, and can be raised in a vertical position, making it accessible for a quick change of measuring drums.

Mode of Operation.

The measuring belt sets the cutting device in motion at every revolution of the measuring drum by a trip which raises a small lever and allows the table to move with the column. This also sets the gears in motion. The cutting and moving back of the table is done entirely by the driving shaft. No work is done by the column of clay beyond the simple act of operating the trip, which could be done by one's little finger, if a comparison is required to show how little the clay has to do.

The transverse bearings on which the cutting frame moves are very large, accurately fitted, and arranged to take up the wear. This is indispensable to smooth running and durability in machines having a reciprocating movement.

The tension spring of our wire fastener imparts a sudden vibration in cutting and throws off all particles having a tendency to adhere, keeping the wires clean at all times.

Reasons Why Our Cutter is Superior to all Others.

First—The capacity is UNLIMITED.

Second—Has no complicated friction or auxiliary to keep in order.

Third—Cuts eighteen bricks at each movement, which allows all parts to move slowly, thereby prolonging the life of the table, and overcoming the disastrous effect of the momentum, as is the case where the table moves rapidly.

Fourth—The wire fasteners have a flexible joint, by the use of which broken wires can be replaced very quickly, without stopping the machine.

Fifth—The thrust bars and stroke are adjustable to allow cutting brick varying in length from 7 inches to 13½ inches, without the addition of any extra parts.

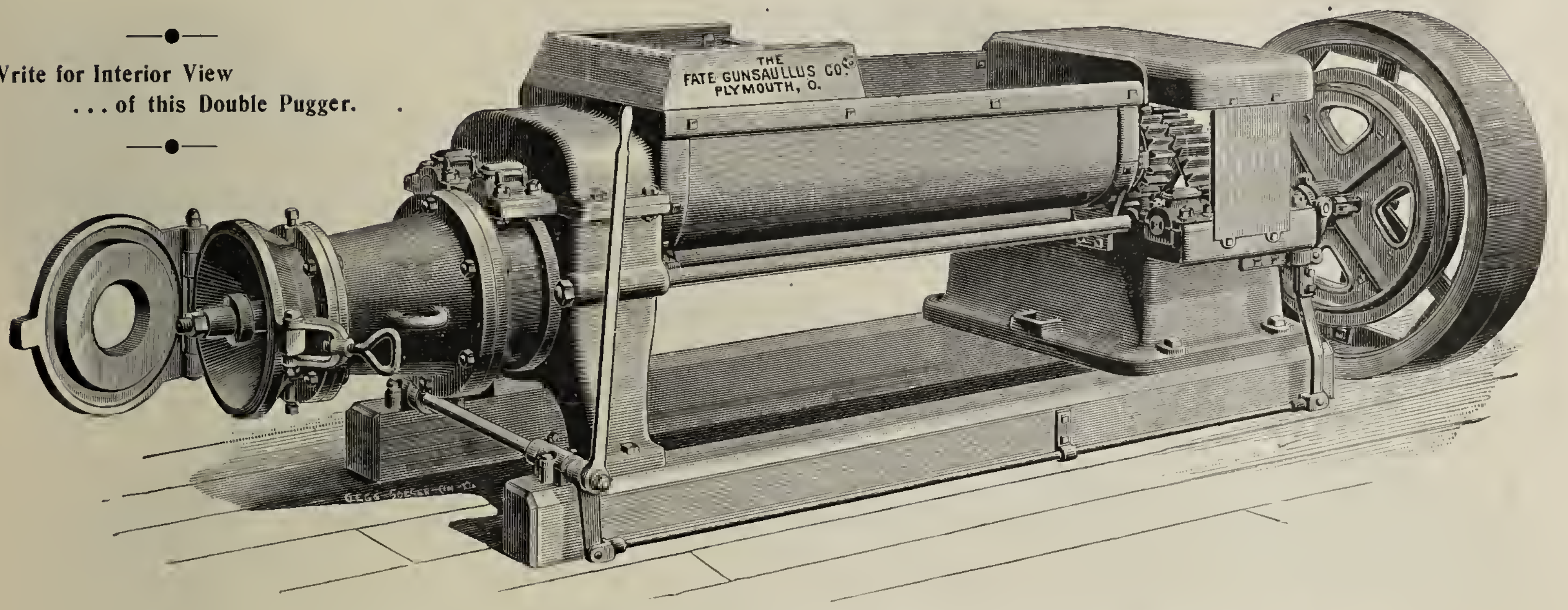
Sixth—We have discarded the use of sprocket wheels, frictions, tension levers, etc.

Seventh—It requires less floor space than any other cutter.

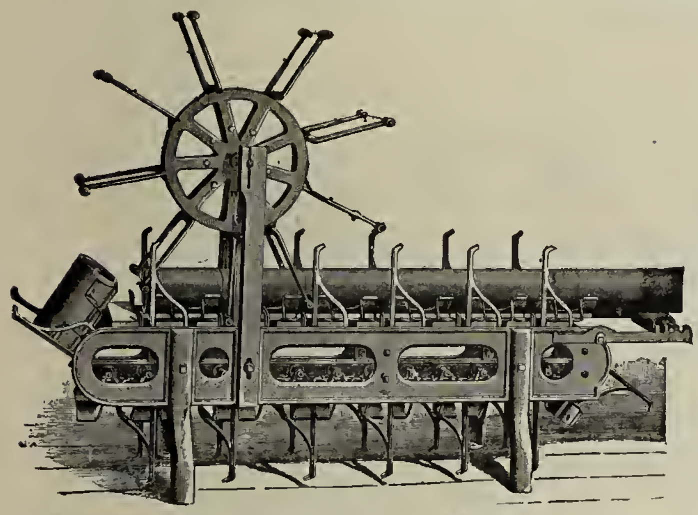
WRITE FOR ADDITIONAL INFORMATION.

The "PLYMOUTH."

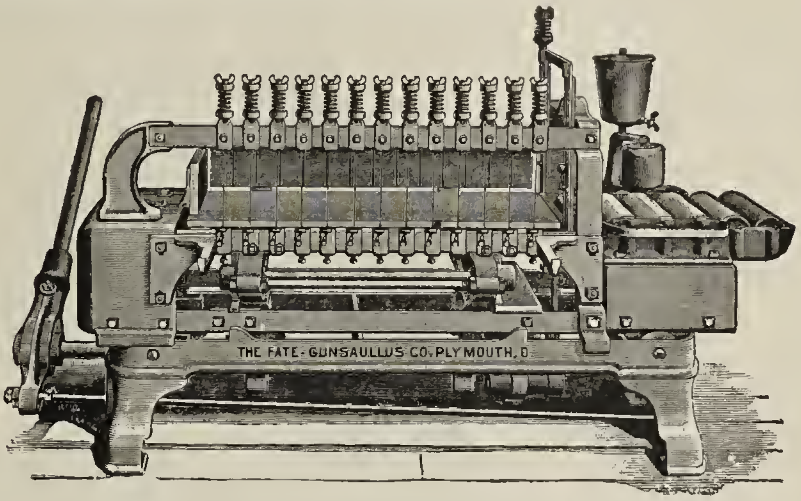
Write for Interior View
. . . of this Double Pugger.


THE FATE GUNSAULLUS CO. PLYMOUTH, O.

The "HUMMER" Combined Pug Mill, Brick and Tile Machine.



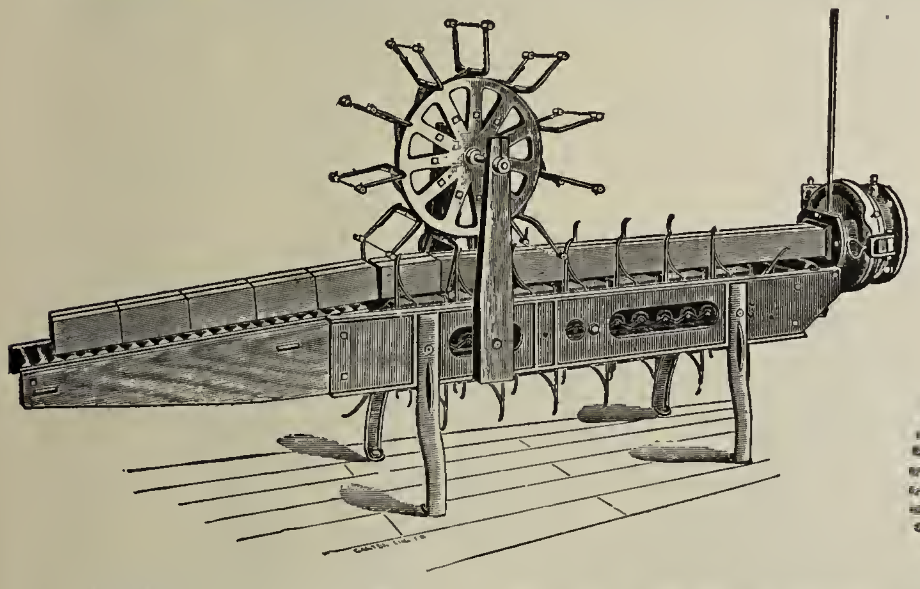
Automatic Table for Tile 2½ to 8-inch and Hollow Blocks.


THE FATE-GUNSAULLUS CO. PLYMOUTH, O.

Board Delivery Side-Cut Table.

The Happy Family

All work together in Harmony. . . .

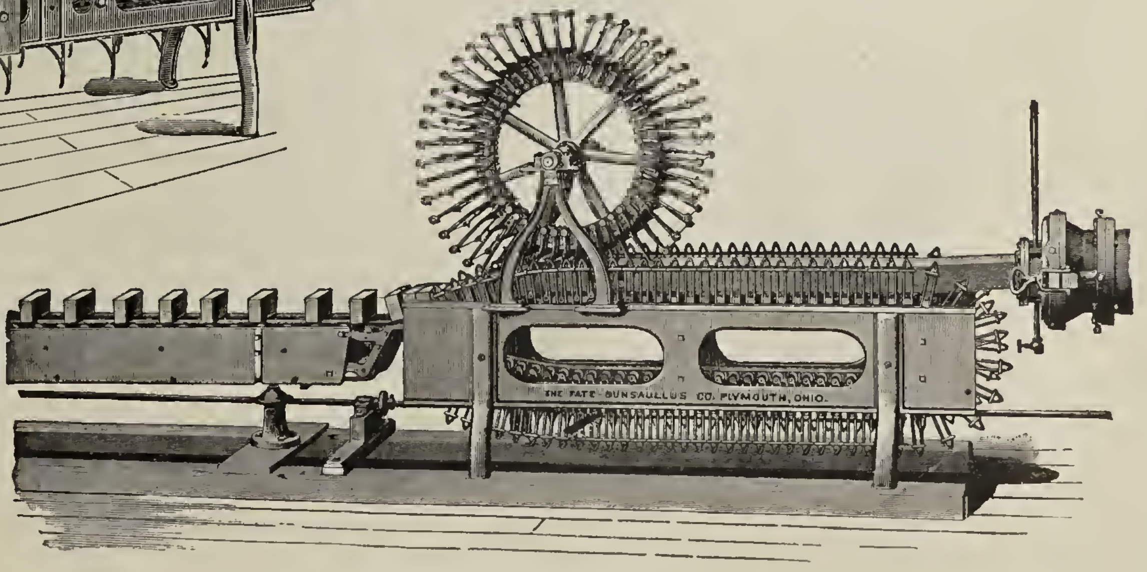


Automatic End-Cut Brick Table.

Write for particulars to

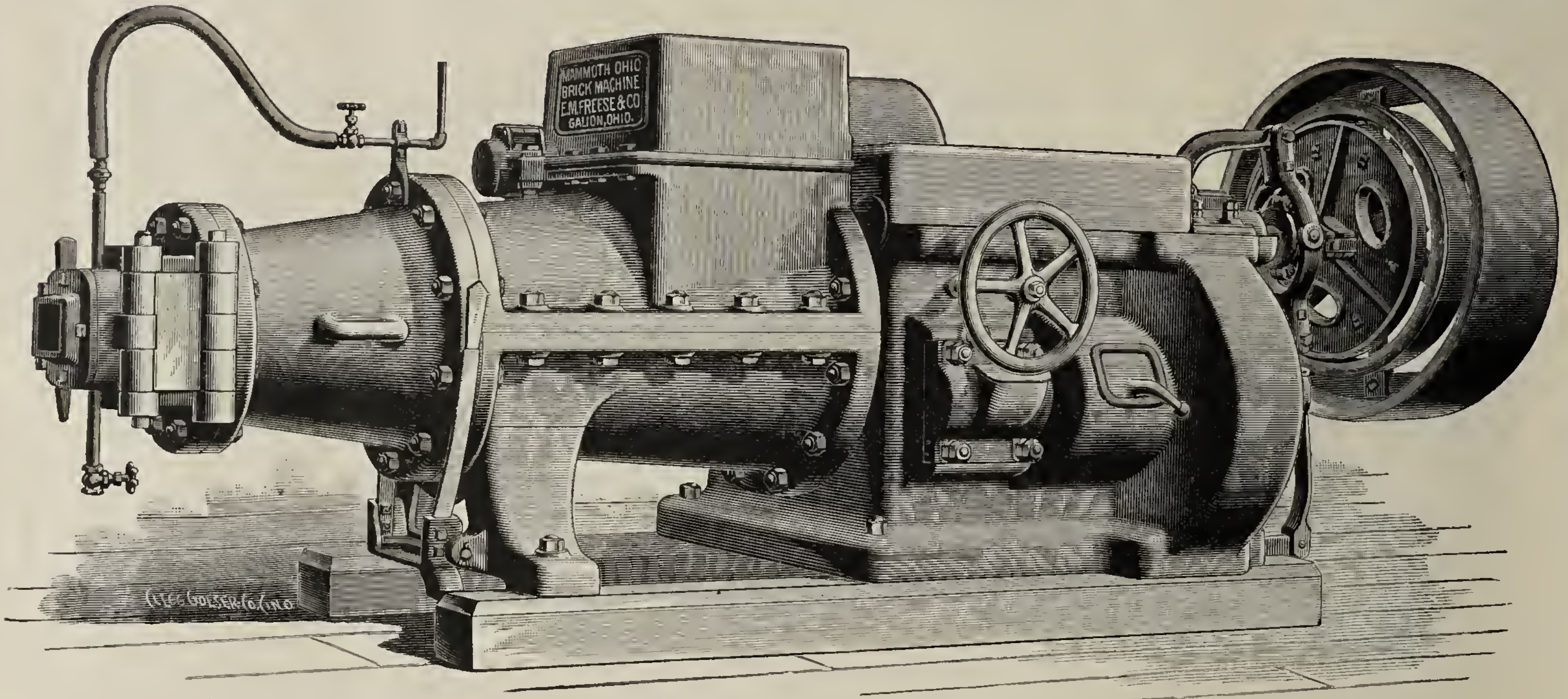
The Fate-Gunsaullus Co.,

PLYMOUTH,
Richland Co., OHIO.

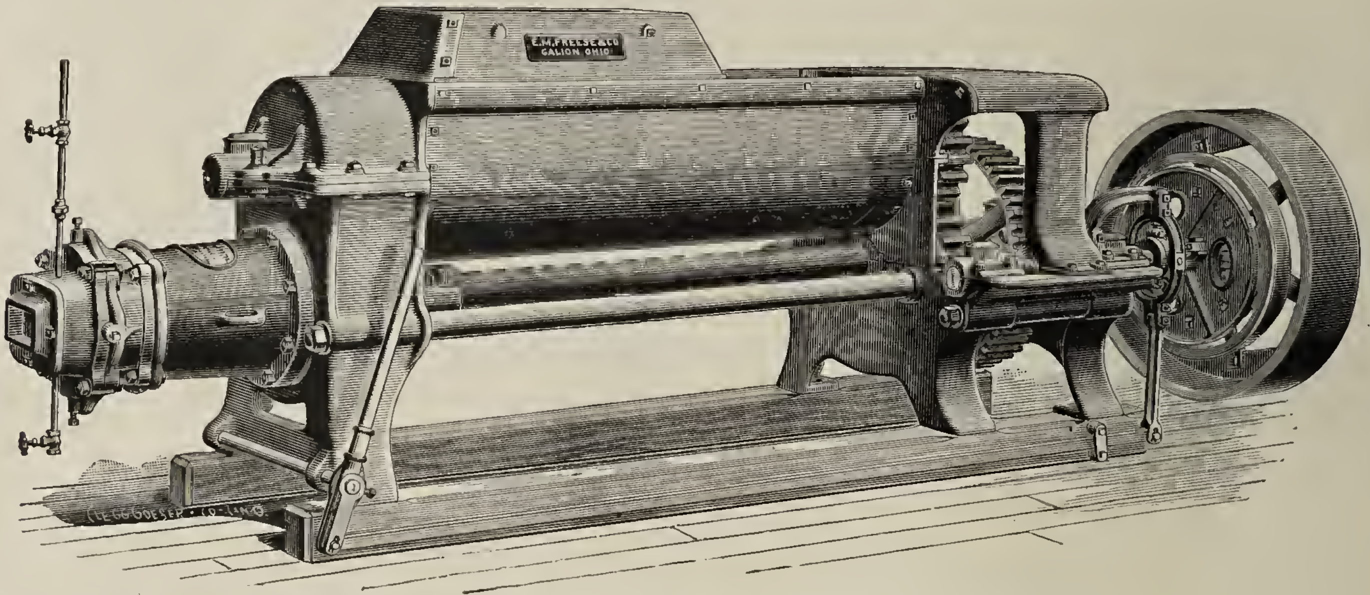

THE FATE GUNSAULLUS CO. PLYMOUTH, OHIO.

Automatic Side-Cut Brick Table.

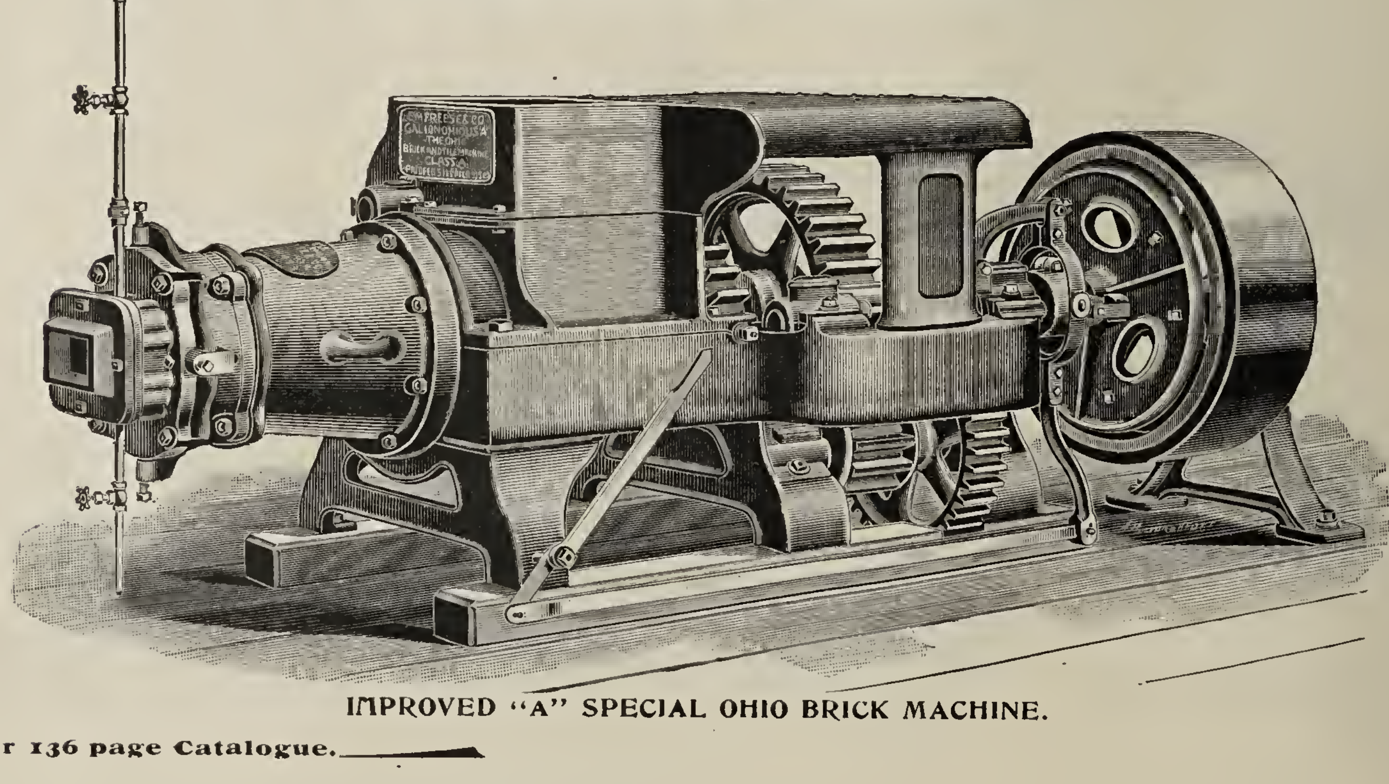
E. M. FREESE & CO., GALION, OHIO.


MAMMOTH OHIO
BRICK MACHINE
E.M.FREESE & CO.
GALION, OHIO.

MAMMOTH BRICK MACHINE.

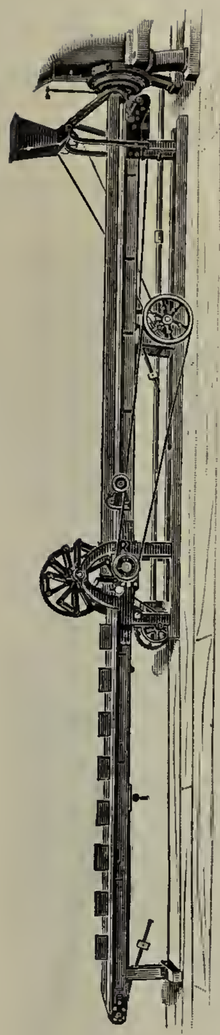


No. 1 COMBINED PUG MILL and AUGER MACHINE.

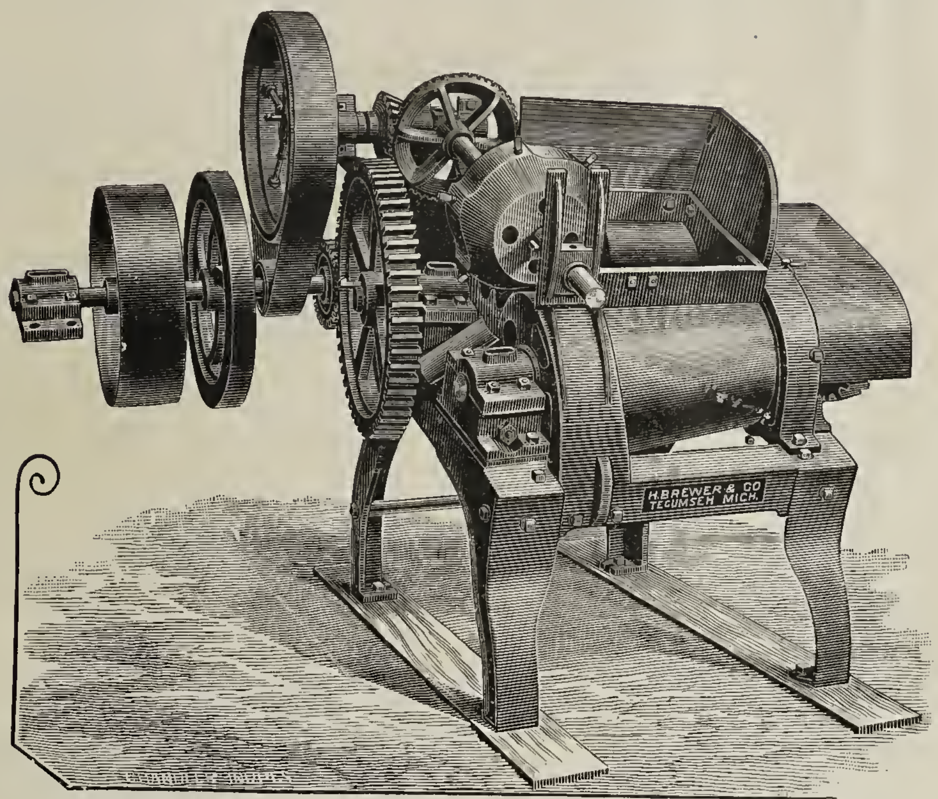


IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.



AUTOMATIC BRICK CUTTER with SANDER ATTACHED.



STONE EXTRACTING CLAY CRUSHER.

Manufactured by

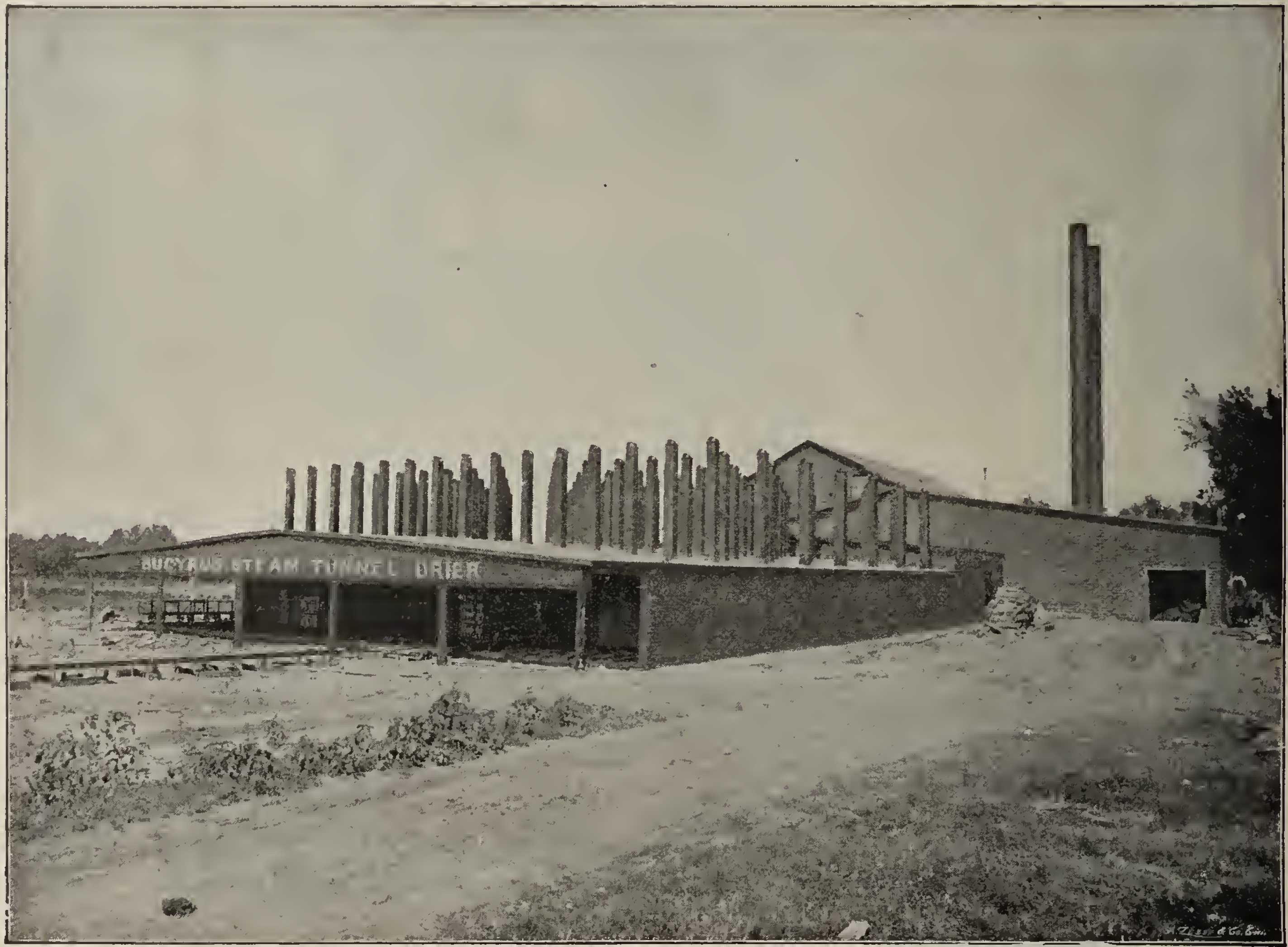
H. Brewer & Co.,

Tecumseh, Mich.

No. 9 "A" BRICK MACHINE.

The BUCYRUS STEAM TUNNEL DRIER,

For Drying Soft Mud, Stiff Mud and Dry Press Brick, also Hollow Building Blocks and Fire Proofing.



Some Users of the **BUCYRUS STEAM TUNNEL DRYER:**

- The Galesburg Brick & Terra Cotta Co., Galesburg, Ill.
- The T. B. Townsend Brick & Contracting Co., Zanesville, Ohio.
- The South Zanesville Sewer Pipe & Brick Co., Zanesville, Ohio.
- The Canton Brick Co., Canton, Ohio.
- The Anderson & Barr Clay Co., Streator, Ill.
- B. H. Reed & Bro., Hightstown, N. J.
- John Keim, Philadelphia, Pa.
- Coplay Cement Co., Coplay, Pa.
- Switzer Pressed Brick Co., Blossburg, Mont.
- The R. H. Savage Brick Co., Reading, Pa.
- The Norwood Park Co., Cincinnati, Ohio.
- The Streator Tile Works, Streator, Ill.
- The Vallisca Brick & Tile Co., Vallisca, Iowa.
- The Raritan Hollow and Porous Brick Co., Perth Amboy, New Jersey.
- The Galesburg Vitrified Brick Co., Galesburg, Ill.
- The Roseville Brick & Terra Cotta Co., Roseville, Ohio.
- F. A. Griffin & Co., Griffin, Ill.
- Kelsey & Mather, Richmond, Ind.
- The H. B. Camp Co., Shreve, Ohio.
- The Wooster Shale Brick & Clay Co., Wooster, Ohio.
- Cooper Brick Co., Akron, Ohio.
- The Scioto Fire Brick Co., Sciotoville, Ohio.
- The Perkiomen Brick Co., Perkiomen, Pa.
- Geo. O. Robinson, Bellaire, Ohio.
- Canton & Osnaburg Brick & Tile Co., Canton, Ohio.
- Allen Jackson & Co., Akron, Ohio.
- W. G. Paul & Co.. Massillon, Ohio.
- Tube City Brick Co., McKeesport, Pa.
- The Beatty Fire Clay Co., Canton, Ohio.
- Keller Brick Co., Cuyahoga Falls, Ohio.
- The Akron Brick & Tile Co., Akron, Ohio.
- M. S. Marquis, Newcastle, Pa.
- Bucyrus Brick & Terra Cotta Co., Bucyrus, Ohio.
- Holloway Paving Brick Co., Canton, Ohio.
- Adams Brick & Terra Cotta Co., Buffalo, N. Y.
- Cloverport Manufacturing Co., Cloverport, Ky.

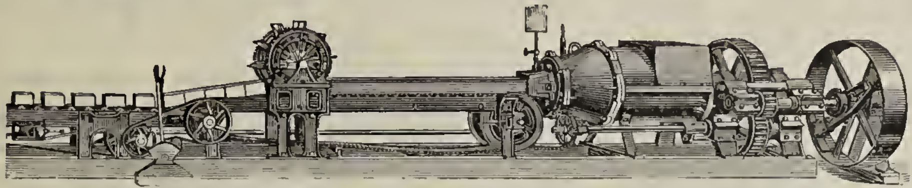
We solicit Correspondence from all Clayworkers. Send for our Catalogue.

THE FREY-SHECKLER CO., - Bucyrus, Ohio, U. S. A.

BUILDERS.

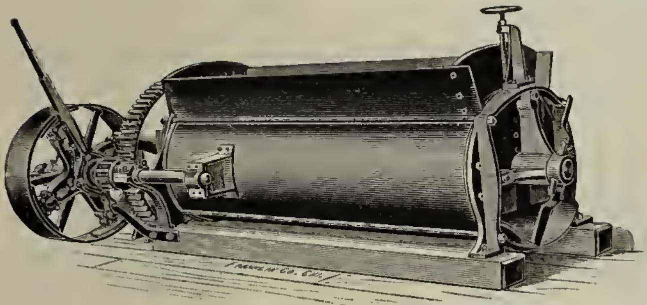
BRICK MACHINERY FOR 1896.

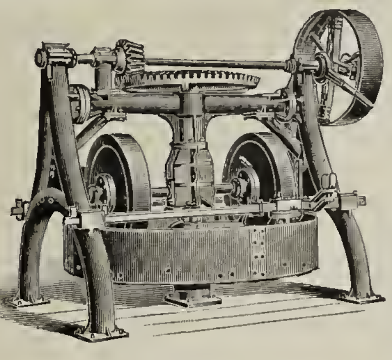
Write for
Catalogue.

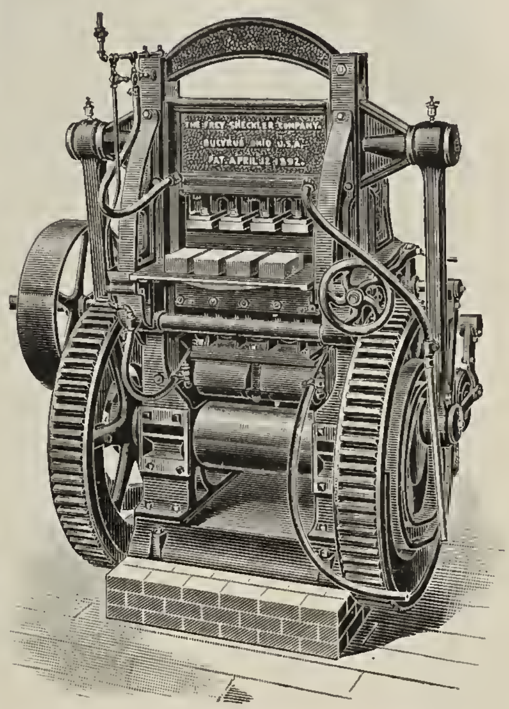

No. 1 Giant Machine and Automatic End Cut Table.

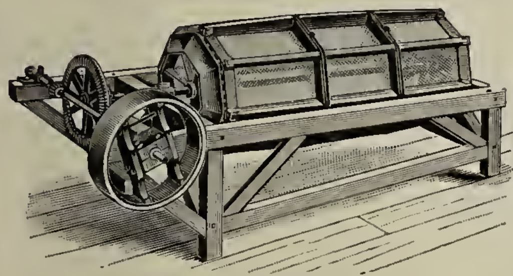
Before Buying

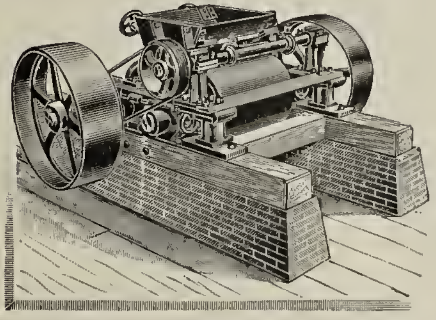
Write for our Prices.

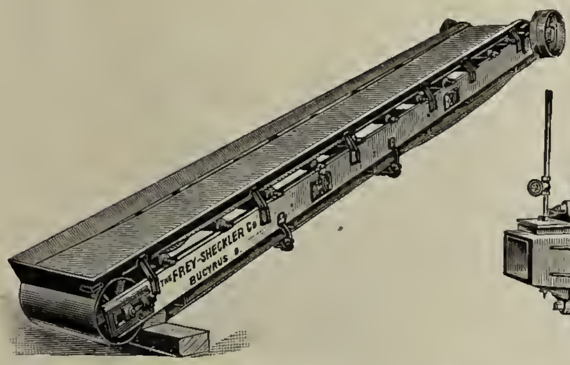

Pug Mills and Granulators.


Dry and Wet Pans.

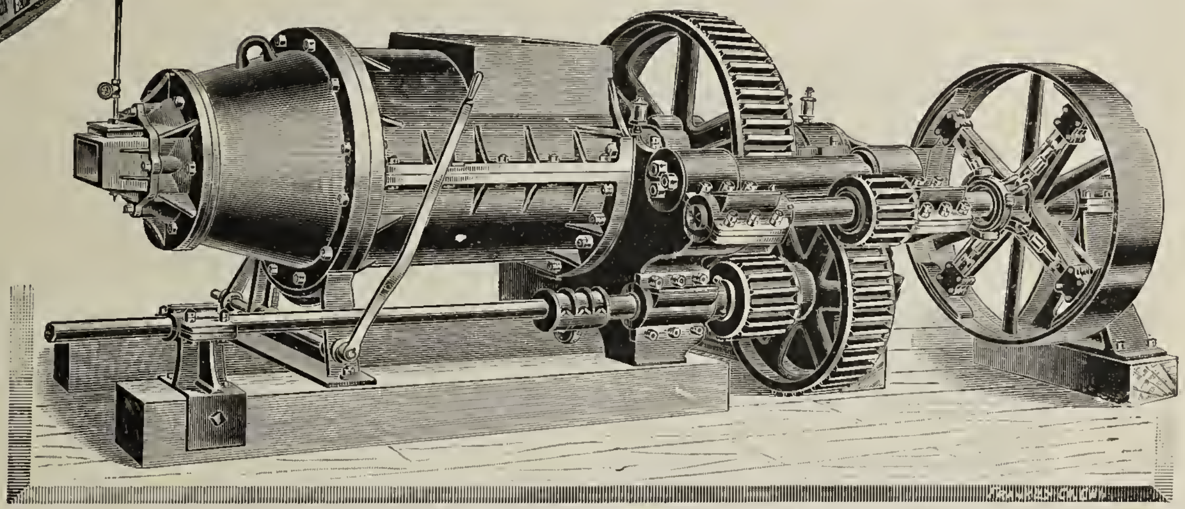

THE FREY SHECKLER COMPANY.
BUCYRUS OHIO U.S.A.
PAT. APRIL 12 1892.
4-Mould Semi-Plastic Brick Press.

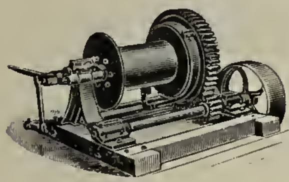

Clay Screens.

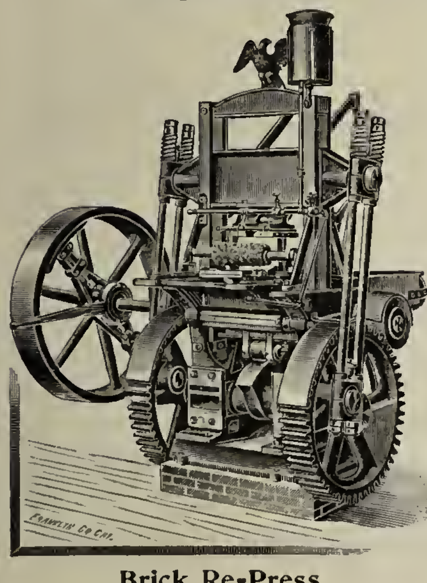

Crushers.

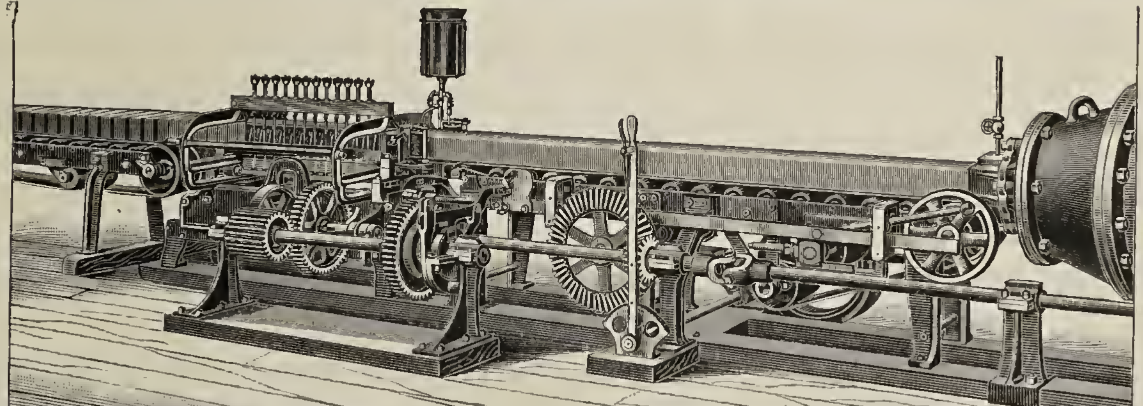


Clay Conveyors.


Special Bucyrus Giant Brick Machine.


Winding Drums.

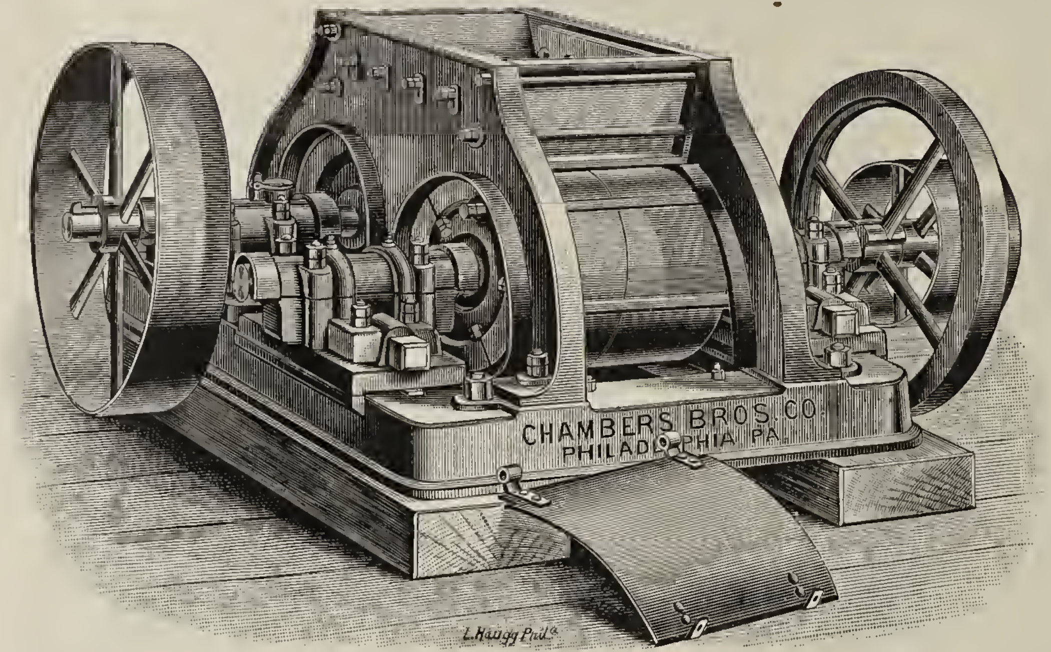

Brick Re-Press.


Bucyrus Automatic Table for Side Cut Brick.

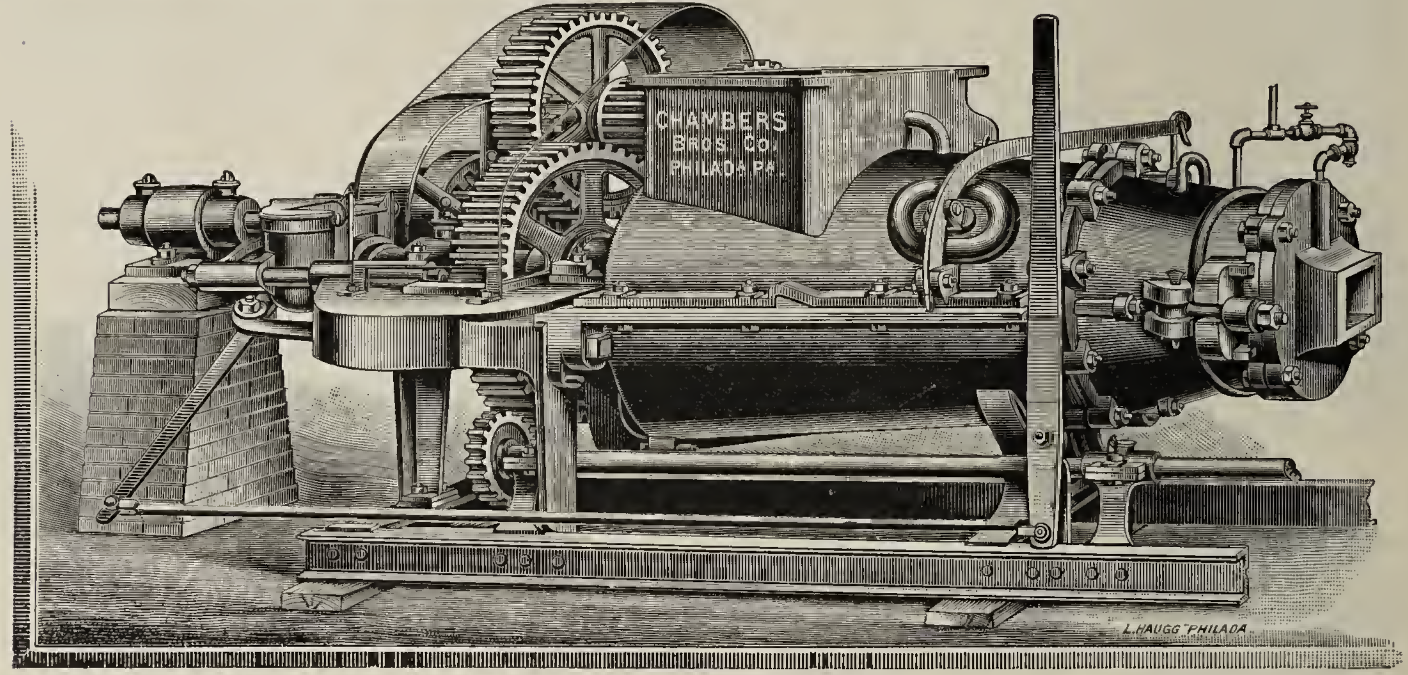
The Frey-Sheckler Co., BUCYRUS, OHIO, U. S. A.

Chambers Brothers Co.,

PHILADELPHIA, PA.


CHAMBERS BROS. CO.
PHILADELPHIA PA.
L. Haugg Phil.

CLAY
DISINTEGRATORS
... OF ...
SUPERIOR
CONSTRUCTION.


CHAMBERS
BROS. CO.
PHILADA PA.
L. HAUGG PHILADA.

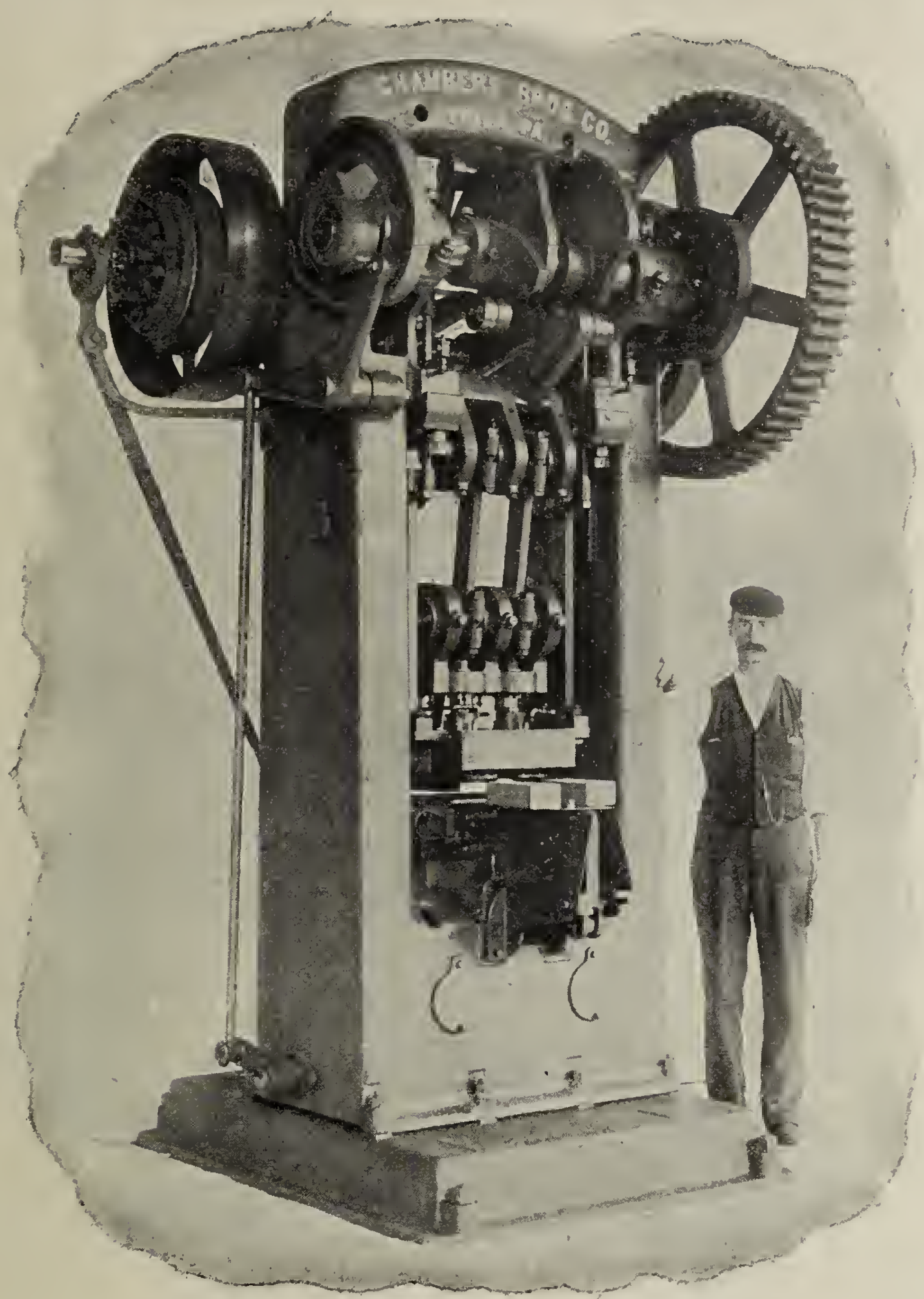
Stiff-Tempered Brick Machines, with . . . .
. . . . Automatic End Cut and Side Cut Tables.

CLAY GRANULATORS and MIXING MACHINES,

HORIZONTAL and VERTICAL PUG MILLS,

ELEVATORS, CONVEYORS, KILN CASTINGS.

See ad. on first cover Page. [Mention the Clay-Worker.



Power Repress for Plastic Brick,

MANUFACTURED BY

CHAMBERS BROTHERS COMPANY,

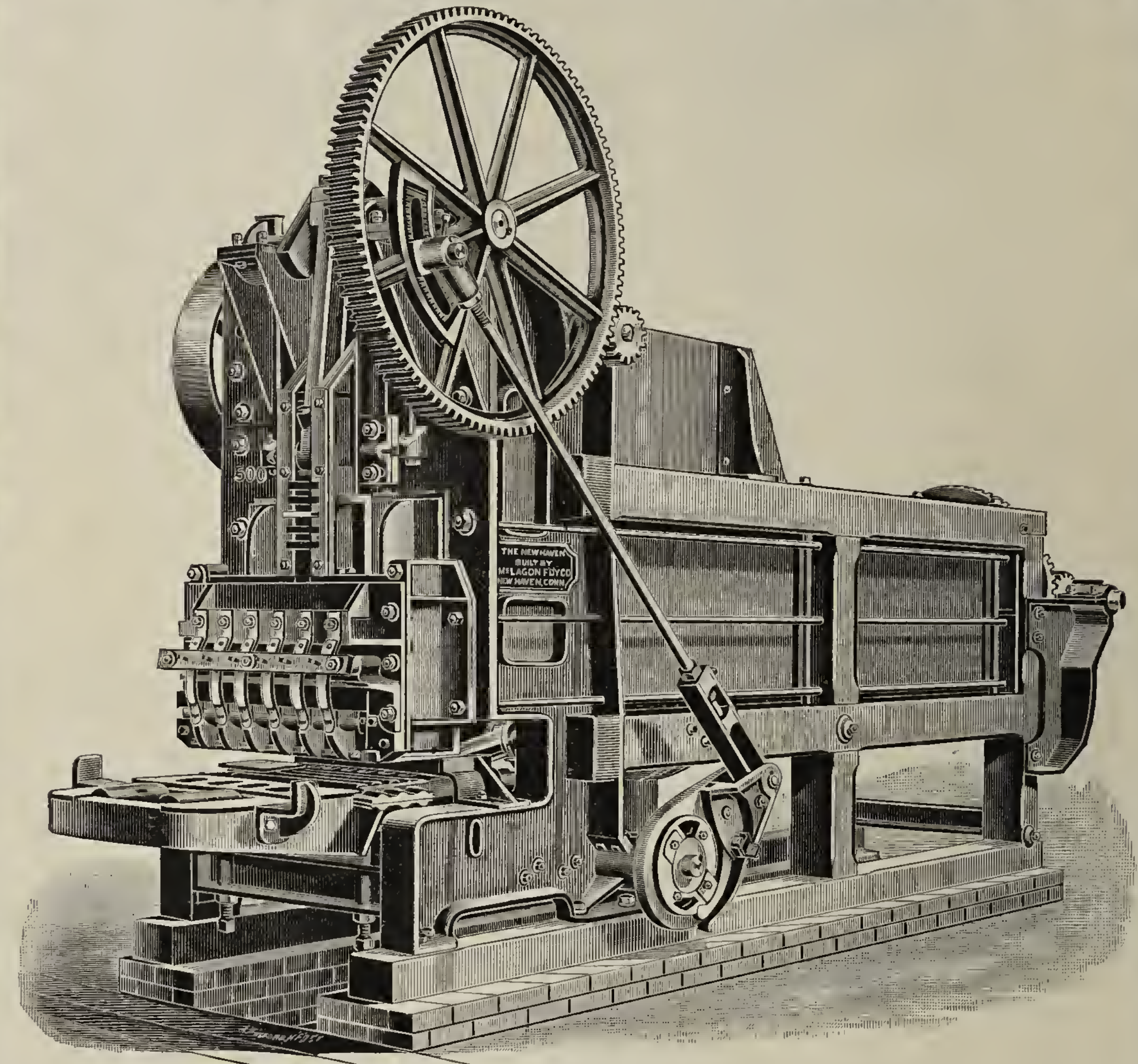
Fifty-Second and Media Sts., Philadelphia.

A strong, stiff machine, with all the pressing machinery above the mould-box and away from the dirt. The finished brick is delivered upon a plate, and is never touched by the incoming clot, which is fed so that it cannot be shaved. During the initial pressure any surplus clay in the clot is expelled, and all brick thus gauged to uniform thickness, following which all openings are closed and the finishing pressure applied in a practically tight box. The product is a repressed, tempered clay brick, free from blemish arising from method of delivery, and of practically uniform density and thickness.

Weight, about 11,000 Pounds. Price, $1200.

"New Haven" Brick Machines

PLEASE EVERY USER.



You may have a preference; still you are reasonable, and, no doubt, open to conviction.

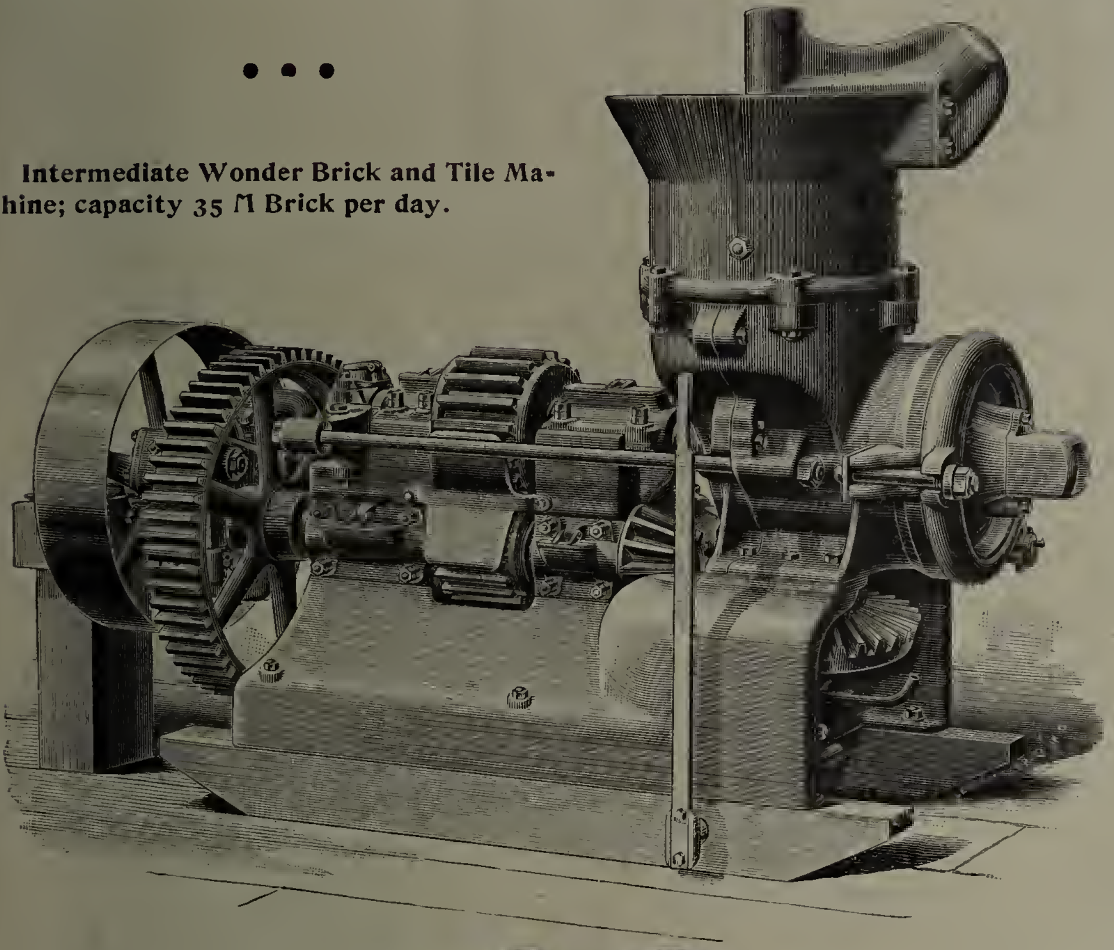
The record is very convincing.

The Eastern Machinery Co.,
NEW HAVEN, CONN.

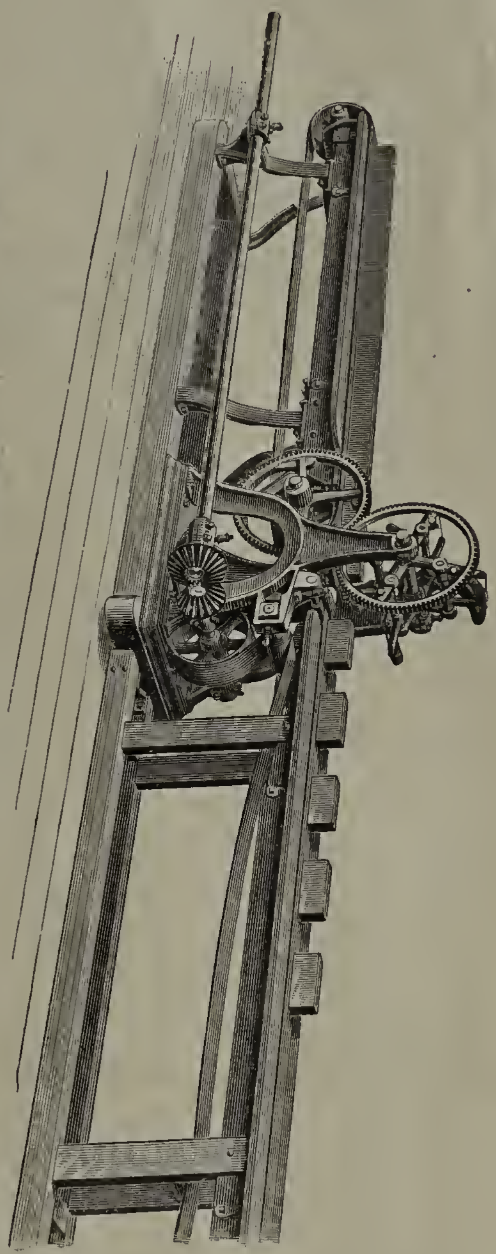
WONDER MACHINERY,

For Brick and Tile.

• • •

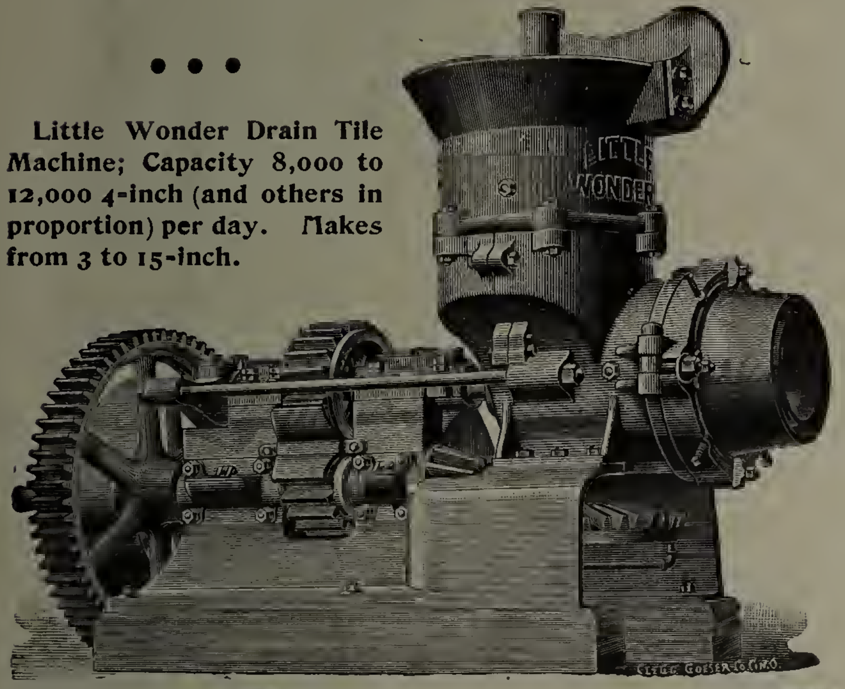


Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



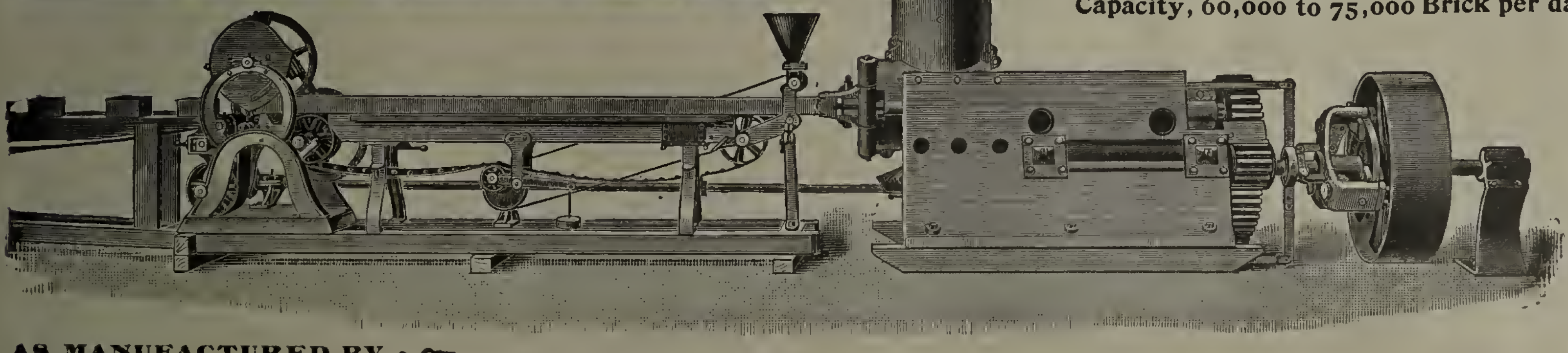
Cunningham's Single Stream Automatic End Cut Brick Cutter.

• • •



Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.

• • •



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.

AS MANUFACTURED BY ~~

The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

Iron Clad Dryer.....IN THE LEAD

Because it is a Great Labor as well as a Fuel Saver, and no Time Lost running your Brick Yard. . . . . . .

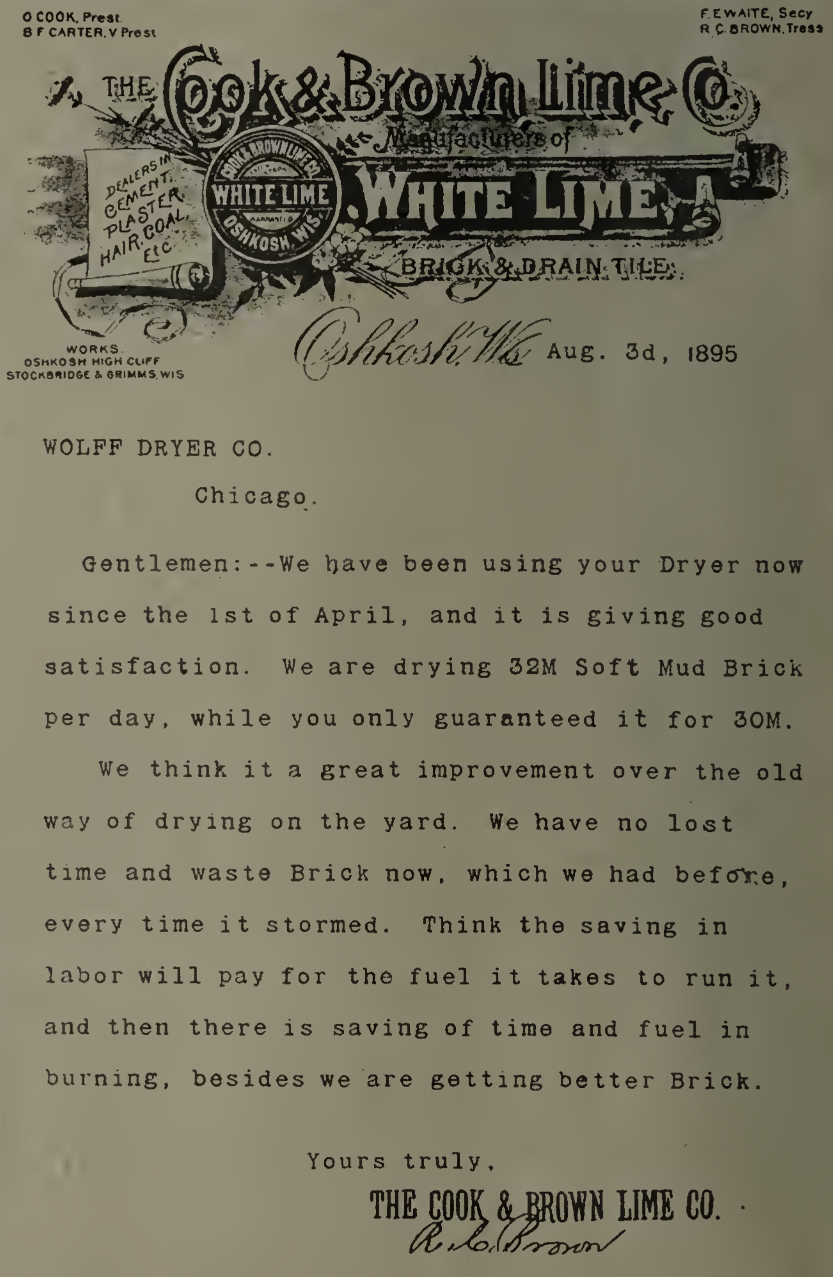
The above cut represents a Soft Mud Brickyard with one of

The Latest Improved Iron=Clad Dryers,

Which from the tone of the testimonial is doing pretty well. . . . . .

Write for Prices and Illustrated Catalogue to

Wolff Dryer Co.,
358 Dearborn St.
Room 303,
CHICAGO, ILL.


O COOK, Prest.
B F CARTER, V Prest.

F. E. WAITE, Secy
R. C. BROWN, Treas

THE Cook & Brown Lime Co.
Manufacturers of
WHITE LIME,
BRICK & DRAIN TILE.

DEALERS IN CEMENT, PLASTER, HAIR, COAL, ETC.

COOK & BROWN LIME CO. WHITE LIME WARRANTED OSHKOSH, WIS.

WORKS.
OSHKOSH HIGH CLIFF
STOCKBRIDGE & GRIMMS, WIS.

Oshkosh, Wis. Aug. 3d, 1895

WOLFF DRYER CO.
Chicago.

Gentlemen:--We have been using your Dryer now since the 1st of April, and it is giving good satisfaction. We are drying 32M Soft Mud Brick per day, while you only guaranteed it for 30M.

We think it a great improvement over the old way of drying on the yard. We have no lost time and waste Brick now, which we had before, every time it stormed. Think the saving in labor will pay for the fuel it takes to run it, and then there is saving of time and fuel in burning, besides we are getting better Brick.

Yours truly,
THE COOK & BROWN LIME CO.
R. C. Brown

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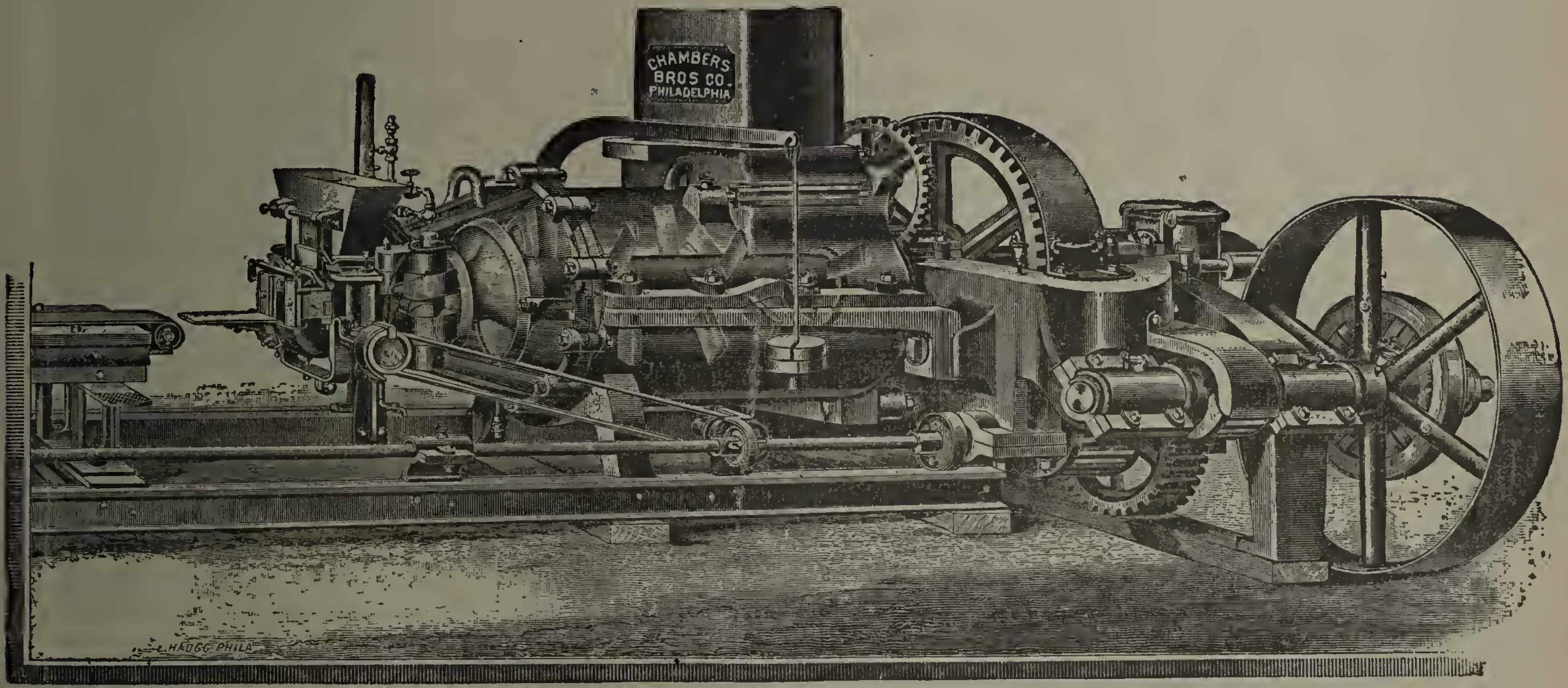
THE
CLAY WORKER
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA COTTA SEWER PIPE POTTERY ETC.
T. A. RANDALL & CO. PUBLISHERS.
CHANDLER SC. INDPLS.

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

Vol. XXV, No. 2. INDIANAPOLIS, IND., FEBRUARY, 1896. $2.00 a Year in Advance.

Brick Making Machinery.


CHAMBERS
BROS CO.
PHILADELPHIA
L. HAUGG. PHILA.

Chambers Brothers Company,

FIFTY-SECOND STREET, BELOW LANCASTER AVE.,

J. E. EASTES, Chicago Agent,
174 South Clinton Street.

PHILADELPHIA, PA.

The Cummer Dryer is a Direct Heat Dryer.

THE CUMMER DRYERS

. . . NO . . .

Boilers,
Pumps,
Steam Pipes,
Big Fuel Bills,
Experimenting.

. . . YES . . .

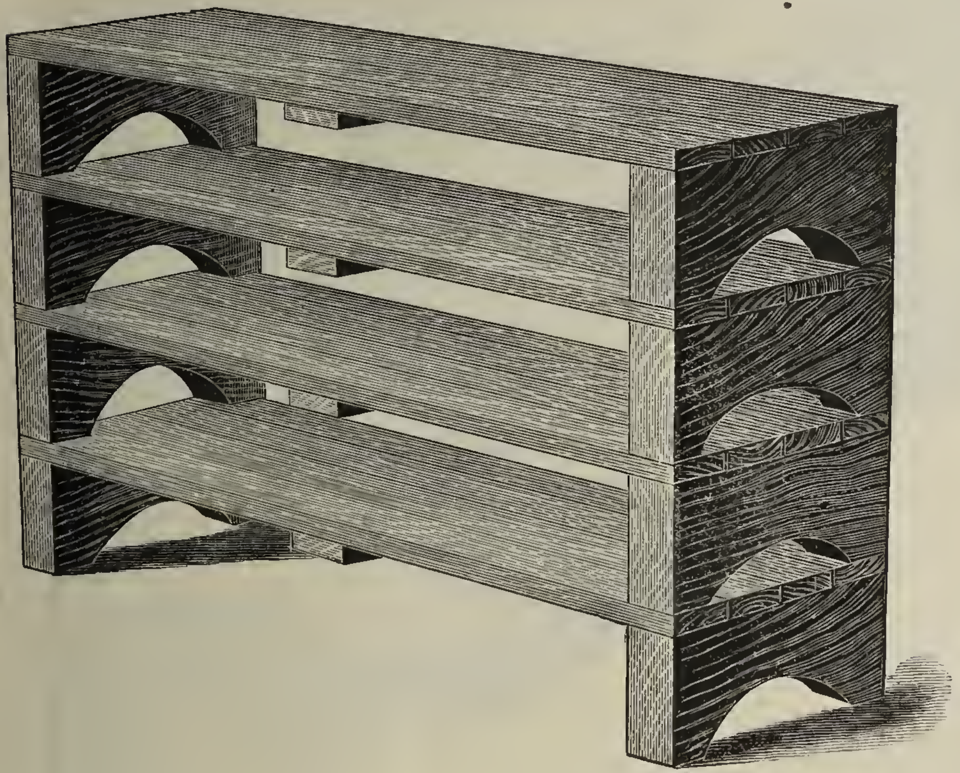
We Guarantee Results and will guarantee to dry your brick with a given amount of fuel. For instance, if your brick each carry one pound of moisture and you want to dry 20,000, we will guarantee to dry them with less than 3,000 pounds of **Slack Bituminous** coal.

CONVERTED

If you have a Dryer that is not satisfactory, it can be **Converted** into a "CUMMER" at slight expense.

The CUMMER REVOLVING CLAY DRYER has many users and is well known. Clay can be dried cheaper in it than by any other method.

The F. D. Cummer & Son Co.,
CLEVELAND, OHIO.



IF YOU NEED..

Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

Rack Pallets,
Hacking Pallets,
Pallets for Dryers,
Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

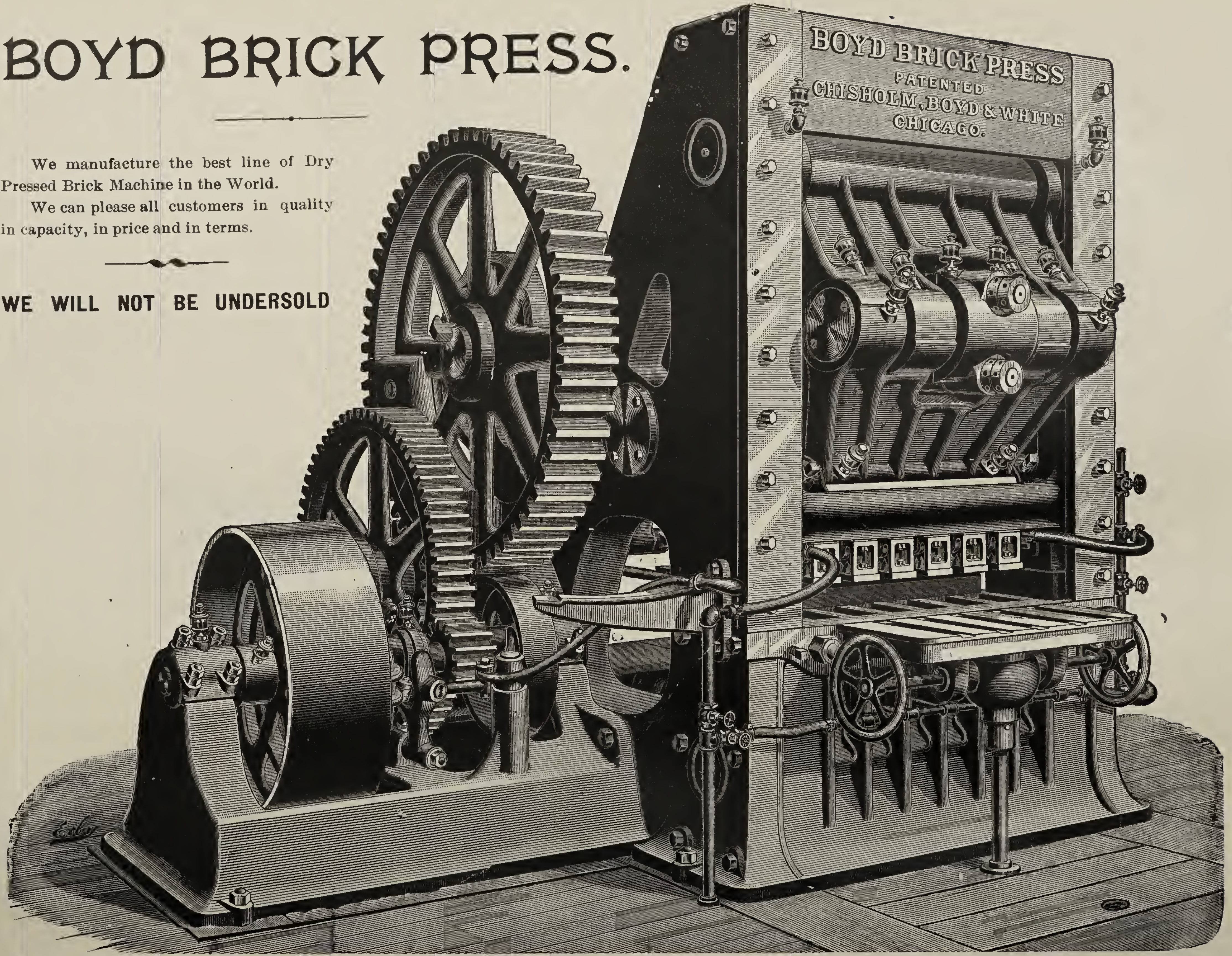
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

BOYD BRICK PRESS.

We manufacture the best line of Dry Pressed Brick Machine in the World.

We can please all customers in quality in capacity, in price and in terms.

WE WILL NOT BE UNDERSOLD



The CHISHOLM, BOYD & WHITE CO., 57th and Wallace Sts., Chicago.

A SURE THING.

We will construct and equip a Brick Plant of any capacity desired for any responsible party, furnishing Brick Presses, Power, Kilns, Clay-preparing Machinery, Shafting, Belts, etc., and erect the necessary Buildings. We will make and burn one or more kilns of brick, and turn the Plant over to him in proper working order under guarantee of satisfactory results as to quality of product and cost per 1,000; the loss to be ours in case of failure.

Why experiment when you have a sure thing?

THE CHISHOLM, BOYD & WHITE CO.,

57th and Wallace Streets. CHICAGO.

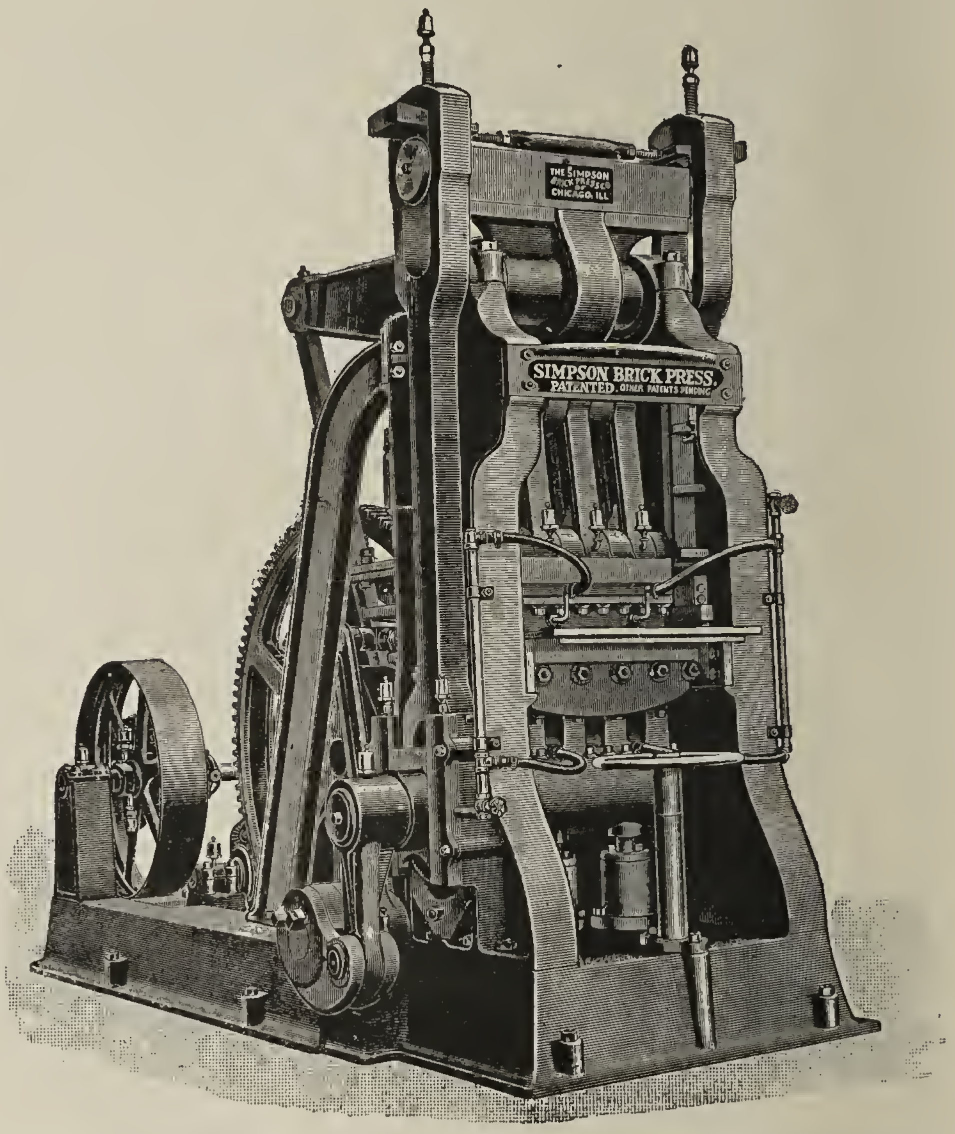
Clay-Working Machinery.

The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line of Brickyard Equipments. . .


THE SIMPSON BRICK PRESS CO CHICAGO, ILL.
SIMPSON BRICK PRESS.
PATENTED. OTHER PATENTS PENDING

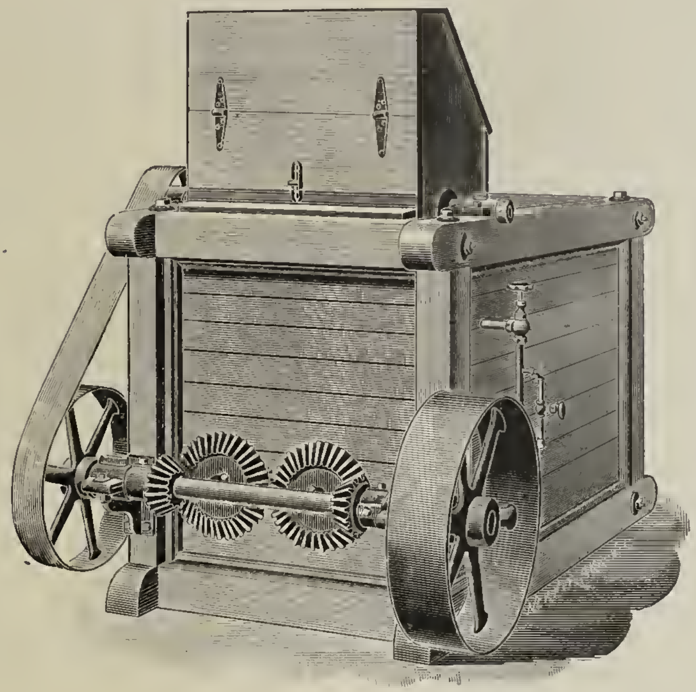
Complete plants constructed and guaranteed. Write for catalogue, etc.

THE SIMPSON BRICK PRESS CO.,

Agents for Canada:
WATEROUS ENGINE WORKS CO.,
BRANTFORD, ONTARIO.

Chamber of Commerce
Chicago...

Are You using a Dry Press Brick Machine? If so, you need the Arnold Clay Steamer.



The Arnold Clay Steamer

IS THE Original Steamer designed to be used in connection with the patented process of preparing clay, by the use of steam, for the Dry Press Machine.

We manufacture a new

Shaking Screen . . . . .

Which requires less space, does more and better work than any other screen, and is fitted with reciprocal springs which take all jar off building.

The Dryer Cars . . . . .

Of our manufacture are strong, durable and light. Made of steel and wrought iron with superior **anti-friction** rolls-bearings. A boy can easily handle 5,000 pounds on one of these cars.

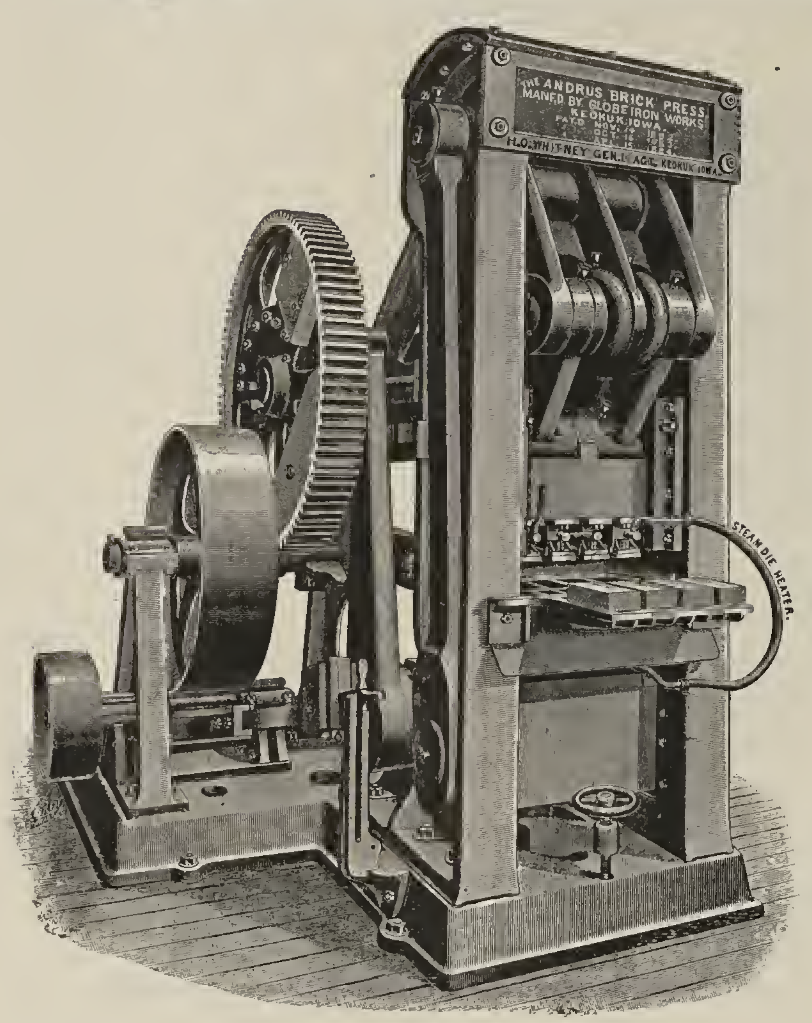
For descriptive circular and terms, address

Arnold Manufacturing Co.,

CANAL DOVER, OHIO.

We have for sale, Canadian Patents No. 35,719, dated 8th January, 1891, Invention entitled "Improvement in Brick Driers," and No. 43,884, dated 10th August 1893, Invention entitled "Process of Preparing Clay."

THE ANDRUS DOUBLE PRESSURE BRICK PRESS.


THE ANDRUS BRICK PRESS.
MANFD BY GLOBE IRON WORKS
KEOKUK, IOWA.
H.O. WHITNEY GEN'L AGT. KEOKUK IOWA
STEAM DIE HEATER.

We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

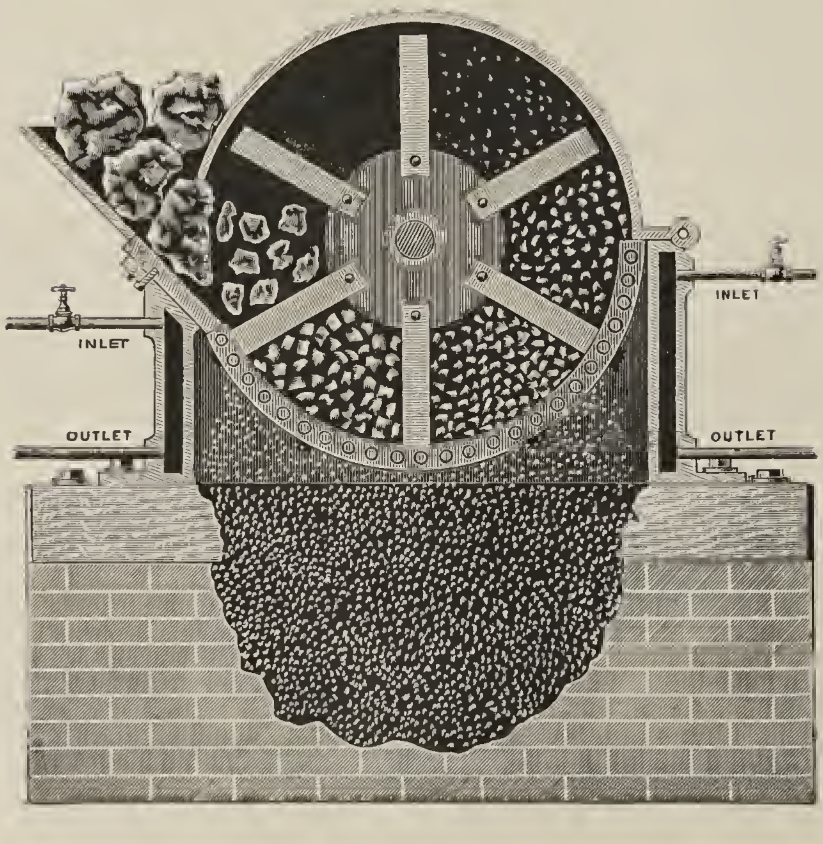
They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . .

Send for descriptive Catalogue, address

H. O. Whitney,
General Agent,
KEOKUK, IOWA.

WILLIAMS'S COMBINED SHALE CRUSHER and CLAY PULVERIZER



This machine is a marvel and surprise to all who have seen it in operation. It does the work of two machines and prepares the Clay or Shale in a most thorough manner. It cannot choke with ordinary damp clay; it will do more and better work, with one-half the power, than any other kind of Pulverizer; the cost for repairs will be less than one-half, and the cost for oil will also be less than one-half.

We will furnish these machines upon 30 days' trial, to responsible parties.

FOR FURTHER
INFORMATION,
ADDRESS

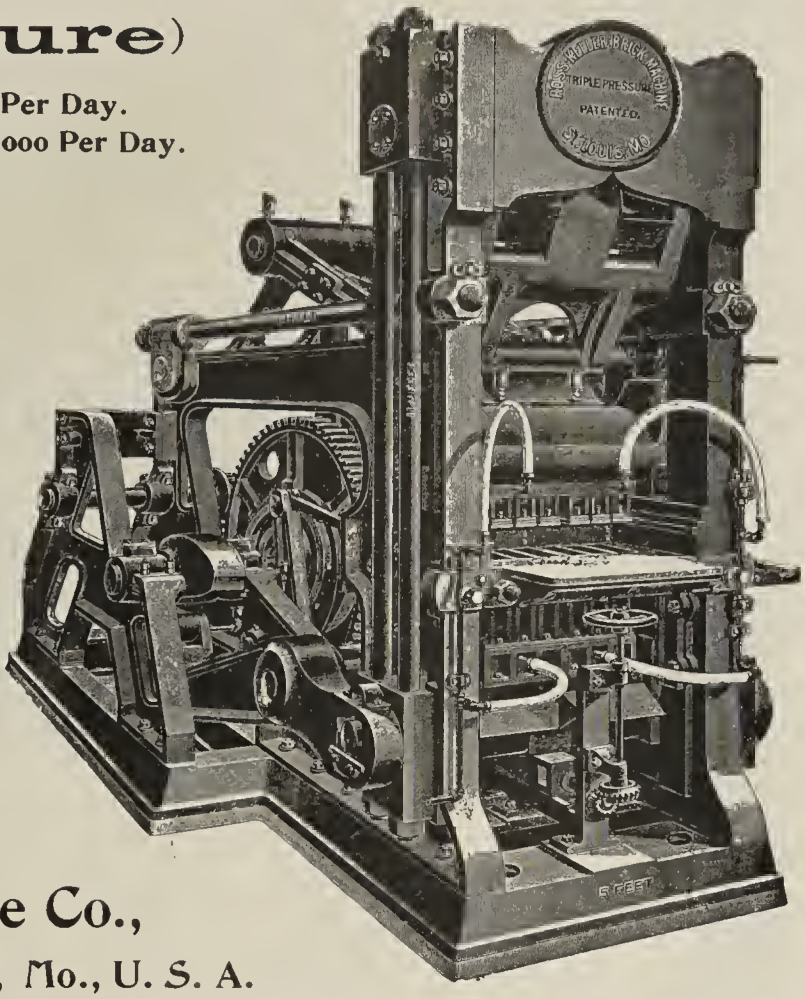
MILTON F. WILLIAMS & CO.,
2705 North Broadway, ST. LOUIS, MO.,

Builders and Contractors of Complete
Dry-Press Brick Plants. . . . .

The Ross-Keller Brick Machine.

(Triple Pressure)

Weight of 4-Mold Press 50,000 Pounds, Capacity 24,000 Per Day.
Weight of 6-Mold Press 75,000 Pounds, Capacity 36,000 Per Day.



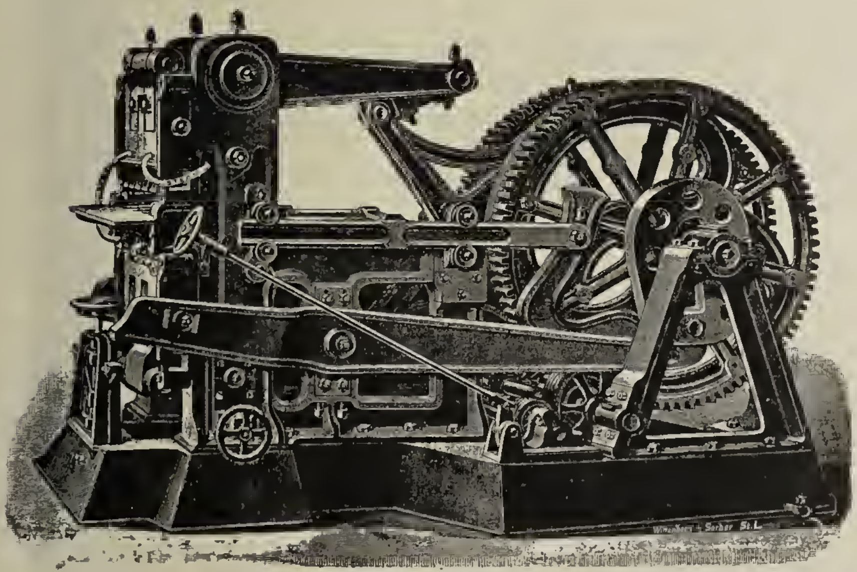
THIS PRESS is made in two sizes, four and six mold, and has **three separate and distinct pressures.** It is noiseless in its movements, and is the most simple and powerful machine ever built in the United States. It works dry or semi-dry clay, and is especially adapted for working **shale** and other similar materials. It presses the brick equally on both sides, and removes all granulation from faces of same. It will make any shape brick desired, also Edge and Roman brick. It has wide bearings bushed with bronze, and all pins and shafts are made of five, six and seven-inch forged steel.

Correspondence Solicited.

☞For Circulars, prices and other particulars, address

Ross=Keller Brick Machine Co.,
Room 201 Laclede Building, St. Louis, Mo., U. S. A.

The Progress Brick Press.



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DESCRIPTIVE pamphlet sent on application treating on the selection of Brick Machinery and its requisites.

❀ ❀ ❀

Progress Press Brick and Machine Co.,
King's Highway and Oak Hill R. R. ST. LOUIS, MO.

Any Draft So Its Up-Draft.

WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost.

Manufacturers of Building Brick can get nothing better.

For all information desired address

R. B. MORRISON & CO.,
P. O. Box 335,
Rome, Ga., U. S. A.

PROPRIETORS
Morrison's Latest Improved Kilns.

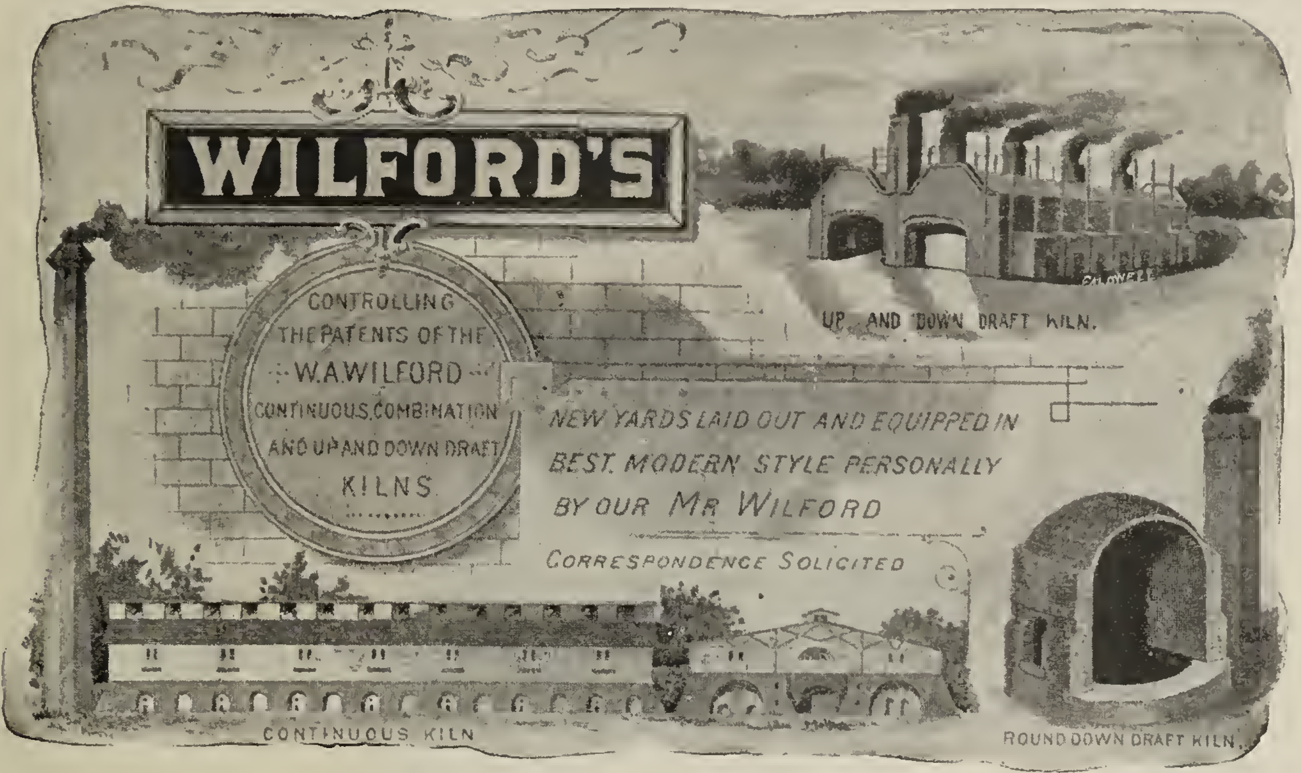
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W. A. WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

HON. A. DESJARDINS, PRESIDENT. JOS. BARSALON, VICE-PRES. HUBERT DESJARDIN, MAN. DIRECTOR. N. T. GAGNON, SECRETARY.

MONTREAL TERRA COTTA LUMBER CO.
LIMITED.
Maisonneuve, P. Q.
Office, 86 *St. Peter Street, Montreal.*

MONTREAL, July 12th, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—In answer to yours of the 1st inst., we are thoroughly satisfied with the kiln you built for us. We find we have better burnt material than we ever had before. Your system of kilns we consider as near perfect as one can expect. Our ware is all burnt alike from top to bottom. We have burnt it many times round, and the more we use it the better we like it. Shall be glad to answer any enquiry from anyone interested in your kilns, as you deserve success. Your very truly,

N. T. GAGNON, *Secretary.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and* 2 *Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago. The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

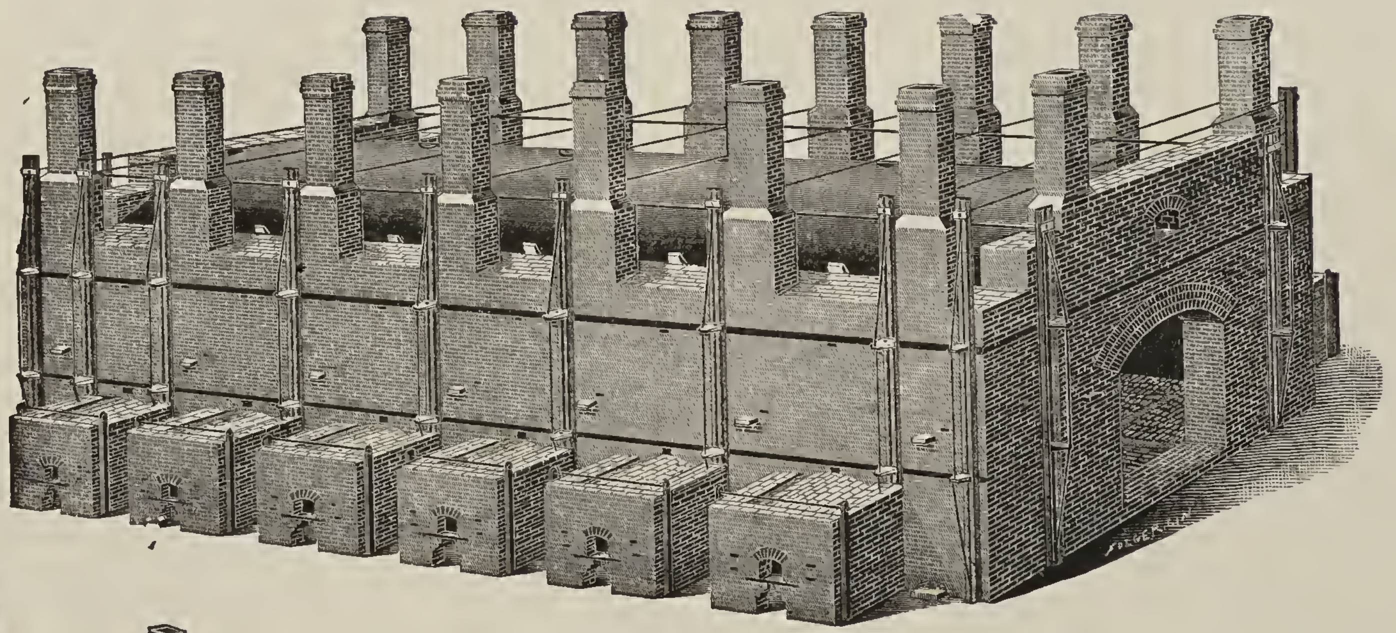
Let us give you full Particulars.

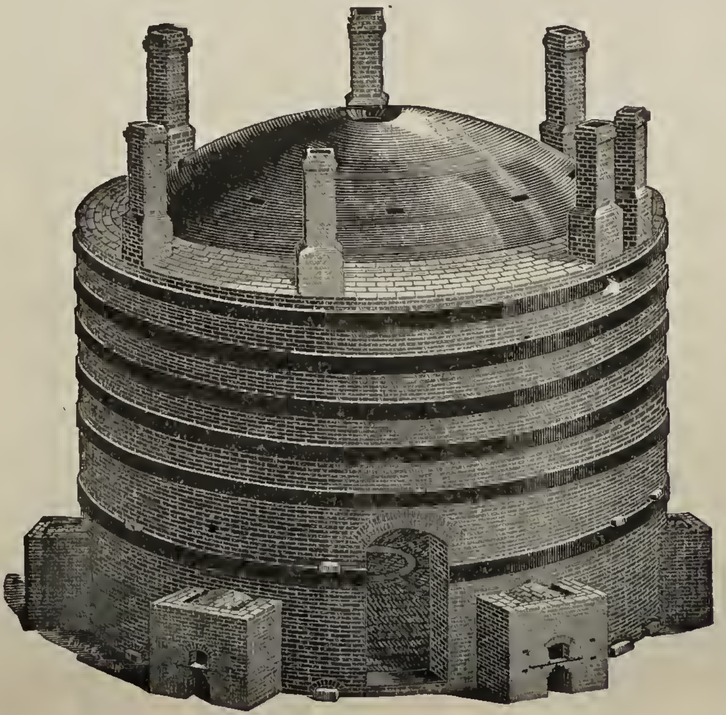
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ELMIRA, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

• The Eudaly Improved Down-Draft Kiln. •





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy** in **cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, **Cincinnati, Ohio.**

OUR ... Improved Hot Blast Brick Dryer

Read this Letter.

"THE BEST FROM EVERY STANDPOINT."

NO DRYER now in Operation CAN SHOW RESULTS to Compare with THIS ONE.

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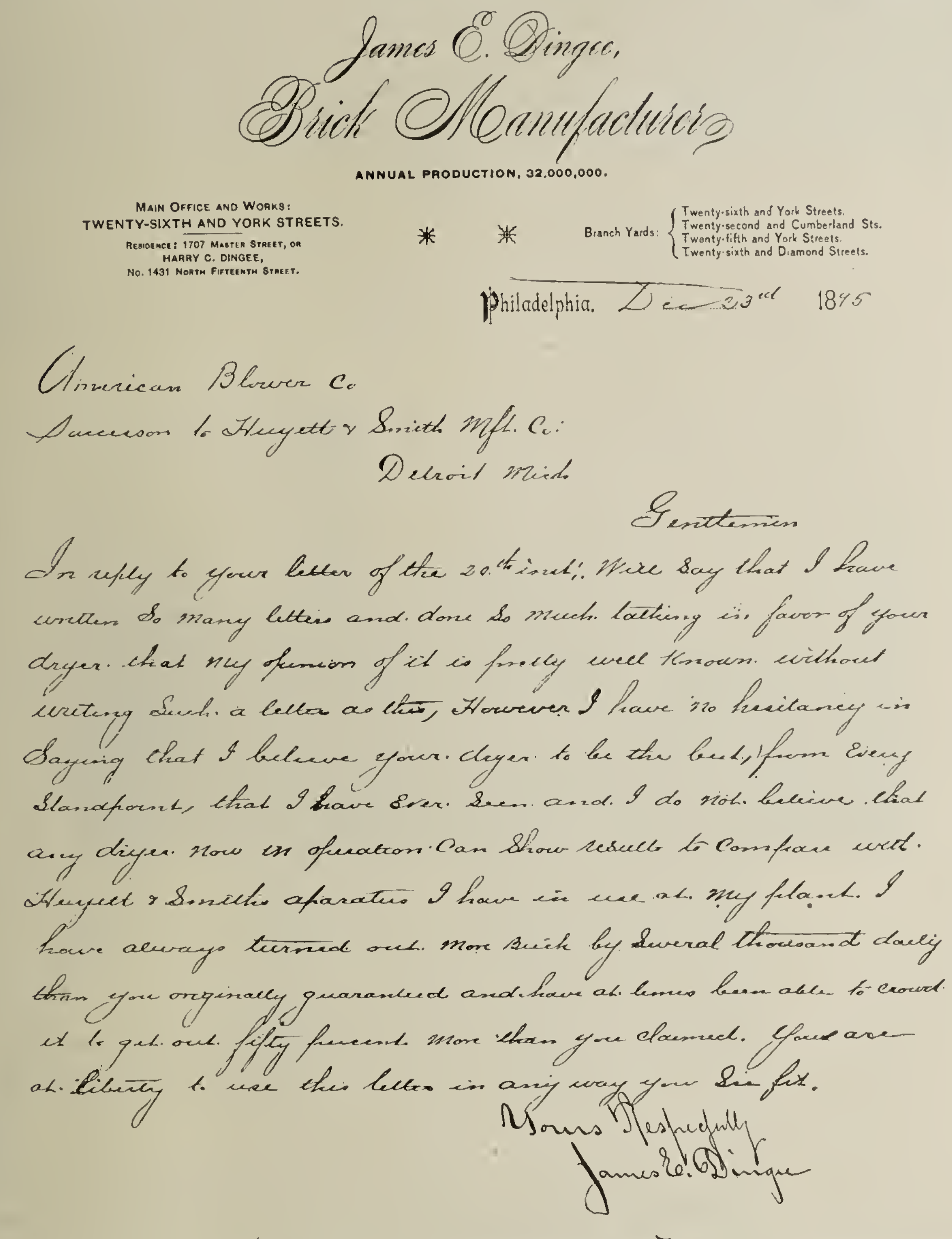

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Philadelphia, Dec 23rd 1895

American Blower Co
Successor to Huyett & Smith Mfg. Co.
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Gentlemen

In reply to your letter of the 20th inst. Will say that I have written So many letters and done So much talking in favor of your dryer that my opinion of it is pretty well Known without writing Such a letter as this, However I have no hesitancy in Saying that I believe your dryer to be the best, from Every Standpoint, that I have Ever Seen and I do not believe that any dryer now in operation Can Show results to Compare with Huyett & Smiths aparatus I have in use at my plant. I have always turned out More brick by Several thousand daily than you originally guaranteed and have at times been able to crowd it to get out fifty percent More than you claimed. You are at Liberty to use this letter in any way you See fit.

Yours Respectfully
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Is capable of such **close regulation**, that any combination of drying influences necessary to suit the particular product or peculiar nature of the clay to be dried, are easily obtainable.

Adaptability to the various clay products now produced is one of its **strong points.** In corroboration of this statement we give below the experience of the Excelsior Brick Works, Brazil, Ind., with a Four Track Drier on **Pavers, Fire Brick, Hollow Blocks, Flue Linings and Drain Tile.**

Office of THE EXCELSIOR CLAY WORKS.

Brazil, Ind , November 4, 1895.

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Gentlemen:—We have had one of your Four Track, 116 foot, Natural Draft Driers in use about four months. During that time we have dried shale pavers, $9\frac{3}{4}$ x $4\frac{1}{2}$ x $2\frac{3}{4}$ inches, fire brick, hollow building blocks, flue linings and drain tile and have never lost one piece of ware in the Drier.

The shale brick we dry 30,000 every twenty-four hours, and have dried hollow blocks $8\frac{1}{2}$ x $8\frac{1}{2}$ x 16 and one inch thick in six (6) hours from machine into burning kiln. Mr. Frey, of the Bonnot Co., was an eye witness to this and expressed his surprise at such rapid and perfect drying.

We are more than pleased with your Drier.

Yours truly,
THE EXCELSIOR CLAY WORKS,
John S. Smith, Gen. Mgr.

We have others too, just as strong, proving its adaptability to soft mud brick made from tender clays.

Your name please and we'll send you our latest catalogue which will surely interest you, if you have the Drier subject under consideration.

Remember that on the **true basis** of comparison—quantity and quality of output and grade of equipment furnished—our prices are as low as the lowest.

The STANDARD DRY KILN CO.,

186 South Meridian St., INDIANAPOLIS, IND.

THE CLAY-WORKER

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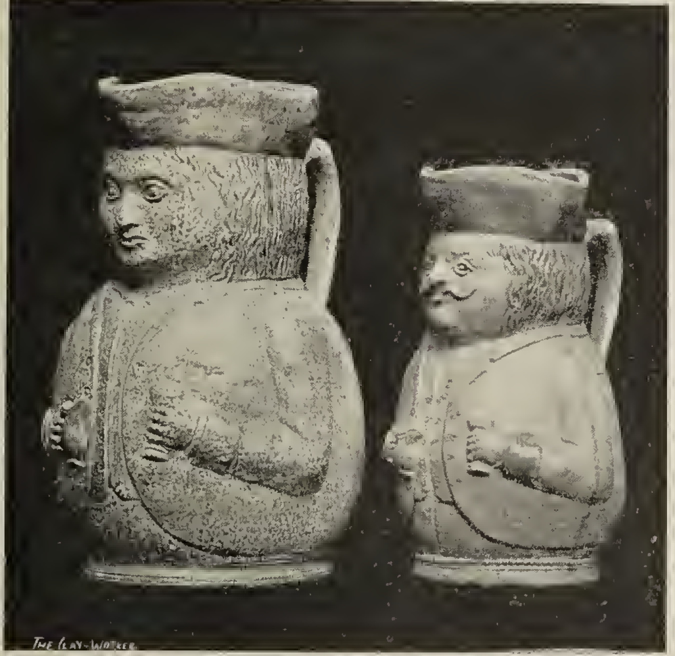
Written for the CLAY-WORKER.

SOME RECENT GERMAN-AMERICAN STONEWARE.

BY EDWIN ATLEE BARBER.

IN THE AMERICAN COLLECTION of pottery and porcelain in the Pennsylvania Museum, Philadelphia, may be seen some examples of decorative stoneware which, at first sight, may be mistaken for the productions of the best German factories, but the accompanying labels will inform the visitor that they were made in this country. They come from a small pottery at Haddonfield, N. J., a few miles east of Philadelphia, which is now being operated by Messrs. Charles Wingender & Bros. The senior member of the firm learned his trade in the stoneware potteries of Hoehr bei Coblenz, Germany, and his brother William studied at the Ceramic School in the same place, where much of the finer stoneware which finds its way to the United States is produced, particularly the blue and gray beer mugs with elaborately modeled relief designs of domestic scenes, battles, warriors, beer-drinkers and dwarfs. That part of Germany, in fact, has been celebrated for its salt-glazed wares for more than a century, and pieces made at Hoehr were brought to America by the Hessians during the Revolutionary war. In the museum of historical relics in old Independence Hall, Philadelphia, is a large stone jug bearing on its front the letters "G. R." (George Rex) in blue, which Mr. Wingender has recognized as having been made from the old molds which were still in use at Hoehr while he was working there.



Stoneware Toby Jugs.

In this country the brothers were employed for some years at the stoneware pottery of Mr. Richard C. Remmey, Philadelphia, where chemical crucibles, jugs, crocks and other utilitarian wares are extensively manufactured. They found little opportunity there for the exercise of their artistic talents, and finally decided to embark in business for themselves. The old pottery at Haddonfield was secured, and here, surrounded by the more congenial atmosphere of an independent establishment, they have been devoting themselves to the development of ornamental stoneware, in addition to the manufacture of the usual line of goods for household purposes. While the capacity of their present plant is limited, they have already turned out some of the best work in the ordinary stoneware body, if not the most original in design, that has been produced in the United States. While their methods are essentially those of the German school, and while they have brought over with them many fine patterns and elaborate examples of modeling which they are utilizing in the ornamentation of mugs, jardinieres and pitchers, they are also producing original work of considerable merit from designs by Mr. William Wingender. In quality the ware resembles the German body, although made entirely from American clays. Having overcome the difficulties encountered in the use of new and unfamiliar materials, they have recently been making a specialty of stoneware water-coolers and large ice jugs, which have met with a ready sale, because they are far superior to anything of the same character produced in this country.

Among the commoner utensils made here are Toby ale jugs, in at least two sizes, colored in brown and cobalt blue. Though crude in form and entirely devoid of artistic treatment, they are far more attractive for kitchen purposes than the plain stoneware pitchers which are sold elsewhere at the same modest price. The beer mugs made at Haddonfield are more carefully modeled, more elaborate in design and more varied in subject than those made at any other American pottery. While some of these are reproductions of German designs, they are such as are not now imported, and represent the best work of the foremost modelers in Germany of a generation or so ago, executed before the demand for cheap wares had caused the degeneration of decorative designing which is so apparent in much of the ware sent to this country. Yet many of these New Jersey pieces are not wholly copies, but are modified by the introduction of decorative details conceived and executed by Mr. Wingender in the spirit of the older German work. In the group of beer mugs shown, the central figure represents an enormous example, with a capacity of seven litres, entirely covered with an elaborate relief design representing the battle of Teutoburg Forest, which took place in September of the year 9 A. D., when Quinctilius Varus led the Roman troops against the Germans. In this engagement, which lasted three days, the Romans were entirely destroyed, and Varus killed himself in despair by falling on his sword. This spirited design was originally used at the Hoehr works, but has been remodeled for use at the Haddonfield pottery. We have had the entire design molded on a flat surface, in order to show it in its entirety, and reproduce it in the accompanying illustration. The figure at the right of the group of mugs shows a fine example, surmounted by a modeled stoneware lid.

The practice of ornamenting the metal lids of beer mugs by inserting in them modeled stoneware medallions has also been followed to some extent by the Wingenders. Two of these designs are here shown. One represents, in high relief, a German interior scene. The smaller one shows a figure design executed by Mr. William Wingender.

The Haddonfield works have also produced a number of fancy flower pot or jardiniere designs in several sizes, usually decorated with relief medallions of heads of warriors of Greek or Roman type, of animals, and carved ornamentation on a solid blue ground. These larger pieces admit of greater freedom of treatment than do the smaller and more elaborately embellished drinking vessels, and are, therefore, more characteristic of Mr. Wingender's peculiar and artistic style. They rank in point of workmanship with the best imported wares of the same class, and, indeed, are often mistaken for German productions by those who are not aware that such work is now being done in this country. The Haddonfield potters, however, find their most congenial employment in the designing and modeling of tankards and fancy mugs, which formed an important branch of the manufacture as carried on at the Hoehr potteries, and they are now prepared to execute special designs to order. Their latest achievement in this direction was the preparation of a quartet of half-litre "steins," bearing on one side the musical notation of the several parts of a male chorus, with the words, which can be sung while drinking, and on the reverse the name of the owner in musical characters. The introduction of music as a decorative motive in the work of the potter is a pleasing conception, and one which, in this connection, is especially appropriate. The idea can be developed most effectively in other directions as well, as, for instance, in the ornamentation of punch bowls, flower pots, flagons and "growlers."

JARDINIERE WITH RELIEF MEDALLIONS.

Thus far the Wingender brothers (of whom there are three) have gone little beyond the experimental stage in the manufacture of purely decorative designs, but the variety and excellence of their productions prove their ability to do work of a still higher order when they shall have received sufficient encouragement from the public.

Written for the CLAY-WORKER.

BRICK SETTING AND DRAFT.

BY R. B. MORRISON.

NEXT TO BURNING of brick, setting them ranks second in importance. The utmost skill of the burner cannot overcome the natural results of careless kilning of brick; hence good burning must be accompanied by good setting to make the former a fact.

To discuss the setting of brick intelligently, the subject of draft must be taken in consideration in connection with it. Draft is a movement of the atmosphere, and in a brick kiln the movement may be upward or downward or horizontally. Draft is caused by atmospheric pressure. Atmosphere near the earth is more dense and heavy than it is higher or further from the earth. The walls of a smokestack withstand this pressure; when there is an opening through near the bottom the pressure at that point drives the air in the stack upward. The same, in a lesser degree, is true of a kiln of brick with air-tight walls around it. This is what we call natural draft. When the air passing through this kiln or smokestack is heated to ten times its natural temperature it expands, becomes much lighter, and its upward movement is accelerated. From this cause we have a much stronger draft through our kiln when it is well heated than at the time we are watersmoking it.

Flowing water and moving air are affected similarly by obstructions. Set a row of stakes across the channel of a stream; let them be of equal size and equal distance between them; the same volume of water will pass through each space. If you place an extra stake in one of the spaces the water at that point will rise above the common level, and part of it move at an angle with the current and pass through the larger space. The same is true in a kiln of brick. If the draft spaces are not uniform, say one square foot has less draft space than the one next to it, that space receives less heat than its portion, and the other more.

While uniform draft space is essential to obtain uniform heat, yet this alone will not insure that result. There are causes that tend to interfere with draft. The walls of the kiln are kept at a lower temperature than the kiln proper by the atmosphere outside. As heat naturally concentrates as it rises, this, in connection with the cooler wall, gives the kiln a short distance from the wall an advantage over the part next the wall. To overcome this it is necessary, in setting, to give larger area of draft space in the kiln at and near the walls. The fire holes being in the walls, air is admitted in greater or less quantity, which drives the heat from this point.

GROUP OF MUGS WITH MUSIC FOR PART SONGS.

There are so many different kinds of kilns—some fired directly through the walls, some in sub-arches, others with generating furnaces outside the walls—that the discussion of setting and draft can only apply to general principles, and not to specific methods of burning. The next thing to consider in reference to uniform draft is by obstructing the natural velocity of same. If you were to set a kiln of brick and put on no flat course or platting on top, leaving same draft space at the point of escape as at entrance, the kiln would not heat uniformly; some parts would be hot, others cold. By covering the kiln with a pavement of brick heat is prevented from escaping as fast as it is generated in the kiln below. It accumulates and presses against this obstruction, and, like water seeking its level, heat seeks an outlet for its upward flight. The surplus heat is forced horizontally, and in this way it is driven to every part of the kiln, and soon every brick is heated, and cold spots either prevented or remedied, by simply closing the whole top. To accomplish this, bats or rough bricks will not answer for platting, but whole, straight bricks, that will form, if necessary, a cover that compels an equal amount of air to be thrown off for each square foot of surface.

Ornamental Beer Mugs.

The first requirement in setting is a smooth, level floor for the foundation course; then the number of bricks in the bench, the width of the arch or flue running across the kiln, the number of straight courses and how many overhanging or projecting courses to the closing course; whether the bricks above the arches shall be set skintling, or in blocks—that is, each layer set at right angles to the one immediately below and above it—or set two courses same way, then two at right angles. There are advocates of each method. The benches may be three lengths of brick between arches, or three and one-third; three and two-thirds or four bricks in length. I think three the minimum and four the maximum. Less than three bricks puts too great weight on the bench, and more than four brick makes it difficult to get sufficient heat to the middle courses.

Ancient Battle Scene From Large Beer Mug.

The benches should be set so that the heat can move horizontally to the middle of the bench from each side. Then there should be sufficient space for draft, so the heat can pass directly upward into the body of the kiln. This cannot occur if the bricks are hacked or joints broken in the bench. The horizontal openings should not be continuous from one arch to another; if they are, fire will be drawn from the cooler to the hotter arch. The overhanging courses should be set in the same manner, in order to let the heat move horizontally through them, then vertically into the kiln proper. This plan of setting benches and overhangers has been illustrated at least twice in the past in the pages of the Clay-Worker.

As to the relative merits of straight and skintled setting: In the latter some draft space is left between ends of brick, and the whole kiln is thoroughly tied together laterally, and by an offset in the face can be tied longitudinally. This method requires greater skill and care on the part of the setter to space the bricks equidistant. Again, in this method the face of every brick is exposed at two or more points to action of flame, and to indentation where the next brick rests upon it.

For fine face brick the face should not be exposed to direct contact with flame. In the other method, where bricks are set three over three, or eight bricks set over three lengths, by setting two courses the same way and setting one brick directly on the brick below or facing them, the face is not stained, and has no cross marks or fire marks, but is perfect in shape, and of uniform color if properly burned. The setter has a gauge to guide him, which, if followed, gives uniform draft space between each course. In this plan there should be between the top of the arch and top of the kiln two offsets, horizontally and laterally, to take the place of the bond which occurs in the skintling method; next the wall, if setting three over three, set five bricks over two lengths, and in setting the benches have one to two inches space next to wall, with here and there an end resting against the wall to steady the kiln. This allows the fire to pass freely upward from the arch next the wall, as more fire is needed here to counteract the effect of the cold wall.

Insert Medallions for Pewter Lids.

This cannot be properly accomplished, however, without an experienced setter, and he cannot do it well unless he is given reasonable time to set a thousand bricks. Men make the mistake of requiring a setter to kiln more brick than he can handle carefully; 1,500 to 2,000 bricks per hour is good work if proper care is bestowed upon this most important work. We hear of men kilning 25,000 or 30,000 per day. This cannot be done with good results. Anything that is not well done is not economically done.

This discussion will be continued in a future article.

MAKE A NOTE OF IT.

While you're hidin' from the sunshine,
  Might be harvestin' yer hay;
While you're waitin' for the wagon
  You could meet it on the way.
—Atlanta Constitution.

Written for the CLAY-WORKER.

PAVING BRICK—ITS MATERIAL, MANUFACTURE AND USE.*—Twelfth Paper.

BY DANIEL W. MEAD.

FUELS (Continued).—COAL.

COAL IS THE MOST IMPORTANT of the fuels, and is almost exclusively used in at least nine-tenths of the factories which manufacture paving brick. The determination of its commercial value is, therefore, of more practical importance to the paving brick manufacturer than that of any other fuel.

It has been found that the ratio of the fixed carbon in dry coal to the total carbon and volatile matter is a valuable index of the calorific power of fuels. Instead of a complete chemical analysis, it is therefore only necessary to have a proximate analysis in order to compare the relative value of coals by this method. Table VI is based on this principle. It was prepared by Mr. William Kent from his examination of the results of Mahler's experiments, and is based on the percentage of fixed carbon present in coal which is dry and free from ash. Mr. Kent finds that above 50 per cent. of free carbon the tabular value is correct within a possible error of 3 per cent.

TABLE VI.

Approximate Heating Value of Coals. (Kent.)

Percentage of Fixed Carbon in Dry Coal free from Ash.	Calorific Value B. T. U. per pound of Combustible.	Theoretical Evaporation of water, from and at 212° per pound of Combustible.
97	14760	15.28
94	15120	15.65
90	15480	16.03
87	15660	16.21
80	15840	16.40
72	15660	16.21
68	15480	16.03
63	15120	15.65
60	14580	15.09
57	14040	14.53
54	13320	13.79
51	12600	13.04
50	12240	12.67

The writer has not had occasion to investigate this table extensively, but in applying it to many of our Western coals, which are low in fixed carbon, the difference in the results of the tabular and calorimetric measurements is considerable more than the 3 per cent. limit of error mentioned by Mr. Kent. The table is, nevertheless, of great value, as it furnishes an approximate method of determining the heating values of coal, where a proximate analysis is available and calorimetric measurements are impossible.

As an example of the use of the table, take the first LaSalle county coal in Table VII. This contains 83.35 per cent. of combustibles (volatile matter and fixed carbon) and 16.65 per cent. of non-combustibles (moisture and ash). The fixed carbon is 43.95 per cent. of the total weight of the coal, or 52.7 per cent. of the total combustibles. The coal, therefore, will have a heating power per pound of combustibles equivalent to the 52.7 per cent., which from the table equals 13008 B. T. U. As, however, there is only 83.35 per cent. of combustible per pound of coal, the heating power per pound of coal will be 10842 B. T. U., which, divided by 966, will give a theoretical evaporation of 11.22 pounds of water from and at 212 degrees Fahr.

—Tests of Coals Widely Used.—

The following table gives the proximate analysis and calorimetric tests of some Illinois coals as determined by Messrs. R. B. McConney and F. H. Clark at the Illinois State University in 1889. The table shows the value of certain coal in common use, and as many of the analyses and tests were made by both observers, they illustrate the difference to be expected in the analysis of a coal with different samples and different observers. The analysis and calorific value of Youghiogheny coal were determined for their comparative value. The writer has calculated the theoretical evaporating power of these coals from and at 212 degrees Fahr., based on the calorimetric determination, and added the same to the table.

TABLE VII.

Heating Power of Some Illinois Coal.

Location of Mine.	Observer	Heating Power, B. T. U.	Volatile Matter, Per Ct.	Fixed Carbon, Per Ct.	Ash, Per Ct.	Moisture, Per Ct.	Theoretical Evaporation
LaSalle, LaSalle county	A	12,169	39.4	43.95	8.43	8.22	12.6
Peru, LaSalle county	A	11,829	37.19	47.2	6.61	9.00	12.3
Bloomington, McLean county	A	11,313	35.99	45.20	14.71	4.10	11.7
Oakwood, Vermillion county	B	12,528	37.55	46.00	8.65	7.8	13.0
Fairmount, Vermillion county	B	11,431	31.8	47.05	13.05	8.1	11.8
Danville, Vermillion county	B	12,285	32.35	53.00	3.65	11.00	12.7
Danville, Vermillion county	A	12,506	43.70	45.37	6.15	4.78	12.9
Danville, Vermillion county	A	11,655	37.07	46.43	10.88	5.62	12.1
Lincoln, Logan county	A	11,272	34.99	44.50	12.06	8.45	11.7
Lincoln, Logan county	B	11,718	31.3	49.5	11.7	7.5	12.1
Mt. Pulaski, Logan county	A	11,360	35.82	46.53	9.97	7.68	11.7
Niantic, Macon county	A	11,529	36.25	47.4	8.47	7.88	13.0
Niantic, Macon county	B	11,529	34.15	45.5	8.5	11.85	13.0
Riverton, Sangamon county	A	11,633	35.39	48.45	9.78	6.38	12.0
Riverton, Sangamon county	B	12,096	38.45	44.3	6.15	11.1	12.5
Barclay, Sangamon county	A	11,205	35.67	46.25	10.71	7.37	11.6
Pana, Christian county	A	11,610	36.37	46.95	9.46	7.22	12.0
Assumption, Christian county	B	13,068	41.2	50.1	4.8	3.9	13.4
Mt. Olive, Macoupin county	A	11,441	35.43	44.49	11.11	7.97	11.8
Mt. Olive, Macoupin county	B	11,772	35.00	51.5	8.2	5.3	12.2
Odin, Marion county	A	11,954	33.99	50.86	9.08	6.07	12.4
Odin, Marion county	B	12,663	41.1	46.9	6.1	5.9	13.1
Kinmundy, Marion county	B	11,664	34.00	47.45	11.55	7.00	12.1
Sandoval, Marion county	A	11,959	35.07	50.86	6.88	7.19	12.4
Centralia, Marion county	A	11,781	38.18	45.50	8.04	8.28	12.2
Duquoin, Perry county	A	12,170	32.03	53.69	7.44	6.84	12.6
Duquoin, Perry county	B	12,393	30.35	54.08	8.9	6.67	12.8
Big Muddy, Franklin county	B	12,825	32.15	56.00	4.00	7.85	13.3
Carbondale, Jackson county	B	12,582	33.65	57.5	4.6	4.25	13.0
Youghiogheny, Penn'a county	A	13,940	33.13	60.82	4.65	1.40	14.4
Youghiogheny, Penn'a county	B	14,256	35.8	58.1	5.4	0.7	14.8

Table VIII gives some valuable determinations of fuel values made at the Chicago, Burlington & Quincy railroad testing laboratory, at Aurora, Ill., in 1893. The heating value of the fuel is expressed in the original paper in pounds of water evaporated, instead of heat units. The column showing the actual heat units has been calculated from the evaporation as given in the original table.

TABLE VIII

Showing Results of Calorimeter Tests of Western Coals Made by the C., B. & Q. R. R.'s Testing Laboratory at Aurora, Ill., in 1893.

ILLINOIS COALS.

Locality and Coal Company.	Average or Selected	Moisture	Volatile	Fixed Carbon	Ash	*Pounds Water	Calorific Value, B. T. U.
Buckheart—Whitebreast Co.	Average	6.14	29.94	46.27	17.65	10.62	10259
Buckheart—Whitebreast Co.	Selected	8.92	33.52	48.06	9.50	11.66	10263
Bryant—Whitebreast Co.	Average	2.42	32.91	42.64	22.03	10.29	9940
Bryant—Whitebreast Co.	Selected	3.88	38.05	48.75	9.32	12.25	11834
Canton—A. W. Heald & Son	Average	3.51	36.99	46.69	12.81	11.33	10945
Canton—A. W. Heald & Son	Selected	4.40	38.32	48.09	9.19	11.94	11534
Claire—Sunday Creek Coal Co.	Average	3.16	32.94	43.05	20.85	10.34	9988
Claire—Sunday Creek Coal Co.	Selected	5.27	37.30	48.21	9.22	12.21	11795
Cuba—Wm. Rutherford & Co.	Average	4.17	36.38	48.62	10.83	11.77	11370
Cuba—Wm. Rutherford & Co.	Selected	6.59	35.85	49.91	7.65	11.99	11583
Dunfermline—Whitebreast Fuel Co	Average	2.46	32.91	45.57	19.06	10.84	10471

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*Copyrighted, 1894, by Daniel W. Mead.

Dunfermline—Whltebreast Fuel Co	Selected	3.54	37.59	52.37	6.50	12.49	12065
Edwards—C. B. Kramm & Co.	Average	1.90	34.48	43.62	20.00	10.29	9940
Edwards—C. B. Kramm & Co.	Selected	5.04	33.96	49.56	11.44	11.44	11051
Edwards—Howarth & Taylor Bros	Average	3.20	35.48	47.77	13.55	11.33	10945
Edwards—Howarth & Taylor Bros	Selected	4.08	38.24	52.17	5.51	12.75	12317
Elmwood—Elmwood Coal Co.	Average	1.36	27.69	35.41	35.54	9.13	8820
Elmwood—Elmwood Coal Co.	Selected	1.90	34.70	48.23	15.17	11.44	11051
Farmington—U. S. Pierce & Co.	Average	3.41	33.88	45.89	16.82	10.84	10471
Farmington—U. S. Plerce & Co.	Selected	6.17	35.96	48.49	9.38	11.94	11534
Ladd—Whitebreast Fuel Co.	Average	8.49	33.63	44.12	13.76	11.17	10790
Ladd—Whitebreast Fuel Co.	Selected	....	.....	.....	.....	11.72	11312
Norris—D. H. Wllliams	Average	7.10	32.12	49.74	11.04	11.06	10684
Norris—D. H. Wllliams	Selected	7.49	35.19	54.45	2.87	12.82	12384
Peoria—Consolidated Coal Co.	Average	3.22	36.13	49.21	11.44	11.77	11370
Peoria—Consolidated Coal Co.	Selected	3.18	39.24	50.56	7.02	12.21	11795
Pottstown—I. Wantling & Son.	Average	4.58	35.52	45.52	14.38	11.17	10790
Pottstown—I. Wantling & Son.	Selected	5.51	35.92	49.76	8.81	12.05	11640
St. David—Carbon Coal Co.	Average	2.00	34.60	46.20	17.20	11.11	10732
St. David—Carbon Coal Co.	Selected	3.07	35.88	52.95	8.46	12.27	11853
St. David—Whitebr'st Fuel Co.	Average	1.50	33.77	47.67	17.06	11.44	11051
St. David—Whitebr'st Fuel Co.	Selected	1.38	37.42	55.89	5.31	12.82	12384
Streator—Star Coal Co.	Average	4.45	39.19	44.05	12.31	11.80	11[illegible]99
Streator—Star Coal Co.	Selected	2.16	40.20	54.97	2.67	13 61	13147
Streator—C., W. & V. Coal Co.	Average	8.30	37.63	45.93	8.14	11.88	11376
Streator—Coal Run Coal Co.	Average	8.40	38.25	47.10	6.25	12.14	11727
Vicary—C. B. Kramer & Co.	Average	5.78	36.60	47.14	10.48	11.94	11534
Vicary—C. B. Kramer & Co.	Selected	7.40	36.26	51.61	4.73	12.65	12220
IOWA COALS.							
Hiteman—Whitebr. Fuel Co.	....	4.99	35.27	25.37	34.37	9.27	8955
Keb—Whitebreast Fuel Co.	....	9.81	37.49	44.75	7.95	11.88	11376
Flagiers—Whltebr'st Fuel Co.	....	9.29	38.86	39.97	11.88	11.05	10684
Flagiers—Whitebr'st Fuel Co.	....	9.84	40.16	37.69	12.31	11.22	10839
Chisholm—Whitebr'st Fuel Co.	....	9.18	40.42	39.58	10.82	11.77	11370
MISSOURI COALS.							
Brookfield—Br'kf'ld Mining Co.	....	4.34	40.27	50.60	4.79	.....	.....
Mendota—Mendota Coal and Mining Co.	....	9.03	37.48	46.24	7.25	11.85	11447
Hamilton—Hamilton Coal Co.	....	5.27	38.09	51.88	4.76	13.09	12645
Hamilton—Caldwell Coal Co.	....	5.06	34.24	47.69	13.01	11.55	11157
Lingo—Little Pittsburg Coal Co	....	7.33	38.29	47.24	7.14	12.43	12007
NEBRASKA COALS.							
Hastings—Colorado Fuel Co.	....	0.21	27.82	60.88	11.09	13.39	12947
WYOMING COALS.							
Cambria	....	4.2	40.6	41.5	13.7	.....	.....
Cambrla	....	4.00	36.00	37.7	22.3	.....	.....
Cambria	....	2.5	37.4	37.9	22.2	.....	.....
Goose Creek	....	9.7	40.2	46.3	3.8	.....	.....
Goose Creek	....	13.3	39.3	44.2	3.2	.....	.....
Deer Creek	....	12.8	35.00	47.7	3.6	.....	.....
Sheridan	....	6.04	42.37	35.57	16.02	.....	.....
Goose Creek	....	12.43	40.25	43.68	3.64	.....	.....
Goose Creek	....	13.92	36.78	42.03	7.27	.....	.....
Felix	....	16.24	35.39	40.55	7.82	9.41	9090
Felix	....	15.17	38.14	40.91	5.78	9.41	9090
Awada	....	14.32	34.45	48.15	3.08	10.40	10046
MISCELLANEOUS COALS.							
Edwards—C. B. Kramm & Bro.	....	6.64	34.71	40.74	17.91	10.84	10472
Edwards—C. B. Kramm & Bro.	....	5.98	30.43	34.89	28.70	9.41	9090
Edwards—C. B. Kramm & Bro.	....	9.34	28.95	35.03	26.68	9.35	9032
Edwards—Howarth & Taylor Bros	....	5.85	35.64	42.47	16.04	11.11	10732
do	....	6.29	32.71	41.35	19.65	10.73	10366
do	....	9.54	32.18	35.31	22.97	9.96	9621

*This column represents the amount of water that one pound of the coal would evaporate from and at 212 degrees if all the heat in the coal were utllized.

A further selection of the analyses of coals from various States not covered by the previous tables is given in Table IX.

TABLE IX.

Analysis of Various Coals of the United States.

	Fixed Carbon	Volatile Matter	Sulphur	Ash	Moisture	Calculated (B. T. U.)	By Calorimeter (B. T. U.)	Theoretical Evaporation in lbs. of Water from and at 212 degrees
Ohio.								
Briar Hill, Mahoning Co.	64.25	31.83	0.56	1.45	2.47	13714	.....	14.2
Hocking Valley	53.15	35.88	0.43	2.72	8.25	13414	.....	13.9
Jackson County	49.88	47.33	....	2.22	....	.....	.....	.....
Portland County	53.40	44.30	....	2.29	....	.....	.....	.....
Mercer County	57.80	40.50	....	1.70	....	.....	.....	.....
Pennsylvania.								
Pittsburg (average)	54.94	35.34	1.97	7.92	1.80	.....	13104	13.46
Plttsburg coking	61.87	30.22	1.35	6.48	1.43	14415	.....	14.9
Youghlogheny	58.98	34.06	....	5.00	1.96	.....	12936	13.39
Reynoldsvllle	65.88	27.12	....	5.80	1.20	.....	12981	13.44
Connellsvllle lump	59.62	30.11	0.78	8.23	1.26	.....	.....	.....
Somerset Co.	69.90	22.00	....	8.10	....	.....	.....	.....
Yellow Springs, Lebanon Co	74.70	14.80	....	10.50	....	.....	.....	.....
Mauch Chunk	90.10	6.60	....	3.30	....	.....	.....	.....
Beaver Meadow	85.34	9.60	....	5.06	....	.....	.....	.....
Indiana.								
Block	63.00	32.50	0.98	1.00	3.50	14020	.....	14.5
Polk County	75.00	21.00	....	4.00	....	.....	.....	.....
Sulllvan County	70.00	28.00	....	2.00	....	.....	.....	.....
Honey Creek, Vigo Co.	70.00	27.50	....	2.50	....	.....	.....	.....
Arkansas.								
Coal Hill, Johnson Co.	74.06	14.93	3.04	9.66	1.35	13713	.....	14.1
Huntington County	71.51	18.95	0.78	8.24	1.30	.....	11756	12.17
Jenny Lind, Sebastian Co.	72.48	17.64	2.11	8.62	1.26	13964	.....	14.4
West Virginia.								
Richmond Coal	59.25	32.00	....	8.75	....	.....	.....	.....
New River	75.89	18.19	0.30	4.68	0.94	.....	.....	.....
Clarksburg	56.74	41.66	....	1.60	....	.....	.....	.....
Big Coal River	50.20	47.10	....	2.70	....	.....	.....	.....
Glen Mary, Scott Co.	61.63	31.47	0.94	4.75	2.15	.....	13167	13.63
Cumberland Mountains	71.00	17.00	....	12.00	....	.....	.....	.....
Etna, Marion County	63.94	23.72	1.19	11.40	0.94	.....	.....	.....
Melville, Hamilton Co.	67.08	26.50	0.91	3.68	2.74	.....	.....	.....
Alabama.								
Llttle Pittsburg Vein	62.20	32.47	0.64	2.28	2.05	.....	.....	.....
Helena Mines	58.96	35.48	0.90	3.82	1.74	.....	.....	.....
Brookwood	58.70	27.80	1.44	2.65	1.95	.....	.....	.....
Rhode Island.								
Portsmouth Mines	85.84	10.50	....	....	....	.....	.....	.....
Cumberland Mines	77.00	7.60	....	15.40	....	.....	.....	.....
Providence Mines	72.00	.....	....	28.00	....	.....	.....	.....
Massachusetts.								
Mansfield Mine	87.40	6.20	....	6.40	....	.....	.....	.....
Maryland.								
Cumberland	73.51	15.47	0.70	9.09	1.23	.....	.....	.....
Virginia.								
Pocahontas Flat-top	74.20	23.90	0.52	1.38	0.52	.....	.....	.....
Kentucky.								
Pulaski County	60.85	35.15	0.40	1.23	1.26	.....	.....	.....
Cannel Coal	59.80	40.20	0.96	8.81	....	.....	.....	.....

TABLE X.

Calorific Value of Various Woods. (Overman.)

Wood.	Specific Gravity	Pounds in One Cord	Percentage Charcoal	Spec. Gravity of Charcoal	Pounds of Charcoal in a Bushel	Relative Value of Wood	Equivalent of One Cord in Pounds of Coal
Hickory, shell bark	1.000	4,469	26.22	0.625	32.89	1.00	1,788
Oak, chestnut	0.885	3,955	22.75	0.481	25.31	0 86	1,582
Oak, white	0.885	3.821	21.62	0.401	21.10	0.81	1,528
Ash	0.772	3,450	25.74	0.447	28.78	0.77	1,380
Dogwood	0.815	3,643	21.00	0.550	29.94	0.75	1,337
Oak, black	0.728	3,254	23.80	0.387	20.36	0.71	1,302
Oak, red	0.728	3,254	22.43	0.400	21.05	0.69	1,302
Beech, white	0.724	3,236	19.62	0.518	27.26	0.65	1,294
Walnut, black	0.681	3,044	22.56	0.418	22.00	0.65	1,218
Maple, hard (sugar)	0.644	2,878	21.43	0.431	22.68	0.60	1,150
Cedar, red	0.565	2,525	24.72	0.238	12.52	0.56	1,010
Magnolia	0.605	2,704	21.59	0.406	21.36	0.56	1,082
Maple, soft	0.597	2,668	20.04	0.370	19.47	0.54	1,067
Pine, yellow	0.551	2,463	23.73	0.333	17.52	0.54	985
Sycamore	0.535	2,391	23.60	0.274	19.68	0.52	956
Butternut	0.567	2,534	20.79	0.237	12.47	0.51	1,018
Pine, New Jersey	0.478	2,137	24.88	0.385	20.26	0.48	855
Pine, pitch	0.426	1,904	26.76	0.298	15.68	0.43	762
Pine, white	0.418	1,868	24.35	0.293	15.42	0.42	747
Poplar, Lombardy	0.397	1,774	25.00	0.245	12.85	0.40	709
Chestnut	0.552	2,333	25.29	0.379	19.74	0.52	933
Poplar, yellow	0.563	2,516	21.81	0.383	20.15	0.52	1,007

—Wood.—

Wood for fuel is largely used in many parts of the country in burning common brick in the old-style up-draft clamp kilns. It is also somtimes used for watersmoking paving brick in the down-draft kilns, and in some parts of the country where wood is comparatively cheap it is used almost exclusively for steam-raising and in the furnace for generating the heat for drying brick.

In Table X the average relative value of wood fuels is given. This table is taken from Overman's Metallurgy. It can, of course, be only approximate, as the location and conditions under which the timbers grow, the time when cut, and its relative dryness all influence the value of the fuel.

In this table the writer has added the last column, which gives the value of a cord of wood in pounds of coal. This column has been calculated on the assumption made in the Rules for Boiler Trials of the American Society of Mechanical Engineers that one pound of wood is equal to four-tenths of a pound of good coal. It will be noted that this column does not agree exactly with Overman's column of "Relative Values of Wood." It is found, also, in practice, that where woods are equally dry a pound of wood has practically the same calorific power, no matter what kind it may be.

—Oil Fuels.—

Fuel oils have been quite extensively used for steam-raising, and have also been adopted, to some extent, at least, for the drying and burning of paving brick. Table XI gives the chemical composition and calorific power of a number of petroleum fuel oils.

TABLE XI.

Chemical Composition and Calorific Value of Petroleum Fuel Oils.

Location.	Specific Gravity.........	Carbon	Hydrogen	Oxygen	Heating Power, B. T. U.	Theoretical Evaporation from and at 212 Deg...	Authority
Pennsylvania Heavy Crude Oil..........	0.886	84.9	13.7	1.4	20736	21.48	Urquhart
Caucasian Light Crude Oil..........	0.884	86.3	13.6	0.1	22027	22.79	do
Caucasian Heavy Crude Oil..........	0.938	86.6	12.3	1.1	20138	20.85	do
Petroleum Refuse...	0.928	87.1	11.7	1.2	19832	20.58	do
West Virginia........	0.840	84.3	14.1	1.6	18324	18.97	St. Claire-Deville
California	...	86.9	11.8	1.1	.....	.....	S. F. Peckham
Ohio	0.887	84.2	13.1	2.7	18718	19.37	St. Claire-Deville
Canada, Bothwell....	0.857	84.3	13.4	2.3	.....	.....	do
France, St. Gabian..	0.894	86.1	12.7	1.2	.....	.....	do
Alsacia, Pechelbrouse	0.892	86.1	12.7	1.2	.....	.....	do
Hanover, Odesse.....	0.892	80.4	12.7	6.9	.....	.....	do

The above analyses show a very great uniformity in the chemical composition of petroleum oils, and a much greater uniformity in calorific power than in the coals.

—Gas Fuels.—

The great development of natural gas in portions of the United States has brought fuel gases to the front in those localities, and it has been extensively utilized in all places where heat is required.

The question of the utilization of coal by its conversion into gas before use as a fuel has also been widely discussed, as has also the application of the various fuel gases to brick burning. The possibility of greater economy in the production and utilization of heat by these methods will warrant at least their careful consideration by all progressive manufacturers.

The following data is from the extended investigations of Mr. Emerson McMillin:

TABLE XII.

Chemical Composition and Combustion Data of Fuel Gases.

	Name of Gas.	Natural Gas.........	Coal Gas.........	Water Gas.........	Producer Gas.........
Chemical Composition by Weight.	Hydrogen	0.268	8.21	5.431	0.458
	Marsh gas....................	90.383	57.20	1.931	1.831
	Carbonic oxide..............	0.857	15.02	76.041	25.095
	Olefiant oxide..............	0.700	1.97	10.622	2.517
	Nitrogen	6.178	3.75	3.380	69.413
	Oxygen	0.666	1.43	0.965	0.000
	Water vapor..................	0.000	2.41	1.630	0.686
	Sulphydric acid..............	0.417	0.00	0.000	0.000
	Per cent......................	100.000	100.00	100.000	100.000
Resulting Gases of Combustion of 1,000 cubic ft. of Gas.	Gas before combustion....	45.60	32.00	45.60	77.50
	Steam	94.25	69.718	25.104	6.92
	Carbon dioxide..............	119.59	68.586	61.754	36.45
	Sulphuric acid..............	0.36	0.000	0.000	0.000
	Nitrogen	664.96	427.222	170.958	126.57
	Total weight after comb..	879.16	565.526	257.816	169.94
	Total oxygen required.....	167.46	107.961	43.149	19.67
	Evaporation	893.25	591.000	262.000	115.100
	Heat units....................	885880	570906	253092	111187

The above data must be regarded only as average results, for all classes of gases named in the table will vary considerably under different conditions. The table, however, will give a basis from which to judge of the approximate relation of fuel gases to other fuels.

—The Comparative Value of Fuels.—

In the selection of fuels, as in all other parts of the business of the brick manufacturer, local conditions must govern. That which may be the best in one place may take a much lower rank in another. Circumstances and conditions and their interrelations must, therefore, be carefully examined in order to secure the best results.

Aside from the furnace conditions, which will be considered hereafter, there are numerous modifying factors which will sometimes become so important as to be controlling.

The bulk of the fuel used and the facility of use are factors sometimes of great importance. These factors practically prohibit the use of wood as a fuel in large plants, and especially in thickly settled communities. Wood in large amounts becomes so cumbersome that its bulk becomes prohibitive. And the value of storage room will also often effect similar results. In small and isolated plants such considerations have no weight whatever.

In 1893, 25,000 horse-power of boiler capacity was used at the World's Columbian Exposition at Chicago. For fuel for these boilers oil was piped from Lima, O. It is estimated that to supply this plant with coal would have required eighty cars per day, and twenty cars per day would have been required to remove the ashes and cinders.

Petroleum fuel has many advantages, some of which may sometimes become controlling, as in the above instance, where bulk and facility of transportation made oil the only practicable fuel for the World's Fair boilers.

The following statement of the advantages of petroleum fuel are condensed from a paper by Mr. C. W. Owston.

First—A petroleum fire can be held in perfect control by any man of ordinary intelligence.

Second—The heat is more uniform than possible with coal or wood.

Third—Economy of boiler capacity. Oil, in practice, will evaporate from 17 to 18½ pounds of water per pound of fuel, against 8 to 10 for coal.

Fourth—Economy in labor; cleanliness and safety; no ashes or sparks.

Fifth—No chilling of the flues by opening furnace doors. No sulphur action on metals.

Sixth—One-half the bulk and one-third the weight of its equivalent in coal.

In southeastern Russia, where all fuel except oil is expensive, fuel oil has been extensively adopted for railroad service. In 1886 the Pennsylvania Railroad Co. sent a representative to examine the system there in use, and they have since made some experiments in its use on their locomotives. The success attained, however, has not been so satisfactory as to lead to its general adoption. Practically, it was found that one pound of petroleum was equal to about one and three-quarters pounds of coal in producing heat, and, taking into account the saving in labor in the use of oil, and other factors, the conclusions reached were that in practice one pound of oil is equal in value to two pounds of coal. Each barrel of petroleum contains 42 gallons, each of which weighs 7.3 pounds, and on this basis the following table of equivalent values of coal and oil has been estimated:

Cost of Coal.	Cost of Oil.	
Per Ton.	Per Barrel.	Per Gallon.
$2.50	.68½	.0163
2.75	.75½	.018
3.00	.82½	.0197
3.25	.89½	.0213
3.50	.96½	.023
3.75	1.03½	.0245
4.00	1.10½	.0263
4.25	1.17½	.028
4.50	1.24½	.0296
4.75	1.31	.0312
5.00	1.38	.0328

It must be remembered, in using the above table, that the coal therein considered is of the better grade of Eastern coals, and that a larger quantity of the poorer qualities of coals would be needed to offset the equivalent value of oil.

Messrs. Pike and Hugo made some very thorough tests and comparisons of coal and oil in Minneapolis and St. Paul. Oil cost $0.0226 per gallon, and the coal used would evaporate 7½ pounds of water from and at 212 degrees Fahr. Their conclusions were that, including the difference in cost of handling coal, ashes and oil,—

With coal at $2.00 per ton, 37.1 per cent. was saved over oil.
With coal at $2.25 per ton, 31.9 per cent. was saved over oil.
With coal at $2.50 per ton, 26.9 per cent. was saved over oil.
With coal at $3.00 per ton, 16.7 per cent. was saved over oil.
With coal at $3.85 per ton, the results were equal to oil.
With coal at $4.85 per ton, cost above oil, 19.5 per cent.

It will be seen that these experiments agree very closely with the above table. A large number of experiments have been made in the use of oil for boiler service, and in general the results above shown are quite uniformly attained. In many cases, where coal has been improperly used and oil is adopted under reasonably good conditions, far better comparative results are claimed and undoubtedly, under prevailing conditions, are attained. The reverse is also equally true. It is, then, apparent that the use of oil is a question of local condition, to be considered in each case by itself.

It may be suggested, however, that the results obtained in boiler practice are not necessarily the same as in kiln use, and for such uses the ability to control the heat and to raise it rapidly, together with other collateral advantages, may create a different scale of equivalent values.

In burning building brick Messrs. May, Purington & Co., Chicago, have used oil at an expense of 36 cents per thousand, against coal and wood at from 90 cents to $1.10 per thousand. Added to this is an improvement in the quality and uniformity of brick.

In the use of gaseous fuel we may compare on the basis of heat units the various gases, which will average about as follows:

	B. T. U. per 1,000 cub. ft. of Gas.	M ft. Equivalent to Ton of Coal.
Natural gas	886000	29.3
Coal gas	571000	45.4
Water gas	253000	101.3
Producer gas	111000	234.0

B. T. U. per ton of first-class coal, 26,000,000.

From the above the following table of equivalent prices of coal and the various gases per equal number of heat units has been calculated:

Cost of Coal per Ton.	Equivalent Cost of Gas per 1,000 ft. Natural Gas.	Coal Gas.	Water Gas.	Producer Gas.
$1.00	.034	.022	.0099	.0043
1.50	.051	.0286	.0148	.0064
2.00	.068	.044	.0197	.0086
2.50	.085	.055	.026	.0107
2.75	.094	.0607	.0272	.0118
3.00	.102	.066	.0296	.0128
3.25	.111	.0714	.0321	.0139
3.50	.119	.077	.0346	.0149
3.75	.128	.0826	.037	.0160
4.00	.137	.088	.0394	.0171
4.25	.145	.0935	.0419	.0182
4.50	.154	.099	.0444	.0192
4.75	.162	.1045	.047	.02003
5.00	.171	.11	.0494	.0214

The actual values of the fuel gases will be, perhaps, 25 per cent. higher than shown by the table, on account of the saving in labor and other collateral advantages which are similar to those previously noted in fuel oils. From this table it will be seen that the immediate prospect for the extended uses of fuel gases is not flattering, except at points where cheap fuels can be utilized for gas-making which cannot be utilized as a direct fuel, or where the collateral considerations are controlling.

Who would reap must plant the seed—
Truth so plain who runs may read;
Plant your field with ads, and till it—
Harvest rich shall surely fill it.
—Printers' Ink.

Written for the CLAY-WORKER.

A TALK ON MANAGEMENT.

Why Some Men Fail in the Brick Business.

A MANUFACTURER who had met with business reverses, and whose plant had not been in operation for several seasons, was, one day in early June, reviewing his property, when a prosperous and wealthy brother manufacturer happened to be passing. He approached him and invited him into his office, which invitation was accepted. After a few preliminary remarks, he said:

"Mr. Randolph, I am thinking of again resuming operations, and have every confidence of meeting with success. But give me your candid opinion; what do you think of my prospects?"

"I can see no reason why you should not be successful. But before making the venture I would advise you to make certain changes."

"Changes? In what respect? Remember, I ask your counsel and advice?"

"Well, to be frank with you, first, you have been exceedingly extravagant; second, you have relied solely upon your employes in the making, setting, burning and delivering of your brick; third, you practiced no discipline among your men. Herein must you make a change."

"I do not quite understand. Kindly explain yourself."

"With pleasure. I said you were extravagant, and such was certainly the case. To begin with, the first smooth-talking agent that made his appearance succeeded in selling you several machines, claiming them to be an A1 article. Without investigating the merits of other makes, you made the purchase, against the advice of old manufacturers, including myself. What was the result? After a season of break-downs and other set-backs, you came to the conclusion that the sum you paid for the cheap-rate machines, together with repairs, would have equipped your plant with high-grade machines that would have been both a credit and a profit to you. It was in this respect that you were extravagant.

"In selecting fuel, you gave it no more attention than a minor detail. I remember an instance when a man offered 800 cords of wood for sale, and asked what I would give him per cord. After looking it over I saw that it was hewed ends, and contained cords of limbs and round sticks that were either too crooked or too large to enter the arch frame. On summing up the ranks of wood I concluded that 600 cords was good wood. I offered him eighteen hundred dollars. He laughed and said he could get more than that from you. A week or so later he told me you had bought and paid him twenty-four hundred dollars for the 800 cords of wood, without even looking it over, but sending a man out to measure it. Subsequently you told me you had lost a great deal on your bargain, as there was so much of it that was unfit for use.

"Mr. Rivers, not only in the buying of machines and fuel did you make telling errors, but also in the purchasing of horses, wagons and harness, often paying sums in excess of the actual value of the whole outfit.

"I stated that you relied solely upon your employes in the making, setting, burning and delivering of your brick, which is all very true. The green brick proved it; the kilns proved it; the burning proved it. Untempered clay was shoveled into the machines and brick made therefrom. But what kind of brick? Some stiff, some soft, some lumpy, and some without corners or edges. All this happened during your absence, which, I regret to say, was too frequent for your own welfare. Visit other yards in our neighborhood and see if such a state of affairs is permitted to exist. Your kilns, Mr. Rivers, were not carefully and scientifically built; the brick were merely piled therein, which in a measure accounted for half the kilns being soft, and which suffered you to endure an uncalled-for loss.

"So far as discipline is concerned, your men did mostly as they pleased. I have known some of your men to be two hours late in the morning two and three times a week during a season. Yet I doubt if you ever knew it, because of your own tardiness in reaching your plant in the early morning. Toward the end of the season your men grew careless; they injured and destroyed many brick; they damaged your machines by neglecting to oil them, and ruined molds and barrows when there was no occasion for it.

"Yes, begin again, Mr. Rivers; but guard your interests with great caution, for, if you do not, no one will. Begin again, and begin right. Success always attends an honest and a deserving concern when it has good management and deep interest for its pilots. Be advised by me. Secure the best machines obtainable, no matter though they cost a trifle more than an inferior article; they will more than repay you in the shortest possible time. Buy your fuel when it can be bought cheapest. Do not take the seller's word that his price is the lowest. Investigate and satisfy yourself that you are not paying more than the market price. Never depend upon your employes for the faithful performance of their duties, for when you do your confidence is misplaced and ever abused. You must be there yourself and demand an honest day's work for an honest day's pay. Have it distinctly understood that each and every man must be there on time, and that all damage through carelessness will be punished by immediate dismissal.

"There are many details in the management of a plant which, if faithfully carried out, help to enhance its prospects. Take my advice and manufacture nothing but sound, whole brick. Have them set after the most approved method. Let every kiln be thoroughly burned. Never employ more men than you actually require. Look to the little expenses, such as horseshoeing, repairing, oils, grease, hay, oats, straw, sand, shovels, etc.

"Be observant of these things, and you will be master of the situation. Never imagine that these little pitfalls cannot engulf your resources, for it is these same little pitfalls that invite and ruin the unwary. On such principles has my plant been conducted for more than a quarter of a century, and during that time my business has prospered and enlarged. It is not the amount of business, but how well it is managed, that makes its prosperity an assurance." J. G. GREUSEL.

Written for the CLAY-WORKER.

DOWN IN JERSEY.

THE M. D. VALENTINE BROTHERS CO., of Woodbridge, N. J., is the owner of two very large fire brick factories, one located at Woodbridge, a suburb of Perth Amboy, the other at Valentine's Station, Lehigh Valley railroad, about three miles from Perth Amboy.

The Woodbridge plant will be the first taken under my penpoint. This plant consists of a very large brick building, two stories high, covering a space probably 100x400. Inside this building is contained two boilers, two engines, brick machines, clay crushers, kilns, dryers, and in fact the whole plant, outside of storage sheds for the manufactured product and fuel. The latter two items cover very large territory, and are so conveniently located to railroad switches that the item of handling fuel and the finished product is very small. The original start was made twenty-seven years ago in a small way, but from year to year the plant has grown, until now it covers this vast space. The brothers are very numerous, but interested in this particular branch of the clay industry is M. D., Colonel Ross and Oscar Valentine. Other members of the family are miners and shippers of clay, owning large deposits in the Woodbridge district. The Valentine Lumber Co. is also an offshoot of the same family. The writer has often put forth the theory that if a family of brothers could stick together and work shoulder to shoulder, nothing under the sun could prevent their success in life. Here is one of the best illustrations of this fact, as the evidence is there in a material shape to show for itself. Not only the factories, but the beautiful homes of the owners show their prosperity. One of the finest residences in Woodbridge is the house of M. D., the head of the firm.

At one end of the factory are the boilers, engines and carpenter shop, also blacksmith shop, as all sorts of molds are made to fill orders for any shape brick one may wish. These shops are fitted with saws, drills and everything necessary to expedite the work. The main building is fitted with dry floors and racks to dry the brick. The clay-preparing machinery is situated on the back part of building, next the clay sheds. Three old-fashioned wheels that revolve in a pit, similar to the old red-brick plants in the East, pug the clay ready for the machines. This part of the plant looks very primitive, but the reputation this firm have all over the country for best quality of brick proves that they know how to pug clay. This clay, after being prepared in these pits, is wheeled out on hand barrows and placed in two heavy iron brick machines, where it is molded into various shapes in the rough shape. After drying partially they are all repressed by hand, then thoroughly dried before setting in kiln. Blocks and heavy shapes are all molded by hand in wooden molds, as the demands for fire brick shapes are so varied a machine could hardly be expected to do the work without great expense for dies.

The large blocks mentioned in last month's news notes weighed, when burned, 1,750 pounds—quite a large brick, I should say. The kilns used are principally of the round updraft pattern, but a few down-draft are in use. One lately built is rather a novelty in its way. This kiln is built with a sheet-steel covering above the hub, bolted together, making as it were, a steel tank, lined with an 8-inch course of red brick next to steel, and a 9-inch course of fire brick. This is a very cheap method of building a kiln, as the steel for this one cost about $75. The brickwork inside, of course, did not need to have the joints struck, and can be built very fast. There are several advantages for this kind of kiln that will readily suggest themselves. First of all, the bands are dispensed with that are usually found necessary to hold the wall in place; second, if the walls do crack inside, the cold air cannot enter through the steelwork. Steel was used in this case because it was found to be as cheap as iron. The material is about three-sixteenths inch thick.

FRONT VIEW M. D. VALENTINE BROS. CO. FIRE BRICK FACTORY, Woodbridge, N. J.

The writer may here add that some years ago he tried to prevail upon some parties with whom he was interested to build a pottery kiln after this idea, but the chief mogul laughed at the idea, "as the heat would burst the ironwork," as he put it. We are glad, of course, to see demonstrated our idea. After all, it is only following in the footsteps of blast furnace builders for years past. This steel structure can be made any shape or size, and can be had of any desired thickness, already punched, so it can be bolted together by any ordinary mechanic, and is certainly a saving over an extra course of brick and the iron bands necessary to hold a wall in place. (N. B.—No patent fees on this idea, either.)

The clays used in these works come from the mines surrounding Woodbridge—some by wagon, some by rail from the Valentine Station works. The Pennsylvania Company have tracks into the works. A dock is also built on Woodbridge creek, and much of the material is shipped by water to points East.

A large industry is also carried on in the stove-lining business. This part of the work is made on the second floor of the building, being dried there upon racks. The stacks of the kilns run through this second floor, and create heat sufficient to dry all this material.

Anthracite coal is used throughout the works, and we notice one economy here that we notice at no other works hereabouts—all coal ashes are taken to a shed and run through a revolving screen, freeing the larger waste lumps that would otherwise go to waste. This material is used under the dry floors, where a slow fire is kept to dry brick. Other manufacturers might utilize this waste to their bank accounts' advantage.

The Valentine brothers are a well-kept lot of gentlemen, and are acknowledged to be fine-looking men. We have been told a story in connection with their start in business, and give it for what it is worth, showing that the father had better material in his sons than he knew of at the time. The father, who was comparatively a well-to-do man, gave the sons one thousand dollars to start in business with, saying at the time: "There, boys, take that. I suspect it won't last you long." But the "boys" were plucky, and the results show that many thousands have been added to the one. There are nine brothers and one sister in the family, and the "Clan Valentine" is known from one end of the State to another.

Rear View M. D. Valentine Bros. Co. Fire Brick Factory, Woodbridge, N. J.

Everything that is erected by this firm is of a permanent character, and expected to stay where it is put.

The fire brick of New Jersey production have a national reputation. They differ materially in looks and make-up from the Western brick, or those of Bolivar and Mount Savage. The Jersey clays, all being of a plastic nature, make a brick quite porous in appearance. A certain percentage of grit or ground-up fire brick or old bats, together with fire sand in certain portions, are mixed with the clays. This fire sand is a coarse white pebbly sand found in large quantities in this region. This sand has a striking likeness to the oil-producing sands of the Pennsylvania and West Virginia oil regions. With all these mixtures properly attended to, a brick can be made to withstand any heat desired. The men in their employ are all old hands at the business, and work year in and year out, so that there are no labor troubles to contend with. A noticeable feature in the Valentine factory is the fact that for all there are tons upon tons of material turned out every day in the year. There is no confusion. Every man knows his place and what is expected of him, so everything moves along smoothly and perfectly.

The number of men employed in this factory is about ninety; horses to haul clay, about twenty-five.

Every day finds the proprietors around the works, and, being thoroughly practical men, they, of course, know what they are about.

A superintendent and foreman look after the little details, and, having been brought up from the ranks, nothing escapes their vigilant eyes. Mr. Cliff Valentine is superintendent, and Mr. Ed Roman is foreman—a Frenchman by birth.

Some years ago, the present factory not being sufficiently large to carry on the fast-increasing business, a new plant was started on the Lehigh Valley railroad. Of this plant I will endeavor to give a description at some future time.

The writer was shown, to-day, a very handsome gold badge by Colonel Ross Valentine—an emblem of his services to the Queen of Great Britain during a visit to Prince Edward's Island, two years ago. As the Colonel (that now is) and some friends were at the island upon a visit, it was found that Mr. Valentine was the only one of the party who lacked a title, so a commission was made out on parchment and handed to him, making him a full-fledged colonel in Her Majesty's services. We believe, though, he never donned the uniform. The medal is a very beautiful piece of workmanship, on one side stating the name and by whom given, upon the reverse side these words: "J. Ross Valentine, at Home; Clay Digger and Brickmaker." No doubt many dollars have been spent by the Colonel to wet the appetites of those who have laughed over the incident. How anyone could conceive of a man carrying the immense corporation under his vest that our friend does digging clay is beyond our ken; but he does make brick, or rather furnishes the brains and money to pay others to make them for him. If the Colonel should happen to meet with the N. B. M. A. next year, just ask him to show his medal, and you will see how pretty it is.

Another new kiln is now being started at the Woodbridge factory, same as new one mentioned, except this will be an up-draft instead of down-draft. Brick are burned in their round up-draft kilns in four days' time, with one day for cooling off, about 45,000 to 50,000 to kiln. W. R. O.

LOOKING FOR TROUBLE—WILL BUILD A SEWER PIPE PLANT.

Please find enclosed $2 for my subscription to the Clay-Worker for another year. I could not do without it. You must excuse me for not writing you before, but when I read Cleveland's message to Congress I expected you would be up here on the borders by this time. I have been hunting up the old flintlock my grandfather used in 1812, but could not find it—I suppose because he must have been in Ireland about that time.

Now about brick. This is not much of a country for using brick, although there appears to be a good brick clay everywhere, of a dark red or brownish color, running to blue at the bottom. I am the only one here in the business. I manufacture about 1,500,000 a year on a Henry Martin machine. They sell in up-and-down lots, delivered at the buildings, from $7 to $7.50 per M, and picked brick from $9 to $10 per M.

I rather think I will make sewer pipe next season. I would be obliged to any of the readers of the Clay-Worker for information on the cost of a plant, etc.

If anything new transpires in this locality I will keep you posted. Yours truly, M. RYAN.

Fredericton, N. B.

The way to plant dimes and harvest dollars is to advertise intelligently.—Printer's Ink.

THE ILLINOIS CLAYWORKERS ASSOCIATION'S

18th ANNUAL CONVENTION

THE EIGHTEENTH annual Convention of the Brick and Tile Manufacturers of Illinois, held at Streator, Jan. 21 and 22, proved the largest and best meeting that Association has held for a number of years. The crowd reached old-time proportions, nearly one hundred being present, and there prevailed a feeling of good fellowship and enthusiasm from start to finish that made the Convention very enjoyable.

Heretofore the yearly meetings have been held at Springfield. Last year it was suggested that it might be a good plan to meet at other towns in the State. The idea struck a popular chord, and it was wisely decided to make the experiment. Mr. Plumb invited the Convention to Streator, promising a warm welcome to all who would come to that enterprising little city. He and his neighbors kept the promise royally, entertaining the visitors so generously that all were loth to say good-bye when the time of departure came.

The meetings were held in a comfortable, well-lighted hall, a few blocks from the Plumb House, which was headquarters. The first session was called to order by the affable president, E. M. Pike, Chenoa, Tuesday at 10 a. m. After those who desired to contribute a dollar to the treasury had been decorated by Secretary Stoll with the pretty badge of membership, all listened attentively to

PRESIDENT PIKE'S ANNUAL ADDRESS.

Gentlemen—In this busy, rustling world of friction which we habitate each one seems to have a calling; even the tramp fills a space, and that space is usually filled with the staff of life, the work of honest toil, but not of him, for he neither toils nor spins.

Not so with us, for we do both, and thus the world and we are better. To undertake to edify or entertain a convention of this character and intelligence I will not attempt, but I do wish to extend greeting to the old guard and charter members of this Association, who have stood by so nobly, and to the new members our right hand of welcome goes out, and to these the front seats are reserved, with all the rights and privileges.

I will not attempt to re-thresh any straw, or to mention straw in any way in connection with the brickyards, formerly owned and operated by the children of Israel, for, of course, this will crop out later in the convention.

The object of these annual meetings is for the interchange of thought, review the past and profit by it if may be, and to make plans for the future. It is such conventions as these, made up of representative clayworkers, the makers of clayworking machinery, and our organs, the clay journals, combining, as they all do, working in a given direction, that give character and strength to our business, and, like the rubbing together of diamonds, we all become brighter.

PRESIDENT E. M. PIKE.

At these very pleasant gatherings we can reset the stakes a-down life's pathway and form a sort of boundary line between the past and an uncertain future. As we imperceptibly move down the years it is well to tarry a little and view the past and speculate as to the future, but the future piles upon us so rapidly that it becomes present, so we must seemingly deal with both, as they fly by us into the past. Here is prospect and retrospect, here ends a part of our journey; the rest is governed by circumstances, which we may in part, to some extent, control.

Some of us perhaps who answer now may answer roll call no more. Some who answer now fear or feel that they will not respond again. But the great multitude, in whom there is the vigor of manhood and health, live in the future. The past is the world in which the aged dwell, but it's the coming years and what is to transpire that holds the heart of the people on earth. They expect to realize their fondest hopes, whether of love, wealth or station, in the days that are to come, and we are not unlike our fellow-mankind, for as like begets like, we, too, catch the spirit, and fall in a part of the living stream.

The opening of the new year is high ground from which we can view both backward and forward. The year past may not have been as bright as some of us would wish, but the year now begun has a more encouraging outlook. But we have in our calling the "Rip Van Winkles," only some of them have slept out their twenty years, and still sleep—won't be wakened. They are still pugging their clay in a hollow sycamore gum, as set forth by our good friend last year at the meeting of this Association.

They have no use for conventions or literature pertaining to their business. The old horse at the sweep still moves in his accustomed circle, and, like his master, is getting older each year, and we see written more plainly than words, over the entire outfit, "Let well enough alone," and the result is they camp on the same ground that progress occupied twenty years before.

Even their plants are monuments of bygone forgetfulness, and, while their owners are hunting the woods for sycamore gums, the very things that they need and should most know are continually voiced at these conventions. To succeed we must give attention to the details of business in a business-like manner, with but one object in view, and that success. The rays of the sun focused on a piece of glass will melt it, so when our energies are bent on a single point the mind will burn its way through all difficulties.

To do this we need not follow a rut, but reach out for side issues, but not to hitch on so many as to retard the balance wheel, but to carry forward all issues in one successful harmony.

Newton once said, "The difference between myself and others is chiefly that

I have acquired the power of concentrating my attention more completely and to hold it longer than most men," and this is one great point of success. We must study our machinery in connection with our clays and their adaptability to each other, to bring forth what we require, and to do it with patience, not on the "cut-and-fit" order, but with system, and under the rule of cause and effect.

Brains are indispensable to a well-established business, and much more so if that business is in embryo. Think, study vigorously, clearly, independently; don't be an air-castle builder; keep low down, and if you should trip you won't fall so hard. Let Darius Green do the flylng, and lighting, too; you view him from afar off, and profit by his tumbles and mistakes. The honest, conservative, able thinker is a grand man. Gladstone was of this type; the same with Edison of to-day, and the very atmosphere in which these men move seems to say: "No excellence without labor."

I do not know of any branch of business that requires so much thought and hard labor as the clay business, for, unlike the most of business, we must learn it many times over. If we, perchance, change our location from the old clay pit we leave behind all of our experience, and the new one is liable to give us new puzzles, and much grief.

New combinations must be worked out, old theories are in danger of being exploded; ordinarily we can work from cause to effect, but in our business it works the other way; we see the effect, and then proceed to ascertain the cause, which we do not always find. Again, the older members of the craft cannot teach the younger ones, for the reason that new complications interpose which set at naught years of experience, and the main reason, as stated, is the ever-changing nature of the clay with which we come in contact.

But it is not all night. The day brightens. We have many helps which we did not have in the past. We have our State associations, as well as our great National Association of Clayworkers, composed of bright, brainy men. We also have a school at Columbus, O., supported by the State, where a regular course is to be had in the study of clay, where tests are made in every conceivable way, such as combination, crushing, fusing, abrasion, absorption, etc., presided over by Professor Orton, a young man, whose clear, bright mind seems not to weary in making the many experiments, which will come to our aid in many ways later on.

Ours is no mean calling. The clay industry is second in the United States, coal being first. Illinois is second in the manufacture of clay products, Ohio being first.

According to the late geological survey Illinois alone, in 1894, basing the size at four-inch, made tile enough to belt the earth, with 1,806 miles to spare.

Illinois ranks first in the amount of brick made in 1894, New York second. It may seem somewhat startling when we take the combined output of brick for 1894 of the United States, and assuming that the brick would surface four by eight inches, they would lay a walk around the earth eleven feet wide, Ohio, Illinois, Indiana and Iowa producing 38 per cent. of the whole amount.

The object of our associations is of two-fold nature—pecuniary and social. The pecuniary part may be present or remote, but I am happy to say that the social feature is always present, and as the present is all that we can command, it is well to make the most of it.

President-Elect Fawcett Plumb.

We often come in contact with a "wiseacre," who, with long-drawn theories, which he has deduced from airy nothingness, supported, perhaps, by a single instance, now and then, that we tilemakers are ruining this country by running off the water too rapidly and thereby destroying the evaporation, and cite as proof, with much flourish, the past two seasons.

It must be remembered that the greatest drouth this country has ever experienced was in the year 1854, before drain tile was known to any extent.

We find the State of Michigan has suffered in the past as much as any State in the Union, and she is almost surrounded by three great lakes, as well as numerous streams and inlets permeating its interior. The facts are that our country has suffered more from excessive rainfall than from drouth, while tile drainage is beneficial to both.

The rainfall percolates through the earth to the tile, creating and leaving innumerable pores. In dry weather these same pores, opened by action of the water, become breathing holes, all centering on the tile; these pores, or holes, create a draft through the tile, which brings night air laden with moisture, which comes in contact with the soil, which is cooler than the air, and the dampness is taken up by the soil and communicated to the roots of vegetation.

The earth virtually breathes, exhales water in wet weather, and inhales moisture-laden air in dry weather, thus showing that drain tile are the best safeguards against both floods and drouth.

From the foregoing we can see that our mission is not yet ended as beautifiers and bread producers of these broad and beautiful prairie lands. We will have a few more tile to make, notwithstanding the threatening danger (?), and settle down upon the truth of the biblical text and make up our minds that the moisture will still come from the heavens and be distributed alike "upon the just and unjust," obeying the laws of nature, for aught that we can do, barring not the rainmakers. Our duty will still be to reduce the surplus.

"White man brings rain," says the Indian. He brings it by multiplying the blades of grass which covers the earth with verdure, but this same white man has become wise enough to drain off what is not needed.

Now that we are assembled in this beautiful hall, as the guests of the good people of Streator, who have so kindly invited us here, let us make this Convention the banner one of them all.

I hope that every department of the clayworking industries of the State is represented here, and that each one will do his best to advance our mutual interests, for at best the time is limited for the amount of matter that should be discussed at this Convention.

I hope the new members and the bashful old ones will consider that they have the same rights in this meeting as the battle-scarred heroes, and exercise their rights by taking part in everything presented, and that when we adjourn we shall feel proud to know that we have gotten so much and have taken such an active part in the eighteenth Illinois Clayworkers' Association Convention. (Applause).

On motion of T. C. Tridel the President appointed J. J. W. Billingsley, A. R. Batley and William Trecker a committee on resolutions, with instructions to report during the final session.

THE QUESTION BOX.

On motion of Mr. Mamer the Secretary was instructed to provide a "Question Box." The President stated that some questions had been received from parties who were not able to be present. The first taken up for discussion was

"WHICH CLAY IS NEAREST TO FIRE CLAY, A SHALE OR THE CLAY MOST COMMON BRICK ARE MADE FROM?"

This question, said the chairman, comes from a brother who makes vitrified brick and wants to convince a customer that they are equal in fire resisting qualities to common hand-made sanded brick.

Mr. Plumb: Some of us have had experience with both soft mud motar and shale motar in our kilns—which is best? I think the clay containing the largest per cent. of silica or the nearest to a fire clay is best.

Mr. Cunningham: As a rule soft mud brick are lower in silica than shale brick. I have found in working with our cupola that mortar made from surface clay stands greater heat than shale. I think that brick made by the stiff clay process will last longer than those made by the hand process of the same clay.

Mr. Stare: I agree with Mr. Cunningham. Six years ago I made some sanded brick by machine, and they are better to-day than the hand-made brick.

Mr. Tridel: I built a kiln a few years ago with common brick laid in fire clay mortar. In two years the kiln was gone. I then built a kiln of moderately burned shale brick. It is in good condition now after three years' use.

Mr. Batley: A vitrified paving brick will not stand the same intense heat that a softer brick will. The common shale is a low order of fire clay.

Mr. Tridel: We have kilns in the crown of which are made from shale brick, moderately burned, and they stand the heat the best.

Mr. Loy: The shale burned moderately will stand the heat the best.

Mr. Batley: The lasting qualities of a brick, in the main, depend upon the quality of the clay. The shrinkage must be taken out before they will last.

Mr. Plumb: I don't like the answer that the shrinkage is taken out.

QUESTION: WHY IS IT THAT KILNS EXPAND LESS AFTER THREE OR FOUR BURNS' USE?"

Do they? (By many.)

Mamer Bros.: We have a kiln that at first bursted the bands on us for six consecutive burns.

President: Why does the kiln do it?

Mamer Bros.: We set our bands even with the start of the crown.

Mr. Stare: The bands were set too near the spring of the crown. Set a little lower and you will have little trouble.

Mr. Batley: We know that kilns expand at first, and we learn where to place the bands. Glass furnaces use silica brick, which are larger when burned than when made, and it is not best to set the brick too close in the lining of the kiln.

Mr. Cunningham: Which is best, a hollow or a solid wall?

Mr. Hammerschmidt: Most any solid wall will be a hollow wall after two or three years' use. (Laughter.)

Mr. Sidney: The band breaks because the entire weight of the crown, in its expansion, comes on to the top band.

QUESTION: IS IT BETTER TO BUILD A CROWN DOME SHAPE OR CONE SHAPE?

Mr. Hammerschmidt: Build it in a circle.

Mr. Stoll: In other words, is it best to have a high crown or a flat crown?

Mr. Hammerschmidt: The higher the crown the less breaking of bands you will have.

Mr. Batley: From my experience as a sewer-pipe manufacturer, I started out with high crowns, but high crowns are expensive luxuries if you have the fuel to furnish. I then tried lower crowns, and found that it was a great saving of fuel.

Vice-President J. W. Skinner.

Mr. Stare: My kilns are eighteen feet, with four feet rise of crown, and they look like they would stand for ten years.

REPORTS OF MEMBERS.

Mr. Hammerschmidt: I made fifty kilns and had good sales the first part of the season, but trade was very dull later on.

Wm. Stare, Mendota: I made 250,000 tile, have 400,000 tile on the yard and few sales.

A. W. Skinner, Varna: I have had about the same success as others. I shut down the 1st of July and sales have been light.

Mr. Cunningham, of Frankfort, Ind.: Business has been good the past year. The future prospect is not so good as I could wish.

Mamer Bros., Campus, Ill.: Business has been slack with us this year and prices lower.

Mr. Fate, of Fate & Gunsaullus: I am glad we are living. (Laughter.)

H. Lambert, St. Mary's, Ill.: Our sales have not been as good as they were in 1894. I have had to cut prices a little.

A Member:Have you made any more sales since you cut prices?

Mr. Lambert: No.

C. W. Raymond, Dayton, O.: Our trade was good the past year.

Oliver Tilbury, Towanda, Ill.: Trade poor.

C. Solfisburg, Aurora, Ill.: I sold 2,000,000 brick and made 250,000 tile, but the sales of tile have been poor.

E. M. Freese & Co., Galion, O.: We are doing fairly well.

Bonnot Company, Canton, O.: Our outlook is not so good as last year.

Mr. President: I made about as many brick and tile as usual. My tile are all on the yard, with nice drives through them. The grass has grown up through the lower courses, and I have no fears of their rotting, but the taxgatherer is likely to come and find them.

H. Martin, Dwight: We sold about two-thirds as many tile as in 1894.

Trecker Bros.: We sold about 400,000 brick and but few tile.

A. R. Batley, Bucyrus, O.: Business was not as good in 1894 and 1895 as in 1893, and prices are not as good as desirable. The cost of a machine on the floor is not the basis of the business, but it costs something to sell and set machinery.

Orestes Tile Works, Orestes, Ind.: We made less tile in 1895 than in 1894, but we had fair sales, although it has required a heap of work. We make some hollow block and had good sales.

Anderson Foundry and Machine Works, Anderson, Ind.: We have not run our works of nights. (Laughter.)

Streator Tile Works: We burned 550 kilns, and it is the first year we have had to shut down.

W. H. Straight, of Manhattan: We have a good stock of tile on hand.

C. C. Barr: We have not as many brick on hand as at this time last year, but prices are unsatisfactory.

H. Stookey: I am here, and will be glad to get any orders.

G. C. Stoll: I am with the Grant Park Tile Company in 1893 and 1894. Since that I have been with the Frey-Sheckler Company, having had fair success.

Adjourned to 1:30 p. m.

SECOND SESSION.

The Convention was called to order by the President, who then introduced Hon. Joseph Kopf, Mayor of the city of Streator, who said:

MAYOR KOPF'S WELCOME TO STREATOR.

I feel that you have done the city of Streator an honor in holding your Convention here. I therefore bid you a hearty welcome and extend to you the freedom of the city. And it is with pleasure that I assure you that our city, though not as large as some cities where you have met before, will accord you a most royal welcome. In conclusion, let me again bid you a hearty welcome, and may your stay with us be most pleasant and profitable. (Applause.)

Hon. Ralph Plumb, Streator, Ill., was introduced to the Convention, and read the following paper:

CLAY AND CLAY MANUFACTURING AT STREATOR, ILL.

The settlement of Streator was induced by the discovery of extensive deposits of coal here, and it is because of the coal-mining industry that this city and its railways came to have a place on the map of Illinois.

Its rapid and substantial growth furnishes new proof that profitable employment for labor is the seed from which our inland towns grow to importance. But it has not been mining alone that has furnished our artisans and laborers employment. It was soon found that the best of glass sand from the Fox river valley could be brought to the coal here at rates of freight that gave to Streator decided advantages over other points for glass works, and straightway glass making in various forms came into prominence and frunished employment to labor to an extent almost equal to coal mining.

—FREE RAW MATERIAL.—

It is conceded that the conversion of raw material into forms of usefulness, making two blades of grass grow where but one grew before by the employment of labor, produces real wealth; but in the development of a country it often occurs that an abundance of materials lie beneath our feet and before our very eyes without suspicion that these materials are to become of importance in supplying great needs and the foundation of great industries. So here in Streator. It is not many years since the first kiln of building brick was made at Streator, and then an experienced brickmaker was so full of doubt as to the quality of the surface clay found here that he could not be induced to undertake to make good brick at his own risk; but the attempt was made at the owner's risk, and was successful to the encouragement of early settlers. From this first venture we have kept moving steadily forward making new discoveries and experiments, until we found that we had not only good clay on the surface for making common brick, but in a short time it was made into drain tile and soon after our soapstone and shale were brought into use in the manufacture of sewer pipe, paving brick, wall coping, chimney flues, dry-pressed brick and sidewalk tile.

In sinking coal shafts at Streator we made other and valuable discoveries of shales, fire clays and plastic clays, so that we are using clays from a distance not less than two hundred feet below the surface. The lowest stratum of clay now used is a low grade of fire clay, out of which fire-proofing can be made as well as sidewalk tile and other valuable clay wares. In brief, we have here at Streator two hundred and thirty feet of coal measures, measuring from the soil at the top to the limestone formation at the bottom, nearly the whole of which is stratified fire clay, common clay, soapstone and shale, with three intermediate veins of coal. Fully one-half of this formation is adapted to the manufacture of clay wares, showing a large variety of products, and a still greater range when we realize how much can be done by special preparation of clays, by the washing and mingling of the experienced clayworker. The party who understands the value of washing clays will be able to demonstrate that many kinds of pottery can be ultimately made from these deposits found here at Streator. What is true of Streator will be found true of many other places in the State, especially in the coal measures.

Col. Ralph Plumb Streator, Ill.

We have developed our clay industries here only to a very slight degree compared to what the future promises. At present we have, in all told, some three hundred men engaged in our clayworking plants. The sewer-pipe works operated by the Streator Clay Manufacturing Company mine their own clay and coal from a deep shaft, and are producing sewer pipe, wall coping, chimney linings and other hollow-ware products used in building. The Anderson & Barr Company are making both paving and building brick from shale taken from a bluff near the Vermillion river. The Streator Tile Works Company are making repressed paving brick from shale lying above the upper vein of coal. The Eagle Clay Works Company is using the low grade fire clay previously referred to, obtained about two hundred feet below the surface and below the lowest vein of coal found here. This fire clay is well suited to the manufacture of hollow building ware, and it is also used for the manufacture of sidewalk tile, and, mingled with a surface clay or upper shale, makes an excellent drain tile. The Parker Brothers' tile factory uses the surface clay, and is manufacturing large quantities of drain tile. The Streator Brick Works Company have recently commenced the manufacture of dry-pressed brick from the shale just above the coal. Recent experiments have demonstrated the fact that one of the strata of clay lying near one of our coal seams is well adapted to the manufacture of roofing tile.

—PAVING BRICK SHALE.—

The shale rock used for pavers covers the first vein of coal in this field. This deposit varies in thickness from thirty to fifty feet, according to locality. It is, moreover, exposed in bluffs in many places, making it easily accessible and cheaply quarried, and is in such proximity to coal that the fuel required for its manufacture can be furnished to the plant without even loading it on the wagon. The quality of this shale as a material for making paving brick has been demonstrated. The pavers now made at Streator, as is shown by thorough testing in the laboratory, are, in transverse strength, breaking load, impact and abrasion, specific gravity and absorption, fully up to the standard adopted for brick paving in Chicago. It is insisted that in the Streator fields is found all that is required for success in the paving brick industry, viz.: good shale, easily quarried, cheap fuel, good facilities for reaching by rail surrounding towns where brick paving is being used, also several competing railways running to Chicago. These facts all point to Streator's right to claim recognition among the paving brick producing points of this State. It was then our important coal deposit found here brought Streator into prominence. It was glass making that first made use of our cheap coal and gave this locality some rank as a manufacturing city. It will be our clay works that shall give us a still greater prominence as time passes. Coal, clay, glass—a trinity of factors in our progress and welfare, and the greatest of these shall be clay.

—A GREAT INDUSTRY.—

The manufacture of clay wares in the United States has already attained large proportions, as shown by statistics of clayworking industries reported to the Department of the Interior, the total value of the output being more than sixty-five million dollars. The goods enumerated are as follows: Common and pressed brick, ornamental brick, fire brick, vitrified brick, drain tile, sewer pipe, terra cotta work, earthen ware, stone ware and other miscellaneous articles. Of common and pressed brick, 6,132,420,000 were made, a quantity sufficient to make a walk around the globe ten feet wide, and if to this be added the 457,000,000 of pavers reported, the walk would be eleven feet in width. In this statement Illinois is near the front of the column of the States, Ohio being the only one ahead of us in the value of its clay products.

The number of working plants in Illinois was 697. Total value of product, $8,474,360, which is almost 13 per cent. of the value of the output of the entire Union. This showing, flattering as it is, will no doubt be greatly improved in the immediate future, as our old-time prosperity returns.

The miles of street paving that must be used by our cities and towns to cover the prairie soils of their streets, to say nothing of the needs of the great metropolis of deep mud and poor drainage, called Chicago, which will call for pavers, must make a large demand for this class of clay goods. It is also evident that brick buildings are to a greater extent than ever before taking the place of wooden structures and modern architecture demands pressed brick fronts and terra cotta trimmings without, with clay shingles for roof and enameled tiles within. The materials for making all these articles are found in this State. Our most intelligent farmers are finding that to thoroughly tile land is to double its value, and they are sure to become more and more consumers of tile. Other uses will doubtless be made of clay goods not yet dreamed of, but the right kind of material and the requisite skill to manipulate it sufficiently for all demands will be forthcoming. In the museum at Liverpool specimens of clay ware first manufactured in England are exhibited side by side with the finest goods now produced in the works of that city so famous for its ceramics, which furnishes an object lesson of encouragement for clayworkers in this country, and, if you please, in Illinois. The first attempts made at Liverpool were like the wares made in the potteries of La Salle county. In New Jersey and Ohio table ware is produced that vies in beauty with Liverpool china, and even in this State there are already in operation establishments that turn out large quantities of the common descriptions of chamber sets and table ware. Who can say, then, to what extent this industry may be perfected and enlarged, especially since the different qualities of clay required for making good ware are already here, and the railroads of the State are ready to deliver these clays to any point desired? This Association builded wisely when it enlarged its scope sufficiently to embrace all clay interests in the State. Allow a citizen of Streator to thank you for coming to this city to hold this, your first gathering away from the State capital. Your coming has brought to us the opportunity of making your personal acquaintance. It will emphasize the importance of this now growing industry in our city. This departure of yours will be followed by invitations from other cities of our State, each one of which will vie with the other in making the next and later meetings of more and more importance, until the time shall come when your State gatherings of the clayworkers of the State of Illinois will take rank with the National Association of Brickmakers, not only in size of gathering, but in the interest manifested. The clayworkers' object, first of all, is commercial success, but this is impossible without good goods, and these can only be had by using good material, good machinery and scientific treatment throughout. This means a knowledge of nature's laws that is applicable; therefore the successful clayworker must become scientific. Geology tells us how clays are produced, and the important part they perform in "making the rough places smooth," so that the dry land can become tenable for the abode of man. It moreover shows the process of disintegration by which the feldspathic rocks, especially granite, gneiss and crystaline rocks, are pulverized into molecules, and by the action of ice and water deposited as clay beds where found by the shaft sinkers of to-day. Verily, the mills of God grind fine, if they do grind slowly. It is thus that the valleys are exalted and the hills made low. This grand work is still going forward, impelled by the same forces that have worked hitherto, and are still working out the beneficent purpose of the infinite.

SECRETARY G. C. STOLL.

Thus does industry, intelligently pursued, even though it be clayworking, not only increase wealth, but also hastens the time for that exaltation that must precede the higher civilization of the race, for which all should strive. (Applause.)

On motion of Mr. Loy, seconded by Mr. Eudaly, a vote of thanks was tendered Mr. Plumb for his interesting contribution.

Secretary Stoll: The next on the program is a paper by Mr. W. M. Pratt, who is unable to be here with us, but has sent me his paper, which I will read for him.

FROM CLAY BANK TO KILN.

By W. M. Pratt.

Mr. President and Gentlemen of the Convention:

Some time ago I received a letter from our Secretary, Mr. Stoll, requesting me to prepare an essay for the Streator Convention, and after thinking some time for a consistent excuse, also one which I thought he would readily accept as the conclusion of our chapter, I wrote him, saying that he was selecting rather poor goods for anything that would be interesting and instructive as well. But soon after I received another letter from this same gentleman, saying that a secretary never accepted no for an answer under such circumstances, and as this was final and supreme I could say no more, so chose "From Clay Bank to Kiln" as the subject of my writing.

As the year just past was my first experience in the manufacture of brick and tile, the most of this Convention can form a pretty accurate idea of my troubles, and I can say that I was no exception to the rule, as my troubles were many, seemingly, but as I came to study the philosophy of the tempering of clay, the effect which was produced by being handled, and, still further, the machine's action in regard to poorly tempered clay and that which was well tempered, my troubles disappeared as time passed by and as I became more familiar with the details of my business. But, gentlemen, do not imagine that I stopped here and sat down composedly, but, instead, I found that it required not a little thought and study to oversee the business and be able to satisfy my customers as well as myself.

Pardon me for mentioning one or two

things here before proceeding further. After making the purchase of my works I commenced reading about other clayworkers and decided to attend the Springfield Convention. While there I met a jolly class of men representing the different industries of Illinois, besides gaining a large amount of useful information. When at home in the spring I was favored by visits from representatives of clayworking machinery of all kinds, and I should have every one, too, you know, gents.

I will now take up my first experience in trying to make tile.

After tearing down a portion of my summer sheds and erecting a two-story frame building, 30x80 feet, equipped to heat by steam, both live and exhaust, I also built a twenty-two-foot downdraft round kiln.

Now putting my men at work with cart and spades, I had the clay pit filled with clay, wet occasionally as they were filling; then we were ready to make tile, such as was never heard of before, of course, but as the clay was not related one spade to another, so far as temper was concerned, you may imagine, naturally, that we put the best tile back as culls and run them through again to temper. After we had made about five hundred of this kind of tile, we fed them through with fresh clay, and in this manner we managed to empty the clay pit. This being my first experience, we, or I, rather, did not know but what it was the usual way, but I soon fell to the idea that it was profit out of pocket.

Convinced that the clay must be allowed to remain in the pit a longer time to thoroughly temper, or do the tempering at the bank, I determined to try the latter by laying a line of one-inch pipe to the bank from the factory tank, and controlled by a valve so that it could be worked at pleasure.

I removed the soil from a convenient width of clay, say three feet wide, and flooded this strip several times, according to what size tile we wished to make, then allowed it to stand for about three days. When we began to work the clay we found it to be of a very even temper and of a gummy nature, making the best of tile and brick. Our per cent. of culls, when using the clay so tempered, was very small.

This result proved to me that without some means to crush the lumps and reduce them to a very small particle, and then, by thorough pugging and mixing by means mechanical before passing into and through the machine and dies, it is impossible to make a strictly first-class article.

Of course, I do not mean to say that any and all clays will make good ware by tempering them at the bank, but I will give it as my preference to do so. Even with my practice of wetting the bank I could not always have my clay free from hard lumps, as the clay is a joint clay, and the water would seek the seams in the bank, and consequently it would leave the bank and run out at the side, so the water escaped before it had done its work. Again, along the side of the bank it would dry out and leave the clay hard in a distance of one or two inches. This we overcame by using a hand sprinkler, keeping it moistened ahead of the work.

In mentioning the time as three days to soak the bank, I use that as arbitrary, it being sufficient in my case.

Thinking that my observations with our machine and clay will be of use to perhaps some one, I will mention a few.

We were troubled sometimes by the machine winding its clay, especially on small tile, sometimes doing nicely. The cause of this I found to be in the propeller auger, either being clogged in one bit by roots or hard clay which had not been cleaned out, or because one bit of auger projecting out closer to the die, and consequently forcing the clay out further than its mate. On large tile we were bothered by the column of clay cracking in direction around, the tile produced by the clay being too short to remain intact as the auger was pressing on a different portion of die. The cracks, if of a very serious nature, will, of course, ruin them, and back they go. We had, therefore, to be careful about going too deep for large tile, as the lower we used the shorter it gets.

W. M. Pratt, Earlville, Ill.

A remedy for this in buying new machinery is to buy a machine having at least three bits on propeller auger, as this pattern distributes the discharge and pressure more evenly around the die.

We may make a fine tile as far as the column is concerned, but unless the table is properly set in relation to the column of clay, you will make a tile uneven in length and likely not to be cut off squarely. If a tile is not properly cut as to length and squareness of ends you cannot help but have considerable trouble in handling and setting them in kiln, as I never saw a tile shrink or square itself setting in shed to dry. We often hear a tile ditcher say that he does not like Jones's tile simply because they cannot be laid in the ditch without considerable adjusting after they are in the ditch. This trouble can be best remedied by making the purchase of a good automatic table, where the columns of clay can have a good, full bearing on pallets, so they will not be twisted out of shape, and one which requires a minimum amount of power to operate.

Having spent most of my time thus far upon tile, I will now mention something in regard to brick.

The requisites of a good brick differ from that of tile in one particular, namely, sand; and quality of clay must not be lost sight of. A brick clay, to give it a nice color, should be of a yellow color, and to allow of its being readily broken where desired, it should be liberally supplied with sand. Sand, also, is a benefit in other ways as well. It prevents the cracking of brick when drying, to a certain extent, by giving to the brick a more porous nature, thereby allowing the moisture to equalize itself more readily, and furnishing a freer means of escape. Again, we find that a brick treated with sand shrinks but very little in drying and burning, and prevents the springing of same in a side-cut ware. Just to what proportions sand can be employed in a brick before it would be a detriment I cannot say, as I know I could not do the testing which I wished to because I had a machine having an improved dry die attached, and that would give the alarm every time I got too much in by feathering the edges and cracking the ends the whole way across. You probably know how this makes one feel when you are trying to use all you can and then see the beam go up with a pit full of more just like it. I will try to avoid this fooling by using a lubricated die, which will reduce the friction on ends and corners of a side-cut brick.

We all know what a nice thing it is to open a kiln and find that, for some reason, the corners of our brick, if a side-cut, fall off, may be one, may be two and three; yes, even four corners will fall off when we handle them. Now, what is the cause of this defect? I find the greatest trouble by laminating is caused directly by not having the clay evenly tempered. If we introduce into the mill clay which is real wet and that which is considerably dryer the two quantities of clay do not have sufficient room and time to mix, consequently the clay is pressed through the die in the form of a roll, or square, if you please, being made up of layers of wet and dry clay. And in some extreme cases I could distinctly trace a layer of water between the layers of clay. Now, as these brick are placed on pallets to dry, the drying process commences as soon as so placed, so that the moisture is being given off, leaving the layers of uneven temper, to shrink unevenly, it being more or less, according to the amount of water in each. We can now see what will be the natural consequence—a brick nicely laminated. By handling these laminations become more apparent, finally falling off altogether. By using a dry die this trouble is magnified because of the extra resistance upon the ends and corners of a side-cut brick in passing through the die. The center of column, having less resistance, will slip by the ends, making two distinct surfaces of clay where there happens to be a surplus of moisture. I am now speaking of an unevenly tempered clay. Where this slipping occurs it will never reunite and is held together at the edges only.

We may increase the laminations of brick by allowing the drying process to proceed too rapidly, thereby drying and consequently shrinking the corners away from the body of the brick. Before I conclude I wish to say that to be a first-class "brick man," without any laminations, having an A1 bluff color, and no perceptible shrinkage, we must be well made and tempered, use nothing but improved methods, but not forgetting to secure a good quality of sand.

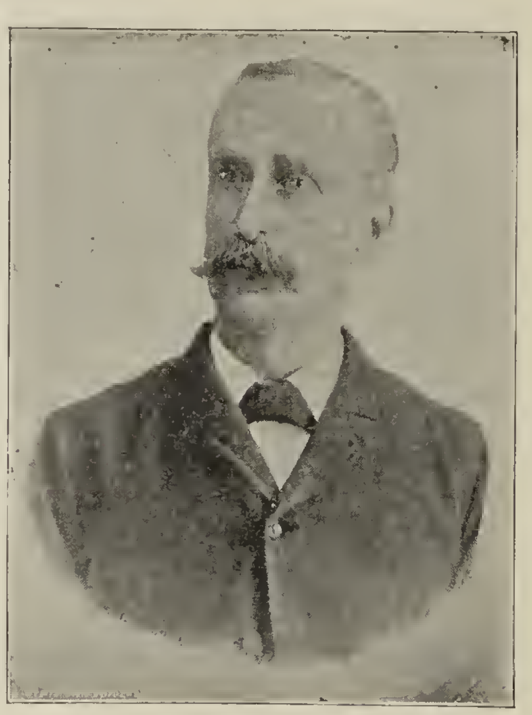
President Pike: The next number on the program is an essay by Thomas Townsley, who, I am sorry to say, is detained at home by sickness. The Secretary will read the paper.

THE BURNING OF CLAYS.

By Thomas Townsley, Alexis, Ill.

The burning of clay is, I suppose, as old as the human race, and has been discussed by experts in the business for hundreds of years, and yet we do not make the progress that is made in other branches of business. When we look at the improved machinery we have at our command, the methods of utilizing the clay right from the bank, the improvement of transportation and the convenience of drying and handling brick we are lost in wonder and thought that we have not made more progress in the burning of clays. While all these improvements are of recent date, or comparatively so, the burning has made little or no progress for fifty years that I can see. Of course, we are getting better results from our kiln than we did years ago, and why? Because we have learned it by long experience and hard toil. I remember when I was a boy we did not see any such burning as we see now, and I think that is the case pretty generally in America. Yet we had the same kilns in those days as we have now. When I read of the success of the ancients in the burning of brick and pottery, I am still more surprised. The Tower of Babel, for instance, on the plains of Shinar, was built over four thousand years ago, yet the brick are in a good state of preservation at the present time, and the mortar adheres to them in such a manner that it is nearly impossible to separate them without breaking them apart by some power beyond the human.

Articles of pottery, thoroughly burnt and in good state of preservation, have been axcavated on the plains of Babylon, in Egypt and Herculaneum, that prove them to be older than the Roman empire or the civilization of Greece. Of course, we are not able to say what system of burning they had (evidently a good one). In fact, when we read of the beautiful pottery, house tiles and other ornaments, with their beautiful designs, different sizes and colors, we are inclined to think that the burning of those days is a lost art.


Thomas Townsley, Alexis, Ind.

But we are here, and I do not think that we can afford to go to that country to investigate; in fact, I do not know of any brickmaker who has made enough money in the last two years to take a trip of that kind, and I think we will be as well off to stay at home and learn to burn the kilns we have better than we have heretofore. I find a great deal of dissatisfaction arises from our own impracticability as burners. We imagine that every kiln we see is better than ours, and that the owner is getting better results from his work than we are. It is right to investigate at home and abroad. That is what we are here for to-day—the exchange of ideas. If you have a better kiln than I have, I want it, and be sure, at the same time, that it is my kiln, and not me. There is quite a variety of kilns in use—down-drafts and up-drafts, mostly down-drafts—and I honestly think that the old style of down-draft kiln, deep bottom, a fire box to every four and one-half thousand capacity, outside stack, fire pockets, and not grates for coal, has not been superceded yet, especially where the ware is to all be hard burned. When they tell me kilns must have cold air flues and dampers, I say, "Oh, humbug," gentlemen.

The next thing is, How would I regulate the heat of these kilns without the flues and dampers? If your kiln draws more on one side than on the other, regulate it by setting your brick closer on that side. If the side draws less, set the brick more open. Much can be done by arranging the bottom of the kiln and the flue to the chimney to obtain the uniformity that is very desirable in any kind of burning. The question arises, How are we to do when we have three or four windy days, the wind blowing from the same quarter all this time? We close the doors as close as possible on the windward side, and partially close the ash pit, and we seldom see any difference in our kilns.

I contend that all the cold air we let into the kiln deducts from the heat of the kiln by cooling it; also, it does more or less damage to the ware.

The burning must be a steady process to get the best results; at least this has been my experience. But this is not all; there is much painstaking necessary to get a good burn. In the first place you must understand the nature of the clay, and what it will stand in the way of steaming off, as we call it. We formerly used wood to steam off, but we found in burning tile that we could not get our tile sound, so we tried coal. Of course, it takes longer, but we had good results. The same is true of brick, but not to the same extent; in fact, no definite rule all through can be given, so that no matter how long experience has been obtained, it has, more or less, to be learned over again when we change locations, and if we depend on analysis and scientific work as our guide we will find that we are in the same perplexity of the young housewife, whose husband, when he came home to dinner, found her with a cook book in her hand reading up on cooking, and the fire in the stove not started.

We find it difficult to get good burners and honest men, men that will not take advantage of the boss. A goodly number of men at nights will lie down to take a nap between firings and not wake up again for probably two or three hours. These men, we find, let the kilns go back instead of forging ahead. A good way to catch such burners is to slip down to the kiln just before daylight and see how they do, and if you find them asleep take a bucket of good, cold water, the colder the better, and douse them. You will be surprised how quick a man will wake up and will not have any more sleepy spells that night. I can guarantee this cure, as I tried it myself and it worked like a charm, and in winter, too.

We usually burn our kilns from five to six days, five days for tile and six for brick. We have four of them, from eighteen to twenty-four feet inside, and we like the twenty-four feet the best. I would advise any one going into the business, and not thoroughly acquainted with burning, to build those kilns and adopt this system of burning, as it is much easier to learn and will give better results. He should build an outside stack, which is much better than a center stack, especially for brick. The stack usually needs to be fifty feet high from the level. As I said before, the burning must be done systematically to obtain the best results. Every fire must be kept at the same heat, and kept steadily at it, too. The last twenty-four or thirty-six hours requires great care so as not to melt the pockets inside the kiln or injure the ware on top by overburning. It must be kept at the fullest heat it will stand and held there to the finish, in order to get the bottom of the kiln hard. Of course, it depends upon what kind of ware you are burning; if fire brick, you can carry a much higher heat than on building brick.

Much has been said about burning kilns in three or four days, but I could never make it practical with my clay to burn in less than from five to six days. I do not think it advisable to burn in less time, from the fact that better burning is done by going steadily along, and it is not near so hard on the kilns. I am satisfied they will last much longer if treated in this way. To tell when a kiln is burned we take out a trial piece at the top of the kiln and see the color of the blaze in the flue at the bottom of the kiln. Another very important part is cooling off. I am very sorry to say that I have spoiled many a kiln by cooling too quickly, sometimes through carelessness, but oftener through necessity. What I mean by spoiling ware is that it seems to be glazed and not have the metallic ring that we all recognize in a No. 1 brick or tile. If we could have enough kilns to burn steady, and cold steam, we would have much better results than we now have.

Much, however, can be done in the mixing of clays to shorten the time of burning and cooling, especially common brick. We all realize that our clay is too fine grained and gives us much trouble in drying and burning, and in many cases we have nothing that we can use to help it. I am happy to say that I overcame that trouble by putting in one of Thomas Peterson's (of Galesburg) dry-pan crushers. I crush up all my cinders, brick and tile rubbish, broken crockery ware and sand rock, and mix from three to four cart loads to each day's work of ten thousand brick, which makes a very nice, but gray, brick.

Much can be done in mixing clays, also. I am using a black gumbo clay to make drain tile that I could not use for anything before I got the dry-pan crusher. Without the grit it would break in drying, even in a cellar. I can now dry and burn it without any trouble, and it makes a good tile and saves me hauling potter's clay one and a half miles.

"General Dispatcher" Wm. Hammerschmidt, Lombard, Ill.

The Monmouth Sewer-pipe Company knows the importance of mixing clays. They mix about one-third or one-fourth common clay from the surface with their fire clay. The results are their pipes will stand a higher pressure without bursting than any other sewer pipe in the country that has contested with them, and it is because the surface clay is a weaker body, and the one is necessary to the other in order to make a compact body that will stand burning at the intense heat required to burn sewer pipe satisfactorily. The surface clay becomes fused, and, I should say, solders the coarser grained clay together. We must understand that the clays must be thoroughly mixed, and so it is if your clay is too fine; it must be mixed with a coarser clay so as to be of practical use in drying and burning to advantage. This is the case where the clay is of a very strong or plastic nature; if the clay is of a loamy nature, and cracks both in drying and burning, I do not think it can be remedied to make it a success for brick or tile use.

Burning up-draft kilns comes next in order, though not the least in importance. They are used in burning building brick. They need much patience and experience to get the best results. We find very few men capable of burning these kilns successfully; in fact, few are capable of learning it.

Some men with long experience never amount to anything but helpers. Experts in this line will always command big wages. Brick can be burned this way (although it is a process of itself) successfully for about 60 cents per thousand when coal on the yard is worth $2 per ton and all conditions favorable—that is, with good casing and the weather fine. I am often asked which is the cheapest to burn, wood or coal? I will say, if you can get good hickory or oak wood for $2 per cord on the yard it is about the same. Good soft wood is, however, the more suitable, as it does not fill the arches with coals, but it should be bought at nearly half the price of hickory or oak to be as cheap.

The steaming-off process takes usually about three days, but that depends on what condition the bricks are in when set and how open they are set. Generally, in this part of the country, it pays not to have the brick too dry, and in the yards where they use no mixture with common clay it pays to set the kilns when the bricks are yet damp.

I have frequently seen clays that would crack in the shed, apparently dried, but it would not be much noticed until the brick were burned, and very often this trouble is laid to the burning. In clay of this kind great care is necessary in setting to see that they are set when a little damp, and to close up the arches of the kiln during the time required in setting the kiln in order to keep the brick from getting too dry in the arches. Care is necessary in steaming off, as the steam can be forced out too rapidly as well as too slowly. In either case it will make the brick dead, or without the ring. We usually set our brick five on five or ten on ten, with a closer platting, open when steaming off, then closed, and where the fire is well through the top of the kiln cover it all over, except the heads and ends, with fine clay that is damp (not too fine), and do not tramp it solid, but leave it unpacked, about two inches thick, and we find that this plan very materially lessens the cost of fuel, as well as saves the arches by keeping them hotter and at a more uniform heat, which cannot be done if the top of kiln is left too open and fire all rushing out, and it is almost impossible to get an even settle if the fire is allowed too much draft. It will work into the chimneys.

I always aim to get the heads settled first; then cover tight with dirt, and you can easily get the center afterwards.

I found it required nine days to burn the necessary color and hardness, although I frequently hear of its being done in five or six days, but I failed to see any first-class burning done in that time. The last two or three days require great care to avoid letting down the arches; as I stated before, a close top (not too close); the kiln must have a reasonable draft, and keep the doors closed (if you want to save the mouth of the arches), and keep hot; never, while under fire, let them get black. Of course, grates are necessary for these kilns, and the best grate I know of is old railroad iron turned bottom side up. These bars are five feet long, two bars to the arch. It makes the best kind of a grate, and will outlast several cast grates, as they will not burn out nor the clinkers stick to them. I pay 1 cent per pound for them, which makes them cost $1 per fire. It is necessary to have an ash pit the length of the grates and about ten inches deep, and never allow the ashes to fill it up. We clean out the pit every twelve hours.

I have generally found it necessary to steam off with wood. (Applause.)

—DISCUSSION.—

Mr. Mamer: I am a young man, and would be glad to hear from others. I do not agree with all the writer has said.

Mr. Hess: I see that he has not been in the brick business long, or he would not have as much hair on his head. The paper belongs to a back method of manufacture. It is out of date.

Mr. Cunningham: The title of the paper was "Paving Brick," but I was a little drowsy and I failed to hear much about the subject. It looks a little like the Chair had set up a job on us by sending Mr. Eudaly out of the room to cut off discussion. (Uproarious laughter.)

Mr. Eudaly: There is no subject that stirs clayworkers so much as the subject of burning. I say that much, laying jokes aside.

A Member: I do not indorse the writer's view of discarding grate bars.

Mr. Eudaly: There are a few things to be thought of in the handling of coal. The volatile qualities of the coal are about 30 per cent., which we call the heating quality of the coal. The balance is coke, or the solid, excepting some waste. We must have the oxygen of the air strike the coal at the proper temperature. A coal that melts and runs easily can probably be burned better if you use no grate bars. It is claimed that too much air will waste the heat in burning such coal. With other coals you must get plenty of air into the burning coal in order to secure the best combustion. If the flames draw out at the tops of the chimneys I know fuel is being wasted. I do not worry so much about smoke, but the escape of the flame means a waste.

Mr. Richardson: I do not think that we do justice to the writer in the discussion of the paper as conducted. The writer of the paper may be so situated that his advice is eminently sound. Besides, the majority of the brick and tilemakers are doing the same thing.

Mr. Batley: I learned my brickmaking in Wales. When I first learned we used no grate bars. Then the rocking grate bars were introduced, and we found that men could tend more fires and burn more cheaply with than without them.

Mr. Stare: I have used grate bars and have abandoned their use for the reason that I get better results without them with my clay and coal.

A. R. BATLEY, Bucyrus, Ohio.

Mr. Batley: The writer of the paper said he had abandoned the use of bars and that air flues are humbugs. That is what I understood from the paper.

Mr. Eudaly: If I wanted to burn common building brick I would use updraft kilns. I hope some man will invent a furnace that will burn coal, all kinds of coal, without grate bars. It will be a great boon to those using boilers on our steamboats, ships, and the great boilers for our factories. Then they could all be dispensed with.

A Member: I was present when two kilns were opened, one of which had been burned with grates and one without. The one burned with bars had checked brick and the one burned without bars were not. The grate bars could all be dispensed with.

Mr. Cunningham: I think the majority of kilns have too little grate surface.

Mr. Stoll: I would rather fire without grate bars. I had to give a good deal of air into the coal to burn it well, and I can do it better without bars.

Mr. Eudaly: I would like to know whether it is the bars or something else in handling the coal. If you will be at the expense of putting in rocking grates you can tend five kilns as easily as one without grates, and that, too, with a great saving of the fuel.

Mr. Batley: If you will use a rocking grate you will find that you will have no trouble with clinkers. It will take something more than grate bars; it requires brains.

Mr. Landrum: That is it; it requires brains. A little common sense goes a great ways in burning.

Mr. Quandt: I use square kilns for brick; use them without grate bars. In the round kilns I use grate bars. See very little difference.

Mr. President: After experimenting for seventeen years, I say that too much air is as fatal to good combustion as too little. When I hear a man say that he has splendid draft, that the flame comes out at the top of the chimneys, then I want to shut off the draft. How do I do it? By drawing out the grate bars and making scrap iron out of them. So, you see, great minds differ.

Max Wolff: It's a pity Mr. Eudaly and President Pike can't sell brains with their kilns, for many kilns are ruined by and bad burns are the result of ignorance and negligence by those who have charge of the work.

Secretary Stoll: The next on the program is a paper which I will read in the absence of the author.

HOLLOW BLOCKS.

By A. T. Griffin, Twin Bluffs, Ill.

The artist in clay has been rapidly coming to the front of late. Twenty-five years ago, when Chicago commenced to rebuild upon her ruins, brick was most largely used of all materials, as it had been proven by that ordeal of fire to be superior to stone or iron, but clay formed no part of the ornamentation.

We think no building of any pretensions can be pointed out, built between 1871 and 1880, with ornamentations not of stone or metal. But the last decade has witnessed a complete revolution in this regard, and for several years past probably three-fourths of all first-class structures have burned clay in the wall and ornamentation.

The genius of architect, designer and sculptor has found a larger field in this direction than in any other, as seen in the magnificent specimens of terra cotta in all our large cities. In this onward march of progress and activity in the clay industry we wish to present the claims of a new building material worthy of the age in which we live. We find this in hollow terra cotta building blocks.

Every intelligent person will recognize the value of hollow walls as furnishing security against dampness, cold and heat, but how to produce this material in artistic form, having unquestioned strength, at reasonable cost, has hitherto been an unsolved problem.

For more than fifteen years hollow fire-proof blocks for inner walls and ceilings, to be covered by plaster, have been largely employed in all the notable public and business structures of the country. The test of strength demanded by architects and engineers in spans and arches has established the value of the hollow fire-proof blocks in this regard.

In a series of elaborate tests made by Professor Orton, of the Ohio State University, the result was reported as follows:

Plastic clays, well burned, have an average crushing strength of about 6,900 pounds per square inch, and shale clays average about 7,300 pounds. These clays were, as compared with ordinary brick clay, nearly moisture proof; enough so to be secure against frosts, and, consequently, to secure a perfectly dry wall, if in hollow form.

It is not claimed that a hollow block is as strong as a solid block of the same material, but we do claim that cases are rare where 3 per cent. of the compressive strength will be used. The Pittsburg Testing and Laboratory Company have found blocks of the most common size (8-14x8-14x16½) enduring a compressive strain of over 183,000 pounds, which is nearly 9,000 pounds to the square inch of the vertical walls of the block.

The average strength of these blocks is only estimated at 6,000 pounds per inch, and it will be readily seen that the claims are modest. Let us illustrate:

If the twenty-story steel frame Masonic Temple of Chicago had an outer wall of these blocks, the entire weight of the wall resting on the lower tier of blocks would demand about 3 per cent. of their crushing value, and the demands upon the foundation of the building would be greatly lessened.

As to clays, it is evident that we must have clays of largest strength, clays of suitable colors to meet the present requirements, viz.: buffs, graded to browns, and also a clay of moisture resisting materials, and this means a clay that will vitrify partially at not too high a temperature. We find these several qualities combined in plastic or bastard fire clays and in shale clays. The former is our main reliance, but the latter is of great service, and used in combination for securing deeper shades of color and mottled effects.

The machinery employed is the same, so far as preparation of clays before the forming process, as would ordinarily be employed in working the same clays. To this machinery is added a block-forming machine and a cutting table especially adapted to the block, and an outfit of suitable dies for the various forms and ornamentation. We have exclusively the Durant process of forming ornamented hollow blocks, which dates back several years. They have at this time a complete system of hollow block building construction, which includes the original patent, that covered broadly the principle of ornamenting one or more of the faces of the hollow block, while the clay was still held within the retaining walls of the forming die, and also numerous other patents of later date.

TREASURER WM. STARR.

Experience has shown that one forming machine, with table and dies and suitable machinery for preparing clay to supply the machine, will produce on the average four thousand blocks of the size before mentioned in ten hours. This number of blocks, the equivalent in bulk of 64,000 common brick, will weigh about sixty-two tons, while the brick would weigh about 160 tons net. Thus it will be seen where the economy comes in when shipping.

As to the expense of producing, it must depend largely upon the cost of clay, fuel and labor. This would vary greatly in different localities, but it can safely be estimated that these blocks, compared with pressed and molded brick of equal grade, will cost less than one-third of the cost of the brick, and, as against an equal surface of no better grade of terra cotta, will cost less than one-tenth as much, while having great advantage over both in shipping, as they weigh but little over one-third as much.

To summarize advantages, we have in hollow terra cotta blocks a superior building material because offering greater resistance to cold and heat, the comparative low cost, the light charges for transportation, lessened cost of laying and all handling, and the ornamentation by laying color in background of figured surfaces, which cannot be said of any other clay building material.

As against other clay industries, a wider market because of lighter freights, and, for the same reason, the ability to locate works at one's market. (Applause.)

DISCUSSION.

Mr. Powell, of Orestes, Ind.: I have made a few blocks, and it is a new thing with me. I constructed a building out of them, and in five weeks I sold enough of them to build four other buildings. It has proved a very profitable little side issue. In making them, cut them 17 inches in such clay as mine.

Mr. Mamer: We have made a few hollow blocks and recommend their use. We make a block 6x8 inches without any cross or inside wall. The shell is an inch thick.

Mr. Powell: I think the cross-section keeps the block from twisting. I sold blocks for a two-story building, and the masons claim that the walls were more firm than common brick walls.

Mr. Batley: Our people put up a building with hollow blocks, 26 feet wall in height. It supports a heavy truss roof, and they are well satisfied with it.

The speaker then named a number of large buildings which have been built of hollow blocks, then adding:

I believe that hollow blocks have come to stay, and there is a large field for this industry as a side issue, and it will help many.

A paper written by F. Lehman, of Chicago, Ill., on "Washing Brick Clays" was read by Mr. Ashby, as follows:

WASHING CLAYS.

By F. Lehman, Chicago, Ill.

Mr. Chairman and Gentlemen of the Illinois Clayworkers' Association:

I occupy, probably, the unique position of being a brickmaker, running a brick works in conjunction with my partner, Mr. Kohlsaat, for demonstration purposes only. Last season we leased some land at Chicago and erected a brickmaking plant to show the working of a portable continuous kiln invented by me, but I am not here to talk about any patent of mine; the subject of my paper is one which, while it is of great importance to many, if not most, of us brick and tile, drain and roofing tile, but especially roofing tile manufacturers, is free and open to all the world, without any restrictions or royalties attaching to it.

When I came to Chicago from the far West to visit the World's Fair and was, like many more, captured and held by the great city, I was nevertheless astonished to find that in a city so renowned for its enterprise and push the brick industry, with all its immense possibilities, was in such a crude state, both in respect to the process of burning and the quality of the brick itself.

The brick are very unattractive in appearance, being full of limestone. This causes a large amount of breakage and unfits them for many purposes, of which I will only mention one—foundations for buildings. A brick foundation is the cheapest and most durable of all, yet foundations in Chicago are always made of stone. Now, a great field may be opened by improving the quality of the brick and fitting it for its legitimate purpose of building foundations.

I tested the clay and found it of a most excellent quality; in fact, I have seldom met with a better. The only thing necessary was to remove the lime, which I decided to do by the process of washing, or slumming. It is a process with which I am thoroughly familiar, although I have never seen it employed in this country, except in our own yard. In Denmark, in and about the city of Copenhagen, the conditions are similar to those of Chicago. We first find a blue, limey clay, and below this limestone. At the Friedrichsborg Brick Works, under the management of Director Koehler, they manufacture from 25,000,000 to 30,000,000 bricks yearly, and a very extensive slumming plant is in operation.

We all know that to get a good product from pure clay homogeneousness is of the first importance. This is usually obtained by working with granulators, rolls, pug mill, etc. The Chicago product shows that this way of preparing the clay cannot be relied upon to give satisfactory results. The brick is checked and cleaves in layers. But the great evil caused by the presence of impurities and the scaly structure of the burned brick are removed by slumming, and at the same time the clay is intimately mixed and rendered perfectly homogeneous.

I am aware that this end can also be accomplished by the dry process—that is, by a very complete crushing and screening of the clay—but the wet process is, in my opinion, cheaper, simpler and more effective. We therefore decided to employ this.

As a matter of course, it is necessary to have a sufficient quantity of water, and there must be room enough, but there are very few brickyards where there is not ample room.

To any one that contemplates slumming his clay, the water question is the first and apparently the most weighty one, but this is not nearly so serious as it appears, for the water can be caught and used over and over again. The second question is the drying. Will the clay dry quickly enough? Under normal conditions, in settling tanks, provided with movable draw-off pipes and filter apparatus, the clay is dry enough to work in from fourteen to twenty-one days. In very dry weather the clay must sometimes be covered with sand, or, with some clays, ground coal may be used, to prevent the top from hardening too quickly. In very damp and rainy weather it may be necessary, on the other hand, to add screened dry clay to it to get the right stiffness.

The third question, which is the most important, is that of cost, or rather of extra cost. This depends upon circumstances, but in general we can say that the extra cost amounts to nothing at all. We must remember that in addition to the superiority of the product, the clay is self-moving, as it passes in solution from the slumming machine to the settling tanks, no matter how far, and all the particles of the clay are mixed. That is, it is rendered homogeneous more completely than by any other method. Though the settling tanks are, as a rule, placed as near as possible to the slummer.

F. LEHMAN, Chicago, Ill.

When everything is properly arranged, the clay passes from the settling tanks to the brick machine in a perfectly regural and uninterrupted manner, and the stiffness of the clay is under complete control. I need not insist upon the great advantage of regular supply and service to a brick machine.

The strongest argument in reply to the objection of extra cost is that we entirely prevent checking in the brick, or tile, both before and after burning. This checking is caused by the presence of impurities and by the want of homogeneousness in the clay. By means of slumming impurities are removed, and any silt present is thoroughly incorporated with the clay.

Silt, which is very often present in clay, sometimes in thin layers, is a frequent cause of lamination. This silt has the character of dust, and possesses little or no affinity for water, so that when tempered in the ordinary way it remains dry and does not become incorporated with the clay, but separates it into layers, forming laminations, which afterwards produce fissures in the brick. As a result of this, I claim that the extra cost caused by extra handling plays no part; on the contrary, an increased profit is obtained upon the goods.

That which is especially applicable to Chicago will apply equally well to any other place where clay containing impurities or too much sand has to be used.

By means of slumming many deposits of clay which are now worthless can be utilized. I have in mind, for instance, some immense deposits in middle and northern Nebraska. As for the installation of the slumming apparatus and its cost, our experience teaches us that we can use it to advantage in any case, from the most primitive horse-power to the largest steam-power plant. There is, too, a considerable economy over the ordinary machinery for working and tempering clay, for the preparation of clay by the wet process takes about 50 per cent. less power than by the ordinary process, working clay direct from the bank.

There are a number of clay deposits in this fortunate country where nature has provided a material which is very equal in quality and homogeneous throughout. For such my plan is not intended.

Slumming is not only an advantage for impure clays, but often for pure clays as well. For instance, where the clay, as is frequently the case, lies in strata, very fat and very lean. Also, where it is considered desirable to mix two or more clays for making vitrified brick or where the addition of sand is necessary for the purpose of reducing the clay, this can be done with the greatest thoroughness and exactness.

A very complete description of my clay-washing plant at Chicago was published in the December issue of Brick, illustrated by photographs and drawings, but the slumming machine itself was not described, as it was not convenient then to give details. This consists, for an output of thirty thousand per day, of an apparatus resembling an ordinary pug mill, but with a wooden case or trough. The inside measurement of this is seven feet long, four feet wide and six feet high. A shaft four inches in diameter runs the length of the trough. The shaft has pugging knives fixed upon it in the usual manner, at six inches apart. The only difference between these and the ordinary pugging knives is that cross knives are fixed upon them to secure a more complete working and cutting of the clay. The clay and water are churned up together by the pugging knives in the trough, and the thin solution of clay continually flows from an outlet, provided at a suitable height, into a box, passes through a screen, which catches any coarser particles, and runs down a gutter into the settling tank.

Stones, gravel and heavy impurities sink to the bottom of the pugging trough. This has two trap doors in the bottom, and they are opened twice a day, at dinner and at the end of the day's work. This clears out the slumming mill. The operation takes about ten minutes.

I find that our slumming plant, for an output of 25,000 to 30,000 brick a day, consisting of a special pug mill, fourteen settling tanks, gutters, trough, etc., can be laid down in working order for $1,500. This does not include pumping apparatus, as the water supply depends upon the special circumstances of the yard. Fourteen tanks is a convenient number. Each tank contains from 1,200 to 1,500 cubic feet of deposited clay About seventeen brick go to the cubic foot, while a cubic foot of clay from the bank, being denser, gives us twenty brick.

Fine sand settles in the gutters as the slum, or solution of clay, flows from the pug mill to the settling tank, so that if we want to remove more sand from the clay we have only to lengthen the gutter and adjust its inclination.

I shall be pleased to answer any questions on this subject, and I give a cordial invitation to every member of the Association to visit our plant at Wellington and Elston avenues, Chicago, and judge of the system for himself.

Some samples of brick made from Chicago clay are here for your inspection. I may mention that these were burned in my portable continuous kiln.

DISCUSSION OF PAPER.

Mr. Batley and others, in the discussion, asserted that many of the statements in the paper were misleading and untrue to the extent that it would cost more money and more room and machinery to do the work, and that the brick would cost more than represented.

Mr. Quandt: We put up a slumming machine to wash the clay at a cost of $1,200, to make 5,000 brick per day, and it worked satisfactorily every way except financially. (Laughter.) We used it about a year and threw it away.

Mr. Plumb: This room would hold enough for a half million brick.

Mr. Batley: No, no; the clay slush would be 75 per cent. water, and if left alone it would hardly be fit to be taken in a year.

Mr. Plumb: I have no doubt that this is a valuable process, with some clays, to get rid of the impurities.

A member: I have recently seen an experiment where one ton of Chicago clay was washed in 45 minutes.

Mr. Batley: Why, that means only four or five thousand brick a day. Are we going back to the old process? One man can mold that many brick. I know that it will require a long time for the clay to settle before the water will run off.

Mr. Ashby: There is a little misconception about the paper. I regret to say that the dimensions of the tanks are not given. There are no excavations; the vats are built above ground. It takes from fourteen to twenty-one days for the clay to settle and dry ready for use, so it takes fourteen tanks so as to use a tank per day. Each tank is presumed to hold twenty thousand brick.

D. O. LOY, POET LAUREATE.

Mr. Richardson: Our attitude should be to get information upon this subject. I don't feel like disputing the statements unless we have information to the contrary. The gentleman has prepared the paper for this Convention for our information, from experiments which he is making. Few of us would like to be at the expense. So let us glady accept the information and profit by it if we can.

Mr. Batley: I think there is more humbug about this subject than about grate bars.

Mr. Stryker: We had a washing process put in about forty years ago at a cost of $40,000 by the Joliet Mound Co., and we soon discarded it, and I advise you to go slow in your experiments.

President Pike: Gentlemen, we will now leave this question and listen to our Poet Laureate.

A SUBMERGED SECTION; OR, HOW FARMER SMITH MADE HIS FORTUNE.

I was strolling in the country,
On one lovely autumn day
When the corn was turning yellow
And the meadows tinted gray;
'Twas Indian summer weather,
The air was soft and sweet,
Birds singing songs in hedge and grove,
Which made my joy complete.

The honey bee was hard at work
On summer's faded flowers,
With charming scenes on every hand,
I traveled on for hours;
Sometimes I watched the men at work,
As busy as the bees,
Picking potatoes from the ground,
The apples from the trees.

Sometimes to see the golden grain
And view a threshing scene
I'd cross the yellow stubble ground
Or wheat fields fresh and green;
Sometimes I'd help to measure grain
In dust from head to feet,
But then we always have to take
Some bitter with the sweet.

I found a farmer in his field
Who had been cutting corn,
But now waiting for the music
Of his old dinner horn.
There were horses in the pasture,
Unbridled, running wild,
With bright mane and tails waving,
Though the wind was low and mild.

Some were grazing, some were gazing,
Others galloping round and round,
A picture in the country
Which nowhere else is found;
While in another field hard by
Were Jerseys, hogs and sheep,
Enough wealth appeared in sight
To make a beggar weep.

The farmer's hair was turning gray,
Though he was in his prime;
"I'm tired," said he, "come in the shade;
We'll chat till dinnertime."
But the bugle never sounded
Above our friendly talk,
And the rustle of the fodder
In the shadow of the shock.

He told me all about his farm
Since thirty years ago;
The story charmed me till I feared
His dinner horn would blow.
"I married in the East," he said,
"Where friends first wished me joy,
Then with the next breath said good-bye,
I moved to Illinois.

"I had a little money then,
Had earned it in New York,
So I bought this very section
On the slough they call Lake Fork.
One half the price I paid in cash,
The rest I went in debt;
The land seemed dry enough that fall,
Next spring 'twas soaking wet.

"My highest ground was overflowed
In spring with heavy rain,
The water soured and soaked away,
No outlet for a drain.
With two old plugs of horses
My highest knobs I'd plow;
Had ducks and geese a plenty,
And one old brindle cow.

It was ten long years I labored
Through seasons wet and dry;
Could always raise a little corn,
But never wheat or rye;
So I failed to save a dollar
While years would glide away,
Yet my wife and I kept hoping
To see a brighter day.

"I'd earn a dollar now and then,
The way cannot be guessed;
'Twas when some way-worn traveler
Was headed for the West;
Homeseekers searching for a farm
On prairie wild and new,
I'd hitch my crow-baits on with their's
And help them cross my slough.

"That walnut grove, those maple trees
Are fifteen miles away;
That prairie like an ocean seemed,
My section like a bay.
A team of horses then," said he,
"Couldn't pull a heavy jag;
You could not go straight ahead,
But had to go zigzag.

"Right out in that direction, sir,
Where grows my finest grain,
That used to be our hunting ground
For ducks, brants, geese and cranes."

While we kept moving around the shock,
Just keeping in the shade,
The farmer kept on telling me
How all his wealth was made.

"We farmers seldom went to town—
That's to our county seat,
But traded at the village near—
There's just one store and street.
It was the place my neighbor went
For everything he buys,
To counsel with 'Squire Billingsley,
A man we counted wise.

"I went to town on rainy days—
Was loafing in the store,
Just talking to my neighbors,
A dozen men or more.
'Squire said a ditch some ten feet deep,
As well as forty wide,
Was to be made along our slough;
We thought the fellow lied.

"With our crops almost a failure
We felt a little blue,
When in walked two commissioners
For district number two.
They were the kind of gentlemen
For whom we had no love,
Since they were dredging out our slough
Some twenty miles above.

"They presented a petition
To ditch along our line;
Intended for our benefit,
Not one of us would sign.
They used the best of arguments,
But talking was in vain,
Except the 'Squire agreed with them;
We thought he was insane.

"Old farmer Jones, just west of me,
Who owned the big Mud lake,
He said if it should be dried up his land
Would crack and bake.
Tom Clarke, the man from Kokomo,
Owns the slough grass hollow;
He said there would be no place left
In which the hogs could wallow.

"One thing all the men agreed,
And I thought just the same—
That is, if ditching was allowed
'Twould drive away our game.
And when I thought of immigrants
It almost took my breath;
The ditching would improve the roads,
Then I must starve to death.

"To all our foolish argument
We had but one reply,
Unless the ditch is crowded through
We'll flood your lands now dry.
Next day we took a trip up north
To see how it was done,
Scooping the dirt and laying tile
In district number one.

"We found where drain tile had been used
The land was all too dry,
And so, to stop their foolishness,
Enjoining we must try.
Next spring our farms were overflowed,
No matter how we cussed;
Then quickly every farmer signs,
For when we must, we must.

"The work in number two began,
Was crowded day and night,
Till, creeping through the hazel grove,
The dredge boat came in sight.
Slowly but surely on it came
Until our farms were passed,
'Twas then the tiling was commenced,
And crowded just as fast.

"When we began to realize
What once we could not see,
The other fools were cussing us
In district number three.
Well, sir, they kept on laying tile
In main and lateral drains
Until we never have a flood
No matter how it rains.

"Since then I've kept on laying tile—
Keep ditching every year;
My ground is moist enough through drought;
Ain't that a little queer?
This corn field I supposed was drained,
I finished it last spring,
But where you see those little shocks
That needs another string.

"And in my meadow across the road
I thought my tiling done,
But found a spongy swag too wet—
My loss at least a ton.
I'm ditching on my high knobs now;
Will tile them to the top;
Have found by draining high and low
I double up my crop."

Then, pointing at his mansion fine,
Bright fields on every hand,
He said, "Excepting my deep wells,
No water on my land.
I'm happy when the sun shines bright,
As happy when it rains;
I owe my fortune to the dredge
And to the large tile drains.

"And lateral ditch in pond or slough
Or on the steep hillside,
If I should strike a dividend
With all I must divide."
And straightening up his shock of corn,
His face one radiant smile,
Said he, "I guess I owe the most
To men who made the tile.

"Ah, there, 'tis noon," the farmer said;
Then I could plainly hear
A distant sound and echo sweet,
Both playing in my ear;
Could hear above my beating heart
The notes I love so well,
'Twas not the farmer's dinner horn,
But chiming supper bell.

All afternoon that man had fed
This hungry heart of mine,
And now, just for my stomach's sake,
With him I go to dine.
The country is a place the best
For either man or beast;
I'd rather supper on a farm
Than at a banquet feast.

Go search the earth, go where you will,
There is no greater charm
Than Indian summer afternoon
And evening on the farm.
I love to watch the sun's last rays
Turn earth and sky to gold,
Then meditate while everywhere
The grandeur I behold.

'Tis grand to see the sun go down,
And watch its golden hue
While painting on the western sky,
Then fading back to blue;
To see its last departing rays
Illuminate the trees,
And hear the chirping of the birds,
The humming of the bees.

'Twas evening and the sun had set,
A voice was calling me,
"Come, do not try to feast on stars;
Walk in, walk in to tea."
When moonbeams kissed the shocks of corn
Smith hitched his handsome brown,
And at a two and forty gait
He drove me into town.

That night I pondered in my heart
The lesson of the day,
A thoughtless tile, a thinking man,
Both fashioned out of clay.
Man made tile. Who made the man,
With all his hopes and fears?
His Creator, lasting on and on,
Himself a few short years.

I heard a sweet immortal tone
Reply, with still small voice,
"The works of men belong to earth,
Man has a higher choice."
Is man made to die and live again?
"Oh, yes," the voice replies,
"God made him with immortal life,
A soul which never dies."
Dec. 23, 1895. D. OSCAR LOY.

Mr. Loy read his poem very effectively, and at its close was loudly applauded.

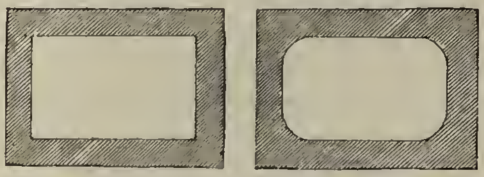
The Convention then adjourned to 1:30, Wednesday, it having been determined to spend the forenoon in visiting the various clay-working establishments about the city.

THIRD SESSION.

President Pike called the third and last session to order at 2 p. m. Wednesday.

The Secretary announced that the first in order would be a paper by Mr. A. R. Smith, Sibley, Ill., on "Hollow Block."

Mr. Smith asked the indulgence of the Convention, stating that he was absent from home at the time the Secretary's invitation came, and had not been able to prepare a regular paper. He said he had been making building blocks for a couple of years. He had encountered a number of difficult problems, but that as a whole the business had proven quite successful and profitable. He made a block 6x8x12 inches, with a seven-eighths-inch shell, which weighed, when burned, twenty pounds. At first they encountered considerable trouble from the cracking of the tile at the corners. This difficulty was overcome by reinforcing the corners of the tile; that is, the die was formed to make the inside of the block round at the corners, instead of square, as shown by the accompanying sketch. Their blocks are used quite extensively for foundations, for which purpose many consider them really better than ordinary brick or stonework. A number of dwellings and stables have also been constructed of the blocks, presenting a very pleasing appearance, and being much warmer in winter and cooler in summer than ordinary structures. In addition to these features, they have the additional advantage of being fire-proof. In building stables they have in several instances supported the upper flooring timbers with telegraph poles placed inside the walls. In Mr. Smith's opinion this is not necessary, as a wall of hollow block is amply strong to support any weight that would be required under ordinary circumstances. For forming corners and angles they cut the blocks when green in mitre-boxes with wire, and in this way make a neat and effective joint without any appreciable waste. In the building of stables and structures for stock, it was best, he thought, to wainscot the inner wall with wood to a height of five feet or more, to prevent the horses from kicking holes in the blocks.



END OF SQUARE AND ROUND CORNERED BLOCK.

Mr. Mamer said they had had some experience in the use of hollow blocks, and thought that the wainscoting feature for stables was hardly necessary, as a horse could hardly kick a hole through hard-burned blocks, such as they were using. The walls of their machine house were built of the hollow blocks, and, desiring to extend their shafting through a partition wall, they made a small round hole through a block with a hammer, and found it was exceedingly difficult, and did not believe there was much, if any, danger of stock breaking a wall of well-burned blocks.

Mr. Jason F. Richardson, Jr., an architect of Ottawa, Ill., by request, gave his experience with building blocks.

Mr. Chairman: During my practice as an architect I have designed a number of buildings in LaSalle county and elsewhere, using the hollow tile block as a building material. We have used it in building dwelling houses, livery barns, foundries and shops of all kinds. The organ factory at Ottawa, Ill., spoken of yesterday by Mr. Batley as being constructed of building tile, was a three-story factory building, built L-shape. It was 260 feet long, 40 feet wide, with an L 150 feet long by 60 feet wide, the corner portion being four stories in height. This building was burned to the ground. I witnessed the burning, and observed that the walls fell outward in each case, and one corner of the four-story portion remained standing the full height, the interior construction dropping down and away. This portion was afterwards pulled down by grappling hooks, the tile, as they fell, being broken into small bits. The office vault was built in the four-story part, and was made of two thicknesses of building tile, with a two-inch air space. The papers and books inside the vault were found intact, the wing of the main building being saved by the hollow tile fire wall built between it and the main part. Had the fireproof doors in the middle dividing wall been closed, the four-story portion would have been saved. This hollow tile ware is made in patterns suitable for window and door sills, corners, water tables, and various parts, so that, with the addition of ornamental terra cotta trimmings, a very pretty building can be designed to be built of stock patterns. This manufacture of hollow building block is an important branch of clayworking that can be studied with profit by us here this afternoon, and I trust will not be lost sight of.

After further discussion by several members, all of whom agreed that the hollow building block possessed many merits, both from the standpoints of the manufacturer and consumer, the Secretary announced that the next on the programme was a paper by Mr. A. S. Kempton, of Budd, Ill., on "The Utility of the Drain Tile."

THE UTILITY OF THE DRAIN TILE.

—By A. S. Kempton, Budd, Ill.—

Mr. Chairman and Gentlemen:

It is quite generally admitted that all agricultural lands must be underdrained to be made productive of the highest results. In some lands this is accomplished naturally by a stratum of gravel or sands lying near enough to the surface to receive and carry off all the surplus water. But nearly all of Ililnois has a clay subsoil without any natural provision for removing the surplus water from below the surface, and resort must therefore be had to tile drainage to correct the evil. These farms, too, have become so valuable that profitable agriculture demands that all waste lands be reclaimed, open ditches dispensed with as far as possible, and the whole fitted for cultivation and put into condition to withstand successfully the extremes of both wet and dry seasons. To this end thorough tile drainage is indispensable. And by thorough drainage is meant a system, and orderly arrangement of laterals from two to four rods apart and generally two and one-half feet in depth, together with mains of a size sufficient to carry off the water that the laterals may collect.

The primitive use of drain tile was to make it possible to blind open ditches made to remove the visible surplus water. It was not anticipated that the incidental benefits would develop that would more than double the expected value of the improvement. Some of the more important of these incidental benefits will be noticed briefly:

First—In early Spring, and after protracted rains, soil not under drainage contains excess water that may not be visible on the surface. That is to say, all the pores of the soil, both large and small, are filled with water, and the soil is said to be saturated. It is well understood that roots must have air as well as moisture, or the plant cannot thrive. The major reason for tilling the soil is to enable the air to penetrate to the roots; therefore, if all the pores are filled with water, although none may be visible at the surface, the plant will certainly languish. It is as unhealthy to plant life to have wet feet as it is to human life.

P. S Kempton, Budd, Ill.

There are but two ways that this excess water can be removed, mainly by evaporation and by underdrainage. Evaporation is so slow and uncertain that the crop may be ruined before it is accomplished; and at best the delay thus occasioned to the farmer by waiting for the soil to become dry enough to work is very serious. Experience has amply demonstrated the wisdom of substituting the tile drainage system for the slower process of evaporation.

Second—Tile drainage has improved the health of the State. Malarial diseases are caused by an atmosphere poisoned by decaying vegetable matter which abounds in low, wet places, particularly in the late Summer and Fall. These places having been tiled and placed under cultivation no longer breed the germs of ague, the terror of the early settler. Thus our little round tiles are eradicating what vast quantities of quinine are only able to mitigate.

Third—The time is coming, and in some localities is at hand, when commercial fertilizers will become essential to profitable agriculture. The removal of excess water by means of tile drains down through the soil instead of over its surface will then become necessary to prevent loss of fertility. And the removal of the water thus will cause to be carried to the roots of the growing crop the elements of food necessary to its growth.

Fourth—Tile-drained land thaws earlier in the Spring; below the line of frost the soil is several degrees warmer than freezing, and hence the thawing process goes on both above and below, the water from below being carried off by the tiles. The soil is thus earlier fitted for the reception of seeds, and the surface becoming dry and warm, tilling may go on without delay. Thus the crop will develop faster and be earlier out of danger from drought and frost.

Fifth—Tile drainage supplies us with a paradox, the significance of which is greatly underestimated; namely, that in relieving the soil of its surplus water it also relieves it from the danger of drought. I mean to place a special emphasis upon this statement, for there is no important agricultural fact better established than this one, nor one concerning which our agricultural friends are less convinced. As briefly as I can I will state some of the more important reasons why this should be so:

Tiles are usually laid two and one-half feet deep and the water in filtering through the soil to reach them must saturate it to a greater depth than it would do if it were not tiled. It will also form numerous small channels or pores and cause it to become loose and pliable. This latter process is hastened by the action of the frost. Once loosened, conditions are never again favorable to the soils settling and compacting as before.

Capillary attraction, the force that carries oil up a lamp wick in opposition to gravity, will retain in the soil as much water as can be made available for plant growth. It is the same force that causes a sponge to absorb water. If a sponge be compressed, a small quantity of water will be absorbed; allow the sponge to expand to its full size and a much larger quantity will be absorbed, because its pores are larger than they were before. So it is with the soil. The waters percolating through it to reach the tiles, together with the action of the frost, makes the pores larger and longer, and therefore capable of holding more water than before. Still I do not wish to be understood as asserting that all the pores thus formed will be filled with water, for such, fortunately, is not the case.

Many of the pores thus formed will be too large to be acted upon by capillary attraction, and hence their water will be discharged into the tiles and air will take its place and will prevent the formation of those injurious chemical compounds that are found in stagnant waters. As air is as necessary about the roots of crops as moisture is, this arrangement of air and water, side by side, deep down in the soil, would seem to be, and is, the ideal one. It enables the roots to grow deep into the soil, reaching utilizing elements of fertility that otherwise would remain unused because untouched. It was doubtless this phase of the question that inspired Emerson to say: "This year a very large quantity of land has been discovered and added to the agricultural lands, and without a murmur of complaint from any neighbor. By tile drainage we have gone to the subsoil, and we have a Concord under Concord, a Middlesex under Middlesex, and a basement story of Massachusetts more valuable than all the superstructure." As we have seen capillary attraction is a greater force than gravity, for it causes the water to rise up in the pores, therefore the moisture thus held in the soil cannot be parted with except by evaporation and plant growth. It is observed of tiled land that at the surface the soil pulverizes and dries rapidly. This fine dirt acts as a blanket and largely prevents the formation of hoar frost and stoal ice, so injurious to winter wheat, and prevents almost wholly the evaporation of the moisture stored deeper down. Thus it is seen that tile drainage causes a larger amount of water to be absorbed and gives rise to a condition that prevents its loss, except as required for the growth of the crop.

By utilizing this principle of fine dry dirt to prevent evaporation I saved a quantity of pugged and tempered clay in the Summer of '94. The great strike of the coal miners deprived me of coal, and consequently of power, at a time when my clay house was about one-third filled with pugged and tempered clay. This I had heaped into a cone-shaped pile and covered to a depth of three or four inches with fine, dry, black dirt. This occurred on June 1, and six weeks later, on July 12 we resumed work and found our clay in as good condition as when we shut down, and this, notwithstanding it was during the dryest and hottest part of the season and the clay house was quite open.

As further bearing upon this question, the following from the agriculture experiment station connected with our State University at Champaign, is important not only because it is reliable, but also because it is recent. A series of experiments were projected to determine if possible what were the causes of the uncertainty and frequent failures of certain crops in the southern part of this State and what remedies could be devised. A special report, made by Professor Davenport in December, covers his personal investigations affecting the productive capacity of the soil from Mattoon to Carbondale, a distance of 136 miles, and over a space of about the same extent in width. He finds, in brief, that the common complaint is that the soil becomes too wet in the Spring and too dry in the Summer, in consequence of which the crops are unreliable. These conditions he attributes, namely, to want of underdrainage and to a too finely divided soil, giving rise to what he calls "Spring puddling and Summer baking." To prevent these serious evils he, in part, recommends underdrainage as well calculated to relieve from the danger of drought and to free the land from excess of water. In reply to my request for a copy of the complete report, Professor Burrill, president of the Board of Direction, wrote me as follows: "The report spoken of by you has not been printed. Neither are we ready to give much to the public in this matter. The purpose of the report was to determine action in regard to certain experimentation in the clay lands of southern Illinois. I am glad to say to you that such experimentation was authorized, and just as soon as we get results full publication will be made. The committee was thoroughly satisfied that sub-soiling, green manuring and tile drainage, separately or together, would be a great benefit over a large region of that part of the State."

J. J. W. BILLINGSLEY, Indianapolis, Ind.

I am also in receipt of another communication under date of Jan. 18, equally important and equally creditable as the foregoing, from Mr. Charles Linney, director State Weather Service, Chicago. He says: "I have the pleasure to hand you herewith the average rainfall for the State for such time as sufficient records have been made to make the data reliable. I also note your questions on tile drainage and wish to say that I have never made much of a study of tile drainage. In regard, however, to its effects on rainfall, it is inappreciable for the amount of water which is thus disposed of is so small in comparison to the vast volume of the air that it is as a drop in a barrel Then, too, air moisture (which falls in rain) is not of local origin, at least that which is of local origin is exceedingly small. Most or all of it comes from the Atlantic or the Gulf, or probably in some extreme cases from the Pacific. The local effect of water upon rainfall is easily seen in Michigan, which, although nearly surrounded by water, had a much more severe drought the past Summer than this State, which has water only on its extreme northeast corner, and the season had prevailing southwest winds. As to the effect of tiles on crops, I understand that they make a wet and soggy ground dry and fruitful, add to the porosity of the soil, or ventilate it, and really make former swamp ground the best land on the farm. A good discussion of this subject appeared in the Aledo Press during the past Summer. It was written by Mr. Thomas Lewis, of Reynolds, Ill., and I hope shortly to reproduce the article in my journal, 'Weather and Crops,' a copy of which I mail you, giving summary for the State for the past year."

Thus we have seen that, theoretically, tile drainage ought to relieve from the danger of drought, and those who are in a position to know assure us that it is so. And we have the authoritative statement that its local effect on rainfall is too small to be appreciated, setting at naught the oft-repeated remark that drainage is the cause of droughty seasons. Then why, may I ask, is there not more tiling done with this object in view? The answer is plain, our customers are not convinced of these facts. My observations have convinced me that both the science and art of tile drainage are very imperfectly understood except by a very worthy few. I trust that my tile-making brethren will pardon the suggestion from so new a member as myself, that we have erred in not making a more united and persistent effort to educate our customers concerning the possibilities of our product when rightly used and how to use it rightly. I have been in the business not quite four years and freely confess my own negligence in this respect. It does seem, however, that inasmuch as the progressive farmers have done the experimenting and have made the results public, we ought to take it upon ourselves to disseminate the information among our possible customers systematically and persistently. Or, as a certain newspaper advertisement tells us, "keep everlastingly at it." Some organized effort ought to be more effective and more economical.

This idea of educating our customers is suggested by the activity of our brethren of the brick persuasion. Not many years ago while I was a resident of this city (Streator) the City Council had the audacity to pass an ordinance to the effect that no more board sidewalks should be laid and that brick should be used instead. The indignation of the people was so great that some of the aldermen resigned their offices (a rare thing in America) to escape further adverse criticism. Others who had voted for the ordinance could not get back into the council until the incident had been forgotten. There was no charge of jobbery, but the people were angry because their sidewalks were to be built of such worthless material as brick. Our brickmakers did not despair. They built sample walks to prove their worth and kept up a ceaseless agitation. What seemed an utter rout had been turned into a magnificent victory, for the people are as clamorous now for brick sidewalks, and for brick streets, too, as they were then for the scalps of their aldermen.

In conclusion, permit me to repeat the suggestion—a campaign of education, presistently maintained, ought to be profitable.

Gentlemen, I thank you for your attention. (Applause.)

"DEEP WELLS AS OUTLETS FOR TILE DRAINS."

Mr. Hammerschmidt: I want to thank the gentleman for this very able paper. There is a great deal in it of interest and value. It ought to be placed in the hands of farmers who are not posted as to the benefits of tiling. I have experienced some difficulty finding outlets. In undertaking to drain one tract of land I found I would have to cross a neighbor's farm. The expense was too great, so I made an experiment. I put in a tubular well about 114 feet deep, using four-inch pipe, and found that outlet carried off the water from a ten-inch tile, and effectively drains a tract of some eighty acres. It worked so well that I have put in additional wells, which cost from $100 to $160 each, according to the depth.

Mr. Eudaly: I am a farmer, and I have found that drain tile don't always drain. That is, I have found that a well-laid drain tile will bring moisture to the surface of the ground as well as take it away. I have put in a great deal of tile in the last year or two, and during the past dry season we could readily locate our tile drains from the healthy condition of the crops along the line of the drains as compared with those on land not tiled. I have found from actual experience that tiling is as profitable in seasons of drought as it is in wet seasons. When I began to lay my drains the neighboring farmers were inclined to make sport of the investment. Now, after a season or two, the laugh is on the other side, and they are all studying up the question. Some of them have already begun to tile their lands, and the balance will follow, for the results have positively demonstrated that well-laid tiling will pay for itself in a season or two from the increase in crops alone.

President Pike: Farmers in our section are learning from results that it pays to drain even their pasture lands. I think there are a great many of them who do not understand the cause, but see the effect, and the result is an increased demand for tile.

T. C. Tridel, Streator, Ill.

Dr. Converse: I, too, am a farmer. Some years ago I bought a tract of land at $20 an acre. I tiled it, and it is now worth $60 an acre. Tile manufacturers should use every means at their command to educate the farmers up to the importance and profit of tile draining. The farmers' institutes and neighborhood clubs are available means to this end. I make it a point to attend all conventions of every sort and character that I can, for I find that I can always learn something from the discussions and controversies. Another thing tile manufacturers ought to do is to write to their agricultural or local papers, giving briefly but plainly their views and experiences. Such efforts will prove helpful to all. A campaign of education will do a great deal, not only to awaken an interest, but to keep farmers in a mood to improve their lands, and this they can best do through the use of drain tile.

The Secretary then announced a paper on "The Comparative Value of Side-cut, End-cut and Repressed Brick for Street Paving," by T. C. Tridel, Streator, Ill.

COMPARATIVE VALUE OF SIDE-CUT, END-CUT AND REPRESSED BRICK FOR STREET-PAVING.

—T. C. Tridel, Streator, Ill.—

Comparative value of end-cut, side-cut, and repressed brick is rather a difficult subject, as there is not a member of this Association that has ever known of a pavement made of good paving brick of either kind that is or was worn out, and it is very doubtful if any one of us will ever see one so worn.

Assuming that the clay has been prepared alike for each style of brick, we are ready to compare them as to their structure, wearing qualities and cost of manufacture. End-cut brick, on account of being forced through a much smaller die than a side-cut, is much more laminated than any other style of brick for the reason that the force required to send the column of clay through the die is much greater and causes the sliding or slipping of the clay on itself, and thereby causing the lamination and cavities that are found in all auger machine brick whether end or side-cut, but it has been my experience that the former has been much more laminated than the latter. There is but little if any doubt that the end-cut brick is more dense and contains more clay to the cubic inch than the side-cut, but the writer does not believe that after both have been properly burned one has any advantage over the other in this respect, for the reason that the side-cut when unburned contains less clay than the end-cut, it necessarily follows that when burned to a vitrified body it will shrink more than the more dense brick would and by so doing overcome the objection of containing less material when green.

One advantage that end-cut has over the side-cut is in handling, as it is well known that men will handle more end-cut than they will of side-cut in the same time, as they are smoother and not so wearing on the hands of the parties handling them and they are also less liable to stick when slightly overburned, which is another reason for more rapid handling.

The end-cut also appears to have the advantage when the useless test of absorption is applied, as the polished surface of the end-cut has the effect of a water-proof coating that is not penetrated as readily as that of the rougher surface of the side-cut, but when the brick are broken and the absorption test is applied, if there is any advantage that one has over the other, it is in favor of the side-cut, as it is less laminated and has fewer cavities, and as a matter of fact, less room for water to lodge. Also another advantage that is claimed for the end-cut is that they are round cornered and are less liable to have corners broken off by the blows of the horses' feet or by the weight of heavily loaded trucks, which, by actual test, does not appear to have the advantage claimed for it.

The fact that the grain of the brick is running in the same direction and with the long way of the toe and calk of the horses' shoes causes the corner to break off much more easily than it would if the grain was running in the opposite direction.

The side-cut, by having the grain running with the street or in the direction the teams and vehicles are going, is not so easily broken on the corner, only as the edge is so much sharper than the rounded edge that it is liable to crumble slightly, but never split or break like an end-cut.

One of the greatest advantages that can be claimed for the side-cut brick is that it is much less laminated than any other die machine brick and therefore more regular in its structure and breaks with a smoother surface. Another advantage for the side-cut from the standpoint of the manufacturer is that you can make from 1 to 4 per cent. more brick per day on the same machine and do it with less steam power. Also that they are much preferred as a building brick by almost all builders and will bring a better price as such when you fail to get them burned sufficiently for pavers, and as we all have brick in greater or less quantities that will not pass for paving it is quite an advantage to have a ready market for them. Another advantage that we claim for the side-cut is that it is more easily dried and, with the same advantages, is in better condition for placing in the kiln and burning than any other style of brick and much less liable to damage by swelling or puffing when being heated to the point when the water is all expelled.

Repressing paving brick does not make them any more dense than before the press was applied, for the reason that you cannot press wet clay in the presses of to-day but little more than you could water, as none of them have a die and plunger that fits so closely but that the clay will ooze out at the sides and ends of top and bottom plates when heavy pressure is applied, and if they were made with so close a fit that this did not occur it would be but a short time until the wear would place them in condition that they would. So far as brick are benefited, with reference to lamination, by repressing, there is little if any advantage received from the pressing, for should the layers of a laminated brick be located close or lightly together repressing would add but little or nothing to that condition, and should there be an opening or cavity between them it would be full of air and could not be pressed together with the pressure equal all around by any power. I have repressed both end and side-cut brick and my experience is that the end-cut will not press and leave the brick in as good condition as the side-cut will, for the reason that the laminations are being pressed the same way that they run through the brick and very frequently are not so close together but that there is more or less air between the layers, and when the pressure is applied it causes the air to change position and probably travel all directions from the center and cause the cavity to become larger if any change is made.

Another reason that I give for believing that the side-cut is preferable for repressing is the fact that if oil is not properly applied or in any way the clay should stick to the die, pick up or pluck, as machine men term it, the end-cut will stick in large thin flakes, showing that the clay parted easily from the part that is picked up by the die.

TOASTMASTER CONVERSE.

In repressing side-cut, should there be any sticking or picking up, the parts that stick will be much smaller in area but much thicker and of a conical shape, leaving a deep hole in the brick of a like shape, indicating to my mind that there were no weak places in the body of the brick, at least none weaker than any other.

The advantages that are to be derived from repressing is that the bricks are all smooth, near of a size, corners all rounded (if this is an advantage), a slightly better appearance both in the kiln and street and in some markets more easily disposed of. As to their lasting qualities I am not prepared to state, as they have not been properly tested, at least not to my knowledge.

After looking at the advantages and disadvantages of the three styles of brick and taking into consideration the little knowledge we have of the lasting qualities of either, it appears that the best value is in the style the manufacturer may have a demand for and the one that pleases his trade the best. But if you are in a locality where the trade demands a repressed brick be sure that you press a side-cut, for the two reasons that it can be produced for less money and is a better brick than the repressed end-cut. (Applause.)

Dr. Converse said, in discussing this paper, that in his opinion the cheapest brick was made by the stiff clay end-cut process, but that he thought the side-cut brick were the best.

Mr. Barr took issue with him on this score, claiming that 5 to 10 per cent. more side-cut than end-cut brick could be made on the same machine under the same conditions.

Mr. James Daugherty, Streator, Ill., then read an interesting paper on "Sewer Pipe," which will be given in a subsequent issue of this magazine.

President Pike then announced that this finished the papers on the regular programme, and that the report of the Committee on Resolutions was next in order.

Mr. Batley: Mr. President and gentlemen, the chairman of our committee (Mr. Billingsley) had to leave on a noon train, so the privilege of presenting the committee's report devolves upon me.

REPORT OF COMMITTEE ON RESOLUTIONS.

Whereas, This Association, at its Eighteenth Annual Convention, has for the first time in its history accepted an invitation from a city other than the capital of the State and has been surprised and gratified at the success of the Convention, we wish to express our hearty approval of the new departure, and it is

Resolved, That the sincere thanks of the Illinois Clayworkers' Association be tendered to the clayworkers and citizens of Streator for the hospitable and hearty reception accorded by them to the Association and for the efforts made by their reception committee to entertain their visitors.

Resolved, That the thanks of the Illinois Clayworkers' Association be tendered to his Honor, the Mayor of Streator, Mayor Kopf, for his support and presence at the meeting of the Association and for his cordial invitation to the members to the freedom of the city.

Resolved, That the thanks of the Illinois Clayworkers' Association be tendered to the committee of arrangements for the conduct of the banquet, and to our distinguished and brilliant toastmaster, Dr. Converse, of Springfield, Ill.

Resolved, That the thanks of the Illinois Clayworkers' Association be tendered to the contributors of the excellent and interesting papers read at meetings, viz.: Col. Ralph Plumb, Streator; W. M. Pratt, Earlville; Thomas Townsley, Alexis; James Daugherty, Streator; F. Lehmann, Chicago; D. O. Loy; A. T. Griffin, Twin Bluffs; T. C. Tridell, Streator; P. S. Kempton, Budd; William Beahan, Streator.

Resolved, That the thanks of the Illinois Clayworkers' Association be tendered to the Wabash, the Chicago, Burlington & Quincy and the Santa Fe railroads for the generous treatment of the members of the Association in granting free transportation, thus enabling the visiting members to become acquainted with and appreciate the great industrial advantages of Streator as a manufacturing center.

Respectfully submitted,
J. J. W. BILLINGSLEY,
A. R. BATLEY,
WILLLIAM TRECKER.

On motion of Mr. Mamer the report was adopted by a standing vote.

Treasurer Stare then made his annual report, which showed a balance in the treasury of $60.55, after the payment of all bills.

THE ELECTION OF OFFICERS.

The election of officers resulted as follows:

President — Hon. Fawcett Plumb, Streator, Ill.

Vice President—J. W. Skinner, Winona, Ill.

Secretary—G. C. Stoll, Grant Park, Ill.

Treasurer—William Stare, Mendota.

Mr. W. D. Richardson, of Cleveland, then moved a vote of thanks to the retiring officers for their efficient work during the past season, which was adopted by a standing vote.

The time and place for holding the next Convention was then considered, and on motion of Mr. T. A. Randall it was referred to the Executive Committee, with instructions to announce the time and place of meeting not less than three months prior to the date of meeting.

Mr. Andrew Harrington, of Galesburg, on behalf of the clayworkers of that city, extended a cordial invitation for the next meeting to be held there, for which he was heartily applauded. It seemed to be the general opinion that Galesburg would secure the prize.

The newly-elected President was then recognized, and thanked the Convention for the honor conferred, assuring the members that he would do everything in his power to advance the interest of the Association.

The Convention then adjourned, subject to the call of the Executive Committee.

THE BANQUET.

The most enjoyable feature of the Convention was the banquet tendered the visitors by the citizens of Streator. "Large bodies move slow;" at any rate it was so in this case. The doors of the banquet hall (the dining room of the Plumb House) were not thrown open till 10 o'clock, but from that time on till after 2 o'clock there was revelry unstinted. The fact that the entire assembly stayed till that late hour, and even then seemed loth to go, evidences the interest and enthusiasm that prevailed, and it was an enthusiasm born solely of good cheer, wit and wisdom, for there were no liquors served to stimulate an artificial fervor. Dr. A. L. Converse, of Springfield, was Toastmaster, and the night's success was due largely to his keen wit. He is equal to any and every emergency. As the guests filed into the dining room each one was presented with a pretty souvenir book containing a series of pictures of Streator's public buildings, manufactories, residences, parks, driveways, etc. Plates were laid for 150, there being a large number of Streator's leading citizens in attendance. Mr. Eudaly was asked to say grace, after which an hour was spent in discussing the following choice

MENU.

Blue Points, Half Shell
Ox Tail Soup Olives
Fried White Fish, Butter Sauce
Chicken Mayonaise
COLD MEATS
Beef Ham Tongue
Broiled Quail on Toast
Fillet of Beef, Green Peas
New York Ice Cream
Fruit Assorted Cake Nuts
Coffee

An excellent mandolin orchestra furnished the instrumental music, and after cigars had been passed to all who had a liking for the weed, Toastmaster Converse made the following quaint introductory address:

Members of the Illinois Clay-Workers' Association, Gentlemen—Some men are born great, others win greatness, while others, yet, like myself, occasionally have greatness thrust upon them.

I am not unmindful of the honor confered upon me in assigning me to the position which I am now trying to fill. Feeling as I do the responsibility of the place, I shall endeavor to divide that responsibility by appointing three well-known gentlemen to act in the respective positions which I shall now enumerate.

I will appoint the Hon. Wm. Simpson to the position of gatherer. His duties will be to gather from the floor all loose buttons found thereon, carefully assort and return them to their respective owners.

I will appoint the Hon. Max Wolff, on account of the magnitude of his proportions, to the position of conveyor. His duties will be to convey to their respective lodging places all persons who have reached that peculiar stage of "inocuous desuetude" as to be unable to act automatically—the machine men will understand the term automatic thoroughly. In using the expression "inocuous desuetude" I wish it particularly understood that this will be the limit of party politics that will be tolerated here to-night, it being a term exclusively democratic.

I will appoint the Hon. Wm. Hammerschmidt (on account of his slight figure) to the position of general dispatcher. His duties will be to immediately wire our respective wives and sweethearts that we won't be home till morning.

Now then, gentlemen, after sitting for over one hour at this hospitable table, and witnessing the frantic efforts of each one to outdo his neighbor, I am frank to admit that I myself feel too full for utterance. I am not unlike the drowning man (not in the act of grabbing at straws), but rather in the condition of needing to be rolled over a barrel. I am not embarrassed. Embarrassment is external and superficial. My feelings are much deeper—they are internal. When troubled with insomnia (that bane of the brickmaker who can't rest at night on account of the atrophied condition of his bank account) I sometimes get relief by reciting a few verses from some standard work on poetry. I say standard because I would not dare to go to sleep after reciting poor poetry. I trust you will therefore pardon me if I try in my present condition, to get relief by reciting a few lines from Longfellow's poem entitled "The Invitation." Some illiterate individuals have thought that this beautiful and pathetic poem was written by Dr. Isaac Watts, but after careful research in the realms of classic literature, I am convinced that Dr. Watts never had anything to do with it. I shall therefore attribute it to Longfellow, first, because it sounds like Longfellow, and second, Longfellow is dead and can't kick. I do not remember having heard of the death of Watts:

It's just one year ago to-night
That I remember well;
I sat down at my friend Plumb's right
While a story he did tell.
'Twas all about this lovely burg
On the Vermillion river—
How, if we'd come and here be heard,
We would regret it, never.

He promised us a handsome hall,
A convention worth reporting,
And guaranteed that one and all
Should feel like boys a-courting.
Of Springfield he did not complain,
But knew of one t'would beat her,
And gently sung, in low refrain,
He thought that one was Streator.

He said if we'd come to this place
In eighteen ninety-six,
And see his people, face to face,
And with his people mix,
We'd want to move here, every one,
And here we'd want to stick,
And spend our time from sun to sun
In Streator, making brick.

And as he warmed up to his work
In earnest invitation,
He said that Streator'd never shirk
If called to feed a nation;
And then, before his final bow,
Before he took his seat,
He said, "Come on with your pow-wow,
And get enough to eat."

Then Brother Pike brushed back his hair
From off his manly brow,
And said to Plumb, "You seem so fair,
I'll go home with you now;"
While Purington, in joyful state,
Looked happy and felt sweeter,
And said to Plumb, "I won't be late
In coming up to Streator."

While Hammerschmidt, filled with delight,
Jumped right up in the air,
And said, "I'll come and stay all night—
You bet that I'll be there."
'Twas Eudaly made the motion
That to Streator we would go,
And Stoll he took the notion
To second it, just so.

Chandler put the question then
To that eager, anxious crowd,
Who voted "Aye," and said that "When
Up there we'll do it proud."
So here we are, each one on hand,
In Streator glad to meet.

To drink the toasts and cheer the band,
  And eat, and eat, and eat.

The welcome that we've had to-night
  Will be remembered long;
The warmth and cheer within our sight
  Should fill our hearts with song.
Then let us sing, if not with voice
  And melody in meter,
That we are glad we made the choice
  With Plumb in jolly Streator.

The Toastmaster then introduced Mr. C. H. Williams, of Streator, who responded briefly but happily to the toast "Our Guests." He was followed by W. D. Richardson, of Cleveland, "Our Hosts;" J. C. Barlow, of Streator, "Our City;" W. A. Eudaly, of Cincinnati, "Our Craft;" James Conden, Streator, "All Is Not Clay that Glitters;" E. M. Pike, Chenoa, "Baldheaded Brickmakers;" Secretary G. C. Stoll, "The Road Agent;" W. R. Cunningham, Frankfort, Ind., "Where Am I At?;" J. E. Landrum, Centerville, O., "The Same Topic;" John Essington, Streator, "Streator's Resources." D. O. Loy recited an original poem and J. D. Doyle, Geo. Ashby and T. A. Randall spoke of "The Trade Press."

Mr. W. H. Miller, editor of the Streator Daily Monitor, made a decided hit in replying as follows to the toast,

THE PRESS.

Upon the average postprandial program the toast to the press appears with as much appropriateness as would a half-tone portrait of Bob Ingersoll in an illustrated album of the early Christian martyrs. However, the eternal fitness of things is preserved in the appearance of the time-honored chestnut upon this occasion. And at the risk of being considered an insufferable egotist let me say that no more competent chestnut-vender than myself could have been selected. From the remote period when authentic record is lost in dim and shadowy tradition down to the present writing there has been an inseparable connection between "clay" and the "press."

At the dawn of sacred history an ambitious young journalist, named Moses, was doing "space work" on The Pentateuch down in Egypt. Moses made his first great hit by his complete report of the first Clay-Workers' Convention—held in the Garden of Eden.

The product turned out in that vicinity was a "brick" in more senses than one. But owing to the primitive state of the craft that product was not entirely satisfactory, being simply sun-dried. The Maker finally "fired" the aforesaid product out into the world with this guarantee:

"If it does not behave well in actual use the Maker agrees to take it back and put it through a second course of burning warranted to produce complete vitrification." That primitive system is still in operation. To-day we are making "big men" out of clay in Streator.

Long before the business managers of modern publications began to create those baseless fabrications—circulation affidavits—the Egyptians, Assyrians, Babylonians and other primeval mugwumps were issuing 5 o'clock extra editions in both brick and terra cotta. And investigation—scientific investigation—leads me to the belief that the hieroglyphics printed upon those crude and primitive "clay journals" were not much harder to understand than the average Streator editorial on the currency question.

It would be interesting to trace a number of parallels between your trade and mine. For instance, the endless varieties of "side-cut" and "end-cut" machines, each warranted to be "the best on earth," have given rise to scarcely less profanity than the lowly wood-cut of the newspaper press.

And the same problems that confront the clayworker also worry the journalistic tribe. In many an editorial sanctum they are to-night considering the advisability, in view of the approaching campaign, of changing from a stiff-mud to a soft-mud machine.

So I think your trade and mine may each receive from the other valuable pointers. For instance, should some clay expert invent a drier that would turn out brick even one-half so dry as the Streator editorial, his fortune would be made.

At this point I had intended to introduce a few eloquent sentences on the dignity of the profession. At first we only modestly pretend to mold public opinion and direct the universe generally. But we have since advanced to the point where we buy white paper for two and a half cents a pound and sell it for five, with a colored supplement thrown in.

And yet in spite of the fact that the journalism of Chicago is now controlled largely by the big bankers, the craft still has some native dignity, and I would be doing it less than justice did I not say a word or two in all seriousness.

Next in dignity to the making of history comes the writing of it. The clay industry is a great and growing one. The journals devoted to the trade are many of them notable examples of intelligent enterprise. To improve, to invent, to perfect the processes of a great art, inseparably connected with the material advancement of a people, is an honorable vocation. To preserve, perpetuate and encourage that advancement by means of the printed page, is no less honorable, though frequently less remunerative. My personal estimate of trade journalism is shown by this fact. I am a subscriber to every prominent and reputable publication in this country and England devoted to the art of printing or the profession of journalism.

And what is true of the trade press is true in even a more marked degree of the local press. From occasional remarks dropped here to-night you may infer that we are proud of Streator. In its progress and development the press has played no unimportant part. To write the daily history of such a town, and of such men as have made its existence possible, is no ignoble mission.

And the value of the press lies almost as much in what it omits to print as in what it actually publishes. When the panic of '93 broke over the land Streator newspaper men held a conference. It was decided that in case any of our mercantile or manufacturing institutions should become involved in financial difficulties, no sensational headlines should announce that fact to the outside world. To that attitude of the press is due in some degree at least the fact that Streator weathered the financial gale without a single shipwreck.

Yea, verily, the things the papers do not print are often both interesting and important. In further proof of this allow me to offer in evidence all the bright things that I have left unsaid. And doing so I will "make even" and "saw off." (Applause.)

LATENT ENERGY.

John H. Shay, of Streator, responded to the toast, "Twisting the Lion's Tail." He said that when he was a boy he twisted the tail of a cow, and, while the cow hustled out of the way, she first landed a kick on his head that put him to sleep. Later, when a man, he twisted the tail of treason in the sunny South, and got some hard blows in return. His own experience was that while it might be a necessary thing to do, the fellow who did it ought to do it with considerable caution. Our fathers twisted the lion's tail at Bunker Hill and in Boston Harbor and on several other occasions. But I have always observed that it put energy into the animal to twist its tail.

We have a monster lion lying dormant right at our doors. It has been sleeping for ages. All it needs is for men like those present to come and twist its tail and it would be aroused and grow to be the first industry in the land instead of the second. I refer to our clays. Such a variety of useful clays, possessing such necessary and useful possibilities cannot be found elsewhere on the globe as can be found here in Streator and in this immediate vicinity along the banks of the Vermillion river.

The two leading industries of the world are here, clay and coal, and enough of each to keep you busy for hundreds of years.

We have seven railroads to transport these products to every part of the land, and our shipping rates are unequaled by those of any other city to the great centers of demand.

Mr. A. R. Batley, of Bucyrus, O., was called on to respond to the novel toast, "Untwisting the Lion's Tail," which he did in a humorus vein, concluding with the suggestion that a committee be appointed to go to Washington, secure the hatchet of the immortal George W. and with it chop off the twisted tail, then when it cooled off it would untwist itself.

Toastmaster Converse was very happy in all introductory remarks, his witicisms causing much merriment.

Mr. Fawcett Plumb closed the seance by relating a very funny anecdote, and, figuratively speaking, the curtain was rung down amid a storm of laughter.

A TRIP ABOUT THE CITY.

On Wednesday morning, promptly at 8 o'clock, a train was in waiting to convey the members of the Association to visit the various industries in and around the city of Streator. The first in order was the Streator Bottle and Glass Co., where we witnessed the work of the blowers making bottles. The sand and coal are near at hand, with good shipping facilities, making this a most important business interest. The Star Coal Co.'s shaft was the next object of interest, where there is coal and the best of clay in abundance. One of the party of visitors is seeking a location for a large tile factory. Here he was offered the best of clay, delivered, for 25 cents per ton, and coal at 35 cents per ton.

The next in order was the Streator Clay Manufacturing Co.'s works, where they manufacture sewer pipe and flue linings. They have been in operation some two years, in which time they have built up a large trade.

The Anderson & Barr Clay Co. came next. They manufacture paving and common brick. This is also a large plant, having in use a continuous kiln, which Mr. Barr admitted cost over $20,000.

The last in order was the Streator Tile Works, where a large business is done in the manufacture of drain tile, brick, etc. The Hon. Fawcett Plumb is interested financially in these works. Here we found a large Eudaly kiln, which holds about 220,000 brick. There are also several Pike kilns. Both of these makes of kilns are spoken well of by the proprietors.

The half day set apart to visit the industries of Streator had been spent, and the visitors had been hurried through, but it was found impossible to visit all the industries; so with reluctance they were compelled to return to the hotel. On every hand the visitors were impressed favorably with the extent of the plants and the future of Streator as a manufacturing city. Here may be had, almost without cost, the best of clay and coal, with the best of shipping facilities.

LIST OF MEMBERS.

Anderson Foundry & Machine Company	Anderson, Ind.
Anderson & Kenward	Roberts.
George J. M. Ashby, editor "Brick"	Chicago
A. R. Batley (Frey-Sheckler Co.)	Bucyrus, O.
C. C. Barr	Streator.
J. J. W. Billingsley, editor "Drainage Journal"	Indianapolis, Ind
T. B. Bennett	Flanagan.
S. T. Beal	Earlville.
E. W. Bach	Ottawa.
Robert Bows	Odell.
The Bonnot Company	Canton, O.
A. L. Converse	Springfield.
W. R. Cunningham (Wallace Mfg. Company)	Frankfort, Ind.
S. C. Cowgill	Summittville
J. Dixon Doyle, editor "Clay Record"	Chicago.
James L. Daugherty	Streator.
M. Dering	Peoria.
Lewis Dietrich	Sandwich.
W. A. Eudaly	Cincinnati, O.
Arthur M. Einstein	Ottawa.
J. E. Eastes (Chambers Bros. Company)	Chicago.
Mr. Fate, Jr. (Fate-Gunsaullus Company)	Plymouth, O.
F. J. Gledhill (E. M. Freese & Co.)	Galion, O.
Wm. Hammerschmidt	Lombard.
Andrew Harrington (Frost Mfg. Company)	Galesburg.
George H. Hartwell	Chicago.
E. L. Hathaway	Macomb.
C. B. Hess	Ottawa.
J. B. Hull	Cambridge.
A. E. Jamison	Cornell.
P. S. Kempton	Budd.
D. S. Kretsinger	Egan City.
L. H. Lambert	St. Mary's.
D. O. Loy	McComb, O.
J. E. Landrum (Brewer & Co.)	Tecumseh, Mich.
Mamer Brothers	Campus.
L. H. Martin	Dwight.
F. A. Martin	Mazon.
E. D. Neal	Chicago.
E. M. Pike	Chenoa.
J. M. Powell	Orestes, Ind.
H. C. Patton	Flanagan.
W. S. Patten	Hinckley.
M. D. Patten	Rochelle.
D. V. Purington	Chicago.
Fawcett Plumb	Streator.
Henry M. Quandt	Ottawa.
J. A. Ridgway (C. W. Raymond & Co.)	Dayton, O.
W. D. Richardson	Cleveland, O.
S. W. Reynolds	Utica.
George B. Rand	Streator.
T. A. Randall, editor "Clay-Worker"	Indianapolis, Ind.
William Stare	Mendota.
Wm. Simpson (Simpson Brick Machine Company)	Chicago.
A. R. Smith	Sibley.
J. W. Skinner	Varna.
C. Solfisburg and Lincoln Solfisburg	Aurora.
W. E. Sidney (The Bonnot Co.)	Canton, O.
F. R. Stryker	Joliet.
H. Stuckey (Frey-Sheckler Company)	Bucyrus, O.
W. A. Straight	Manhattan.
G. C. Stoll	Grant Park.
H. B. Skeele	Chicago Heights
Oliver Tilbury	Towanda.
Trecker Brothers	Odell.
T. C. Tridel	Streator
Thomas Trainor	Turner.
Thomas Townsley	Alexis.
H. T. Townsend	Avon.
S. W. Williams	Ottawa.
H. O. Whitney	Summitville, Ind.
J. A. Wilson	Paw Paw.
Max Wolff (Wolff Dryer Co.)	Chicago.

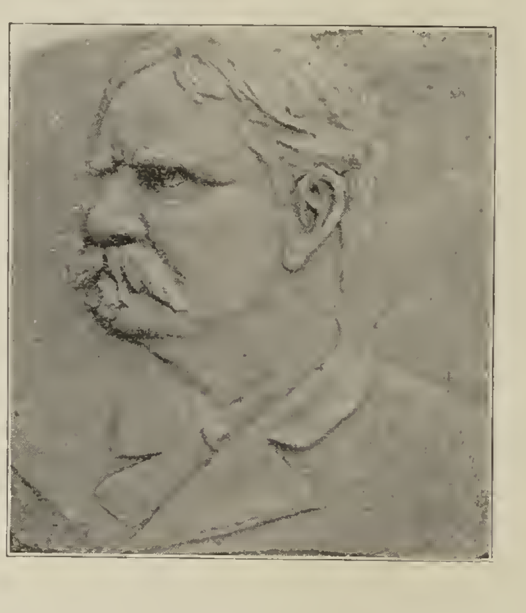
UNTWISTING THE LION'S TAIL.

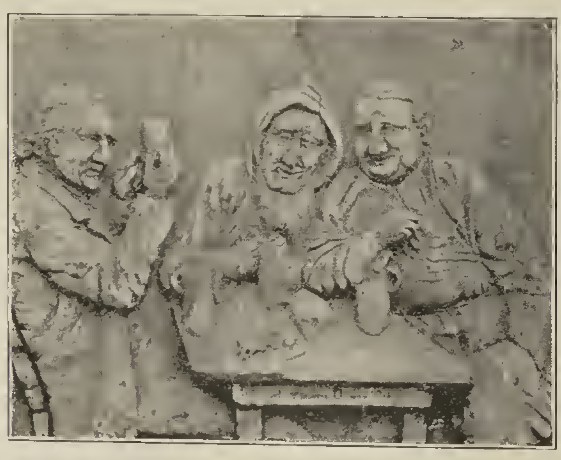
Written for the CLAY-WORKER.

MODELING IN CLAY.

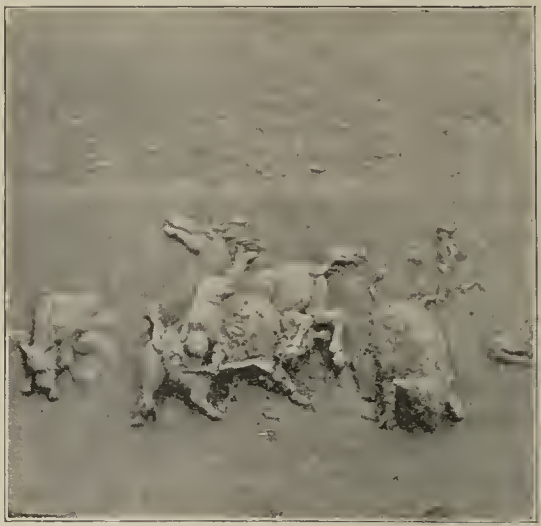
A VISIT to the Owensboro, Ky., Sewer Pipe and Tile Factory revealed an art industry that has had but little development in the South. I refer to decorative work in clay. The capability of this art I had hardly imagined before. I was shown some sketches executed by Mr. James Gamble Stuart which were very creditable, indeed, as to execution, and stamped him as a young man of unusual talent. Mr. Stuart has not had the benefit of any special training, yet the material, in his hand, though not of the best quality of modeling clay, has been thrown into shape at once ornamental and artistic, with excellent finish. His animal sketches are elaborate in detail, and show the susceptibility of the art to giving energy of movement and to his faces expression and feeling. A medallion head of Dante, also one of Mr. Watterson, editor of the Courier-Journal, show rare talent for portrait work in clay. A bust of Dr. Weir is a perfect likeness in pose and features and expression. Of Mr. W. the Courier-Journal remarks in its issue of Nov. 30, 1895:

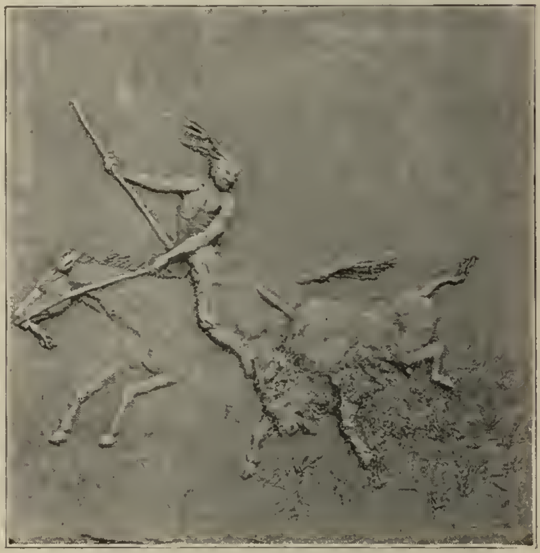
"Mr. Henry Offutt, of The Evening Times, has just received a very fine clay model of Mr. Henry Watterson. The work is that of Mr. J. Gamble Stuart, of Owensboro, Ky., a young sculptor, who is rapidly winning his way. Mr. Stuart was a schoolmate of Mr. Offutt, and is a son of Prof. W. H. Stuart, now in charge of a college at Owensboro, but who for years was identified with Stuart's Seminary for Girls, at Shelbyville, Ky. Young Stuart has traveled all over the world. He was in the city a few months ago. He asked Mr. Offutt to send him a picture of Mr. Watterson, as he wanted to make a medallion of it. A small picture was sent, and it is not a usual thing for a sculptor to bring forth so true and lifelike a piece in clay even from sittings as Mr. Stuart has produced from the picture."

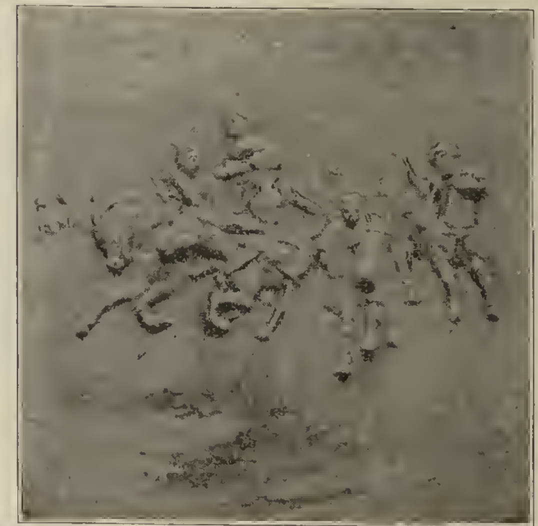




Other pieces, struck off at odd hours, show the possibilities of the art. The most notable of these sketches are photographed and appear in this article. The cuts shown are brick made for Dutch mantels, or for terra cotta ornamentation. The first we call attention to is a copy of a famous painting of Grutzner's, styled "A Judicial Decision," representing three monks seated around a table in the cellar of the monastery tasting of the vintage. The next two scenes are original impressions of hunting in the wild West, life studies made of the buffalo in Yellowstone Park, Golden Gate, Central Park, and at Buffalo Bill's Wild West Show in Chicago, where Mr. Stuart resided and studied all during the world's fair. One is rather too elaborate a work to set forth in clay, yet it is distinct and intelligible. A companion piece, less complex, includes an Indian hunter pursuing a buffalo on horseback; the hunter has buried the spear in the brute, and the handle has broken off. The scene is quite alive with intense action. The last piece I will mention is entitled "XII O'Clock," and represents two boys mounted on horses, with the gear on, and, having taken them to water, are riding at jehu speed for the barn. The gait of the horses and their action is well portrayed by Mr. Stuart. For outside decorations in terra cotta and inside decoration of Dutch chimneys there is a wide and comparatively new field for art development. There is room for the display of the highest art and invention in this direction. The photographic prints accompanying this article fairly represent the variety and beauty of Mr. Stuart's work. He is prepared to furnish designs, specifications, or to execute any design that fancy might demand, and invites correspondence and offers.







NEMO.

Some people are alarmed because the raw material out of which paper is made is likely to give out. The supply of rags long ago became insufficient; then they took to using wood, but now the forests are thinning out so fast that it is only a question of time when the wood must fail. But there is no cause for alarm. By the time wood gives out good paper will be manufactured out of clay. It may be hard on the brickmakers of that coming time to have to share their clay with the papermakers, but they are a generous people, and they will do it cheerfully.

NEBRASKA BRICK MANUFACTURERS ORGANIZE.

A Move in the Right Direction.

Editor Clay-Worker:

Our good ship Organization has been launched successfully, thanks to your kindly assistance and advice, and we think will weather the storms and put into port with a good cargo of brickmaking lore each year for many seasons to come. At any rate the trial trip was very satisfactory to all on board.

Pursuant to a call issued by our enterprising leader, Mr. Geo. F. Cotton, of Table Rock, who has done good work in this direction before, having been one of the original organizers of the Illinois State Association, and also a member of the N. B. M. A., twenty enthusiastic brickmakers gathered in the parlor of Capital Hotel, at Lincoln, Tuesday afternoon, Jan. 21, and after due deliberation agreed to join in an active effort to establish a working organization for mutual benefit along the same lines followed by the National and other State Associations. A temporary organization was first formed, Mr. Cotton very appropriately being chosen President by acclamation, and Mr. W. H. Bushell, of David City, was similarly chosen for Secretary. Subsequently, when a permanent organization was effected, these gentlemen were unanimously elected for the ensuing year, and Mr. J. E. Stockwell, of Lincoln, was elected First Vice President, Mr. B. H. T. Jungbluth, of Arlington, Second Vice President, and Mr. C. F. Kaul, Madison, Treasurer.

Charter Members of the Nebraska Brick Manufacturers' Association, Lincoln, January 1896.

President Cotton appointed J. E. Stockwell, B. H. T. Jungbluth and John Eidlemaier a Committee on Constitution. In due season they reported, recommending the adoption of a set of By-Laws similar to those governing the N. B. M. A., which was done. The Committee on Resolutions, of which C. F. Kaul was chairman, reported a series of resolutions thanking the citizens and press of Lincoln for the courtesies shown the visiting members, and inviting all the clayworkers of the State to take membership in the Association and take an active part in the work; that the Executive Committee be instructed to wait on the proper committee of the State Legislature and suggest such measures as would tend to help the development of the clay industries of the State, and that each member of the Association be requested to take and subscribe for one or more of the clayworking magazines. All of which was adopted. The Executive Committee was also instructed to meet in July and decide upon the time and place for the next yearly meeting.

It was further agreed that should any member of the Association experience difficulty in working his clay that he could not master alone, the Executive Committee was to send an expert workman, who would, if possible, suggest and demonstrate a means of overcoming the difficulty, the expense of the experiment to be borne by the Association.

Many questions of interest were discussed by the members, one of whom asked "Why do not Nebraska farmers build more brick houses?" to which President Cotton replied as follows:

"I cannot understand why the people of Nebraska continue to build frame houses in a climate that is conceded to be the worst in the world for lumber. Modern building methods have done away with the old-fashioned dungeon-like brick house with its damp walls so that there is no longer any objection to a brick structure, except in the imagination of the people. The old idea that a brick house costs more than a frame house no longer exists where reason prevails. With the cost no greater for a brick house why do people go on thinking that they ought to live and die in the same kind of a home that their fathers built? The cost of a frame wall, built with sheeting, weatherboarding, paper and back plastered, is just as great as a brick wall. A gentleman of my county recently prepared to put up a frame house. I asked him if he would just as leave have a brick house, and he said he would much prefer it, but he could not afford to pay the difference. In reply I offered to duplicate the bid he had received for a frame house. I put up the brick structure for the same money and found I had received $10 a thousand for my brick, the best price I had secured for a long time. I will agree to put up a brick house any time as cheap as anyone can put up a good substantial frame. There is another good argument that cannot be denied. If a middle-aged man builds a frame he has nothing left when he comes to die in his old age, but if he builds of brick, he leaves to his family a house as good as it was the day he built it. Many farmers of the State are now building brick residences and they find them warmer in winter and cooler in the summer than a frame. When people realize that this is true and they keep all the money at home that now goes outside for lumber, the people of Nebraska will be more prosperous. Architects know what I say is true, but they continue to offer their patrons no inducements to build with brick."

This sentiment was roundly applauded. The members one and all expressed themselves as well pleased with the meeting, and promised to do all in their power to swell the attendance at their next Convention. Following is a list of

—The Charter Members.—

Geo. F. Cotton	Table Rock.
J. E. Stockwell	Lincoln.
B. H. T. Jungbluth	Arlington.
W. H. Bushell	David City.
C. F. Kaul	Madison.
M. M. Fellers	Table Rock.
John Eidelmaier	Hooper.
N. W. Servoss	Beemer.
W. H. Harrium	Auburn.
Hermann Gesecke	Norfolk.
L. K. Holmes	Lincoln.

The accompanying photograph of the members of the Association will prove a pleasing reminder of our first meeting in after years when we have grown in numbers and influence, as we are sure to do, for under the guidance of such an enterprising and masterly clayworker as President Cotton our ship will have a safe and prosperous voyage.

A CHARTER MEMBER.

CORRESPONDENCE

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

CONVENTION ECHOES.

Brickmakers' Literature.

Only a few years ago text-books upon the subject of brickmaking were an unknown quantity of very inferior quality. But now they are not only abundant, but they are available, practical and useful.

At the Atlanta Convention our genial friend, W. D. Gates, of Chicago, sounded a note that resounds with an echo which ought to reach the ear of every brickmaker in America. It was this: "In the ten years that have passed since we first organized this Association there has been a great change among us. I think we have all grown to be larger, broader, better men. I think there has a brickmakers' literature grown out of our Association." A brickmakers' literature! That alone is enough to justify our existence and our continuance. Ten years ago where could the young brickmaker go for education in his craft, outside of the daily routine of his brickyard? Ten years ago where could the experienced brickmaker look for information when confronted with some new difficulty arising from changed locality or variety in his clay? Where could they learn how to improve their methods of making and burning brick, or how to increase their output so as to create and supply a demand of trade incident to the growth of population, cities and the new architecture? Wisdom comes not from within. Careful consideration of one's own methods and failures may, indeed, lead to improvement, but mutual improvement is far more effectual than individual correction. Co-operation is far more potent than isolated effort. Verily, "union is strength." Our organization drew brickmakers together from different sections of this great country. Men who used different material, who burned with various fuels, hard coal, soft coal, wood, gas. Men who employed a variety of methods in shaping their brick, in drying them and in burning them. These assembled brickmakers spoke to each other, they talked shop, they related experiences, compared results and suggested ideas which in many ways were helpful, and thus educated each other. After these gatherings were over, afterthoughts cropped out and correspondence ensued. This was the origin of the modern brickmakers' literature, of which we are so justly proud, and which is the visible result of ten years of co-operation by brickmakers, edited by our faithful secretary.

The brickmaker of to-day is vastly in advance of his predecessors in this matter of acquiring knowledge in his business. He can learn of many methods differing from his own, and perhaps may be instructed how to improve his own practice and production and market.

This literature publishes a record of the experiments of beginners, those young enthusiasts, who, in brickmaking, as in all other walks of life, can boastingly say, "I am only a four-year-old, but I have made no mistakes in my brickmaking." With these are also given the experiences of the lifelong brickmaker, who, after half a century spent in the brickyard, bearing the heat and burden of the day in every department, and having by persistent courage and successful effort to improve his business earned a competence and the respect of his fellows, is willing to acknowledge that "the mistakes of his (brickmaking) life have been many." Between these two extremes are given much of inquiry and instruction in the pages of the journals created by the work of our Association, and which are devoted to the interests of the American brickmaker.

The Clay-Worker is the oldest, and it may well be called "The Brickmakers' Guide." Its work entirely covers the mechanical and chemical and commercial side of the brickmaking industry.

The Brick-Builder, a noble five-year-old, is justly entitled to be called "The Brickmakers' Friend." Its work is very important. It is especially adapted for the education of architects and builders, and the gentlemen who conduct it are thoroughly equipped and competent for the work. It teaches how to make use of brick, while the Clay-Worker teaches how to make brick. Here is the true spirit of co-operation.

These journals, the Clay-Worker, the Brick-Builder, the Clay Record and others, are full of useful information for the brickmaker; and, best of all, their pages are open to correspondents for the interchange of ideas, suggestions and experiences. By this correspondence there is gathered together much valuable data, ready for distribution among the present generation of brickmakers periodically, so that if any brickmaker to-day feels that he is alone, with none to help him, it is his own fault.

Two dollars per annum will make him a member of our Association, with four hundred brickmakers willing to help him, and give him the Convention report, which alone is so full of good things as to be worth more than the cost. Two dollars more will bring to him monthly a copy of the Clay-Worker, with its wealth of information about various clays, fuels and machinery and kilns, together with a record of the progress of the craft in all parts of our country. Two dollars and fifty cents will furnish him a monthly copy of the Brick-Builder, which he will find profitable to have at hand to show to the architects and builders whom he may meet in his business, for it will act as a special agent in extending his business.

Thus, for the annual outlay of six dollars and fifty cents, only the price of one thousand of very common brick, he may receive a library for reference, a school for learning, a medium for asking questions and getting special information, and, above all, keep himself posted in the development of brickmaking.

Who dare say that the modern brickmaker is not favored beyond his fathers. True, the public demand upon his skill and industry is more exacting and extended, but his equipment is far in advance of the demand, provided he will use his opportunity.

Rule of thumb does not pay now, if it ever did. "Knowledge is power." The successful brickmaker will be found in the front ranks, not at the rear with the stragglers. "There is always room at the top." JAMES TAYLOR.

New Tillers for the Old Craft.

Editor Clay-Worker:

In a recent report made by the United States Survey, Mr. Day, Chief of the Division of Mineral Resources, puts the value of the clay products manufactured in our Republic during the year 1894 (a dull one at that), including only all kinds of common, pressed, ornamental, fire and paving bricks, tile, sewer pipe and terra cotta, at $65,389,784. This report is the outcome of the first statistical canvass ever made. Naturally it is incomplete, and it would perhaps be only fair to increase this to ninety millions, owing to the inability of the Department to secure the names of all firms manufacturing or the neglect of many to send in their report.

During the last twenty years the introduction of improved machinery, which is likewise expensive, has made it necessary for capital in the clayworking industries to amalgamate, and the next twenty years will bring about a much stronger and more decided move in that direction.

Looking around the country, how many young men do we see fitting themselves to take charge of clayworking plants? Ninety millions of dollars' worth of business done in one year! This means at least two thousand young men of education, first-class business ability, a thorough knowledge of clays, clayworking machinery, dryers, kilns and all the thousand and one details connected with the same, that vary according to location, material, market and means of transportation. Have we got them?

The parents of a young man starting out in the dry goods business are well content to pay a good firm $100 the first year for the privilege of allowing their son to learn what he can. He works like a slave, is nothing but a light porter, taking care of the stock, dusting and sweeping out the warehouse. The second year he is lucky to receive $100 for his services. The third year he is a clerk to a salesman, perhaps traveling a little and taking care of his superior's samples. When he has learned the business he knows it, whether his fortune casts him into New York, Philadelphia, Boston, Cincinnati, Chicago, St. Louis, Kansas City, Omaha or San Francisco. Are there many young men to-day who are spending three years of their mature lives (for boys are not taken in stock by a dry goods house), without pecuniary reward, in learning how to make up the clay of the Hudson river district into a merchantable product? And yet this business of ours, confined to one locality, with its intricacies of chemistry, molding, drying, burning, selling, shipping, collecting and care of the plant, is much more complicated than the work done by a general salesman in a large wholesale house. How much more is there to be learned before a man is capable of taking charge of any clayworking industry, wheresoever it may be situated, without the necessity of going all through another apprenticeship and crippling his backers with a long string of failures in that learning!

The old, deep-rooted prejudice held by young men of education and refinement has not been overcome; the word "brickmaker" is associated still with the red-shirted individual who took his breakfast on the yard, and if, from this article, one young man's ideas have undergone a change I shall count it well worth the trouble of writing.

With the commencement day's exercises comes the grave thoughts of future occupation, and in making his choice the young man is influenced, first, by the lucrativeness, and, second, the congeniality of employment. If a man likes his work he will devote all his energies to it for the satisfaction he derives from his success. The reward is to a great extent a secondary consideration. If it be irksome, he is only "out for the stuff," and he expects to make his pile in a very few years.

Speaking now from the standpoint of capital amalgamated, and in twenty years, I repeat, there will not be room for many small plants owned and operated by individuals. Where do we find larger salaries paid for the amount of capital represented than in our business? Again, given a suitable location, and in what industry do we find the prospect for more permanence of demand or more opportunity for the broadening and increase of capacity than ours? Every day it is spreading; every week we hear of some new article manufactured from the dirt beneath our feet; every month we read of some other material used in our business, and each year brings almost a revolution in the manner of manufacture.

Our business has many things connected with it that recommend it to the liking of the most refined and best educated young man. It is healthy, free from monotony (I see some old brickmaker shake his head and whisper "Too much so" at that), full of opportunities for original invention and exhaustive research. The difficulties are immense, it is true, but the consciousness of achieved success is hugged but the closer for that, and in it are combined all the fascination of chemical transformation, mechanical ingenuity, command of men, bargain and barter.

Young men, the day is coming when, before you can take charge of a clayworking plant, you will have to be able to point to so many years in the university of so and so and so many years side by side with one of the leaders of your craft, and those of you who have done or are doing this will get your pick of the ripest apples, whilst the others will have to satisfy themselves with but the scrubby fruit. Practical men of sound business judgment, well educated in all the departments of financial economy, and sufficient adaptability to mix with all classes, are scarce to-day, and, unless more extensive preparations are made, ten years from now they will be just that many times more so.

F. W. BUTTERWORTH.

Ancient Enameled Bricks.

Editor Clay-Worker:

Any reference to the art of making common bricks by the ancients is not acceptable to the N. B. M. A. This may not be so in regard to making enameled bricks, however. I could not rest quietly in my grave while your young contributors, ignoring the knowledge and skill of ancient days, were contending for the honor of having made inventions in the art of enameling bricks, and have decided to send you a communication through "our medium," notwithstanding the apparent danger of having my name and fame besmirched for having published "rude secrets" four thousand years old. They will call me a "back number," and tell me to "go to grass," alluding to my well-known misfortune. But, Mr. Editor, you need not be told that my misfortune has no more relation to the making of enameled bricks than their early advantages in life. It is quite evident that nothing I could say would be considered as evidence, so I will quote from the writings of a man of your own race, famed for his knowledge—although it is very limited—of the arts of ancient days. Indeed, sir, if your young men, clayworkers, but knew the advanced state of the art under the ancient monarchies, instead of contending unblushingly for the honor of having made great improvements therein, they would blush with shame that they and their ancestors in this country know less about the art than was known many centuries before their civilization existed. If they will turn to Volume 2, page 382, of "Rawlinson's Ancient Monarchies" they will find the following passage:

"The pigments used by the Assyrians seem to have derived their tints entirely from minerals. The opaque white is found to be oxide of tin; the yellow is the admixture of lead or Naples yellow with a slight admixture of tin; the blue is oxide of copper, without any cobalt; the green is also from copper; the brown is from iron, and the red is a suboxide of copper. The bricks were slightly baked. They were then painted and enameled on one side only, the flux and glazes used being composed of silicate of soda, aided by oxide of lead. Thus prepared, they were again submitted to the action of fire, care being taken to place the painted side uppermost, and having been thoroughly baked were ready for use."

Is it not very strange that it should be asked by a member of your N. B. M. A., at its last session, "Are enameled brick successfully made in this country?" Your people have but very little, if any, occasion for boasting of their progress in this art, or in brickmaking generally, excepting that which has resulted from the use of machinery. Yours truly, NEBUCHADNEZZAR.

Morrison's Rifle Practice.

Editor Clay-Worker:

When any subject is under discussion it is owing to different views held on that subject. Sometimes it is opinion against opinion; controversy is then usually stale and unprofitable, except when conducted by men of sound judgment and liberal education. When opinion arrays its forces against well-known established principles or science, it is usually a one-sided affair, opinion going to the wall. Science against science only occurs through misunderstanding or mistake, and when each side distinctly states his position their differences disappear. Thus it is with Brother Morrison and myself. A clear statement from each leaves us nothing in dispute. His ideas and mine on the nature and influence of draft run parallel, and, as parallel lines cannot cross each other when extended (mathematical axiom), Brother Morrison's ideas cannot cross mine, nor mine his. The apparent difference arose out of our different methods of treating the subject. He looked at the draft question in connection with all the incidentals bearing on its production, while I only viewed it with its immediate effect on heat, leaving convenience, cost, etc., for after consideration. Here, again, when it is all summed up, we quite agree, and become fitting examples of another axiom—the whole is equal to the sum of all its part.

Nothing would give me more pleasure than a hearty handshake with Brother Morrison, Brother Carson and numerous other brethren I could mention. I often wonder if Brother Morrison is a brother or in any way related to John Morrison, editor and proprietor of the Sharon Herald, and his brother, proprietor of the Sharon Boiler Works. AERO DYNAMICS.

Prof. H. Bauerman Vindicated.

Editor Clay-Worker:

In the January number of the Clay-Worker we are treated to another sample of Brother Carson's effrontery and questionable tactics in debate. I have no intention of continuing this squabble further, and, as apologies are in order, I offer mine to you and your readers for the rough-and-tumble exhibition you have been compelled to witness. I very much regret I did not follow the example of my esteemed friend, Father Crary, by dropping our juvenile trickster and letting him severely alone at an early stage of the dispute, and now, in laying down my end of it, I would ask a few plain questions.

1. Why drag Geo. H. Bauerman into this fiasco? Have I ever questioned anything in his work on "Gas Producers," or even mentioned him till now?

2. Did you not say in August Clay-Worker, "I am neither a chemist nor a universal know-it-all, so I accepted the deductions of Prof. H. Bauerman, F. G. S., and other engineers?"

3. When you undertook to inform "a convention of intelligent brickmakers" at Louisville about the decomposition or steam by passing through burning coals, and the resulting gases being carbonic acid and hydro-carbon gases, did you even hint at the source from whence you drew this inspiring draught of information? And did you not allow this adulterated, garbled information to pass as genuine into the convention number, and later into the annual report, where it still remains in black and white, an example of your ignorance or criminal carelessness? How does this accord with your assertion of being "particularly careful to say only such things that practice has proven (to me) correct?" Is accepting the deductions of other people your unique method of proving things by practice?

4. Do you think it a "strictly creditable" piece of business to garble a paragraph from one author without the slightest hint of acknowledgement, and when a question arises as to the soundness and accuracy of the views expressed therein to shield yourself behind another author because of your incompetence to personally take up the matter? For example, you quote and garble Geo. H. Bauerman, but conceal the fact as long as you possibly can, letting it pass for J. W. Carson's erudition and astuteness. How suggestive of shining in borrowed plumes! When a difficulty arises you excuse yourself by saying you accepted Prof. H. Bauerman's deductions. Why do you mix the two in this matter? Is there no quibbling in pursuing such a course? Is this your way of doing things "above board?" Save the mark!

5. Does not Brother Carson comprehend my reason for giving an early date when and why the steam decomposition idea was abandoned by those who understood the laws of such decomposition? Not he. So, on the ground of this misapprehension, he proceeds to demolish my statement, or rather the statement of Prof. H. Bauerman, whose deductions he had accepted, with a later statement of the case by Geo. H. Bauerman. You may spare yourself the pains of rubbing this flagrant inconsistency in.

6. Does Brother Carson for one moment entertain the idea that a statement made by one author is refuted by another because of the latter being of a more recent date? Apparently he does, for he evidently thinks he made a very piercing point by quoting, not the authority whose deductions he had accepted, but another of more recent date. As dates appear to have more weight than reason with Brother C., I feel inclined to furnish him with some others. In November Clay-Worker I quoted from Prof. H. Bauerman's Metallurgy of Iron, fourth edition, published 1874. The same paragraph, precisely as quoted, appears also in the fifth and sixth editions of the same work, published in 1880 and 1890, respectively. I claim no advantage by these dates; the 1874 edition bears me out in my assertion, and is, consequently, a flat contradiction of the assertion by Brother C.

7. By the by, Brother C., what professor did you truthfully quote on this subject previous to the January Clay-Worker? You certainly have not the audacity to call the passage before referred to in your Louisville paper a truthfully quoted passage from Prof. H. Bauerman, nor, in fact, from Geo. H. Bauerman, for that matter, as may readily be seen by comparison; with the latter Bauerman, however, I have nothing to do at present. I maintain that my challenge remains untouched by Brother C., and my defense of Prof. H. Bauerman, F. G. S., and his metallurgical work, so far complete. My temerity, obtuseness, egotism, etc., of course, have much to do with such a conclusion, also with the conclusion that Brother C. can have the question all to himself so far as I am concerned.

8. In conclusion, I would ask: Don't you think, my young friend—don't begin to rave about the crime of being young; this was once a very pretty phrase, but it is now badly worn and very "seedy," and never quite atoned for or completely covered

the follies of youth—don't you think, then, you had better hoard up much of that advice you so freely lavish on your elders? In fifteen or twenty years hence you will surely regret such profligacy.

9. "In the long, dim past, when you were a boy," did your parents teach you the behavior, courtesy and deference due to the aged, especially the very aged, or had you the misfortune to be brought up and spoiled by an overindulgent grandmother?

Personally, I am quite indifferent as to the courtesy, deference, etc., of our worthy youngster, but would suggest that it is in very questionable taste to hurl epithets like "egotism" at the head of such a venerable old gentleman as Father Crary. This, too, stands permanently fixed in black and white against our "always very careful" Brother Carson. AERO DYNAMICS.

Why do Brick Stacks Vibrate?

Editor Clay-Worker:

I read the article of D. W. Stookey in the January Clay-Worker, entitled "Why Do Brick Stacks Vibrate?" with much interest. A discussion of this point will not aid us in working clay, but I understand you prefer that your readers should give their views on subjects published.

I certainly do not see how Mr. Stookey's theory can hold water. He seems to have forgotten that a stack is built brick upon brick, and each brick has a chance to communicate its motion to the ones above as they are being laid.

Mr. Stookey speaks of the motion of the earth without making any statement as to whether that motion is uniform or intermittent. He only mentions a difference in the rate of motion on the earth's surface and on the top of a tall stack, and I presume he takes for granted a uniform motion of the earth. His theory ignores all disturbances of atmosphere; in fact, states that is not the cause of vibration of stacks.

I would like to ask upon what law of motion or force he founds a theory that makes a uniform motion or force, acting in one direction upon a body with a constant resistance, produce a vibratory or intermittent motion?

Could a stack be pushed up to its full height in an instant of time it might vibrate for a short time, but the forces would soon balance and it would come to rest unless some force other than the earth's uniform motion were brought to bear on it.

Here is another theory, which, by the way, I don't believe in: The earth is larger from east to west than from north to south, consequently it curves slightly less from east to west. Its crust would then, when subjected to shocks, vibrate more easily from east to west than from north to south. Consequently the waves breaking on the beach at Coney Island rock the big stack in Chicago. Or it might be from the shock produced by the applause in Convention following the speeches of one of our Chicago members.

There has been a patent taken out for utilizing the motion of the waves to propel a vessel. Can't friend Stookey get out a patent for using the motion of a stack to run the plant?

G. AMMON.

S. P. Crafts, A. N. Oldtimer, W. R. Osborne, Et al.

Editor Clay-Worker:

The question of the heating properties of coal dust mixed with clay, as at present being discussed in the Clay-Worker, may be getting very stale and tiresome, as intimated by Brother O. in November issue, yet it seems of sufficient importance to be set down for discussion at the Convention at Atlanta. Now, while I own up to having commenced the "fuss" on this question in the Clay-Worker, I repudiate any connection, directly or indirectly, with foisting it on the Convention, although, personally, I am pleased it is so. If it really possesses all the advantages claimed for it by its patrons it ought to be countenanced by all brickmakers whose clay is rich enough to stand it, and if not possessed of any such advantage it ought to be dropped the same as any other old-time, useless custom.

I see my old, esteemed antagonist, Brother Crafts, throws down his gauntlet again. Well, if he is prepared for another dose of my "suavity" and "vituperation" (see Clay-Worker four or five years ago), I renounce all responsibility as to the outcome of the present fray. My only objection to an encounter with Brother Crafts is, he cannot or will not—I don't know which—confine himself to the weapons I choose to use, but picks up anything he can lay hold of, going on the principle, "the end justifies the means." In other words, he meets science with jibes, witty rejoinders, sarcasm, metaphor—very effective at times, but often two-edged—and hard-headed practical experience, all of which he can use very dexterously, in his own peculiar way. I therefore propose to lay aside the scientific aspects of this question, which appear to be of no earthly use to those brethren mentioned at the heading of this letter, and treat the subject from the standpoint of practical, hard-headed experience.

The hands now writing this letter have handled the coal shovel and other stoking tools for something over forty-five years, and in that time have burnt coal of every degree of fineness and quality, also coke, wood, charcoal, oil and gas. I have burnt coal very rapidly and very slowly, so slowly that three bushels would last twenty-four hours on a grate with an area of forty-eight square feet, and so rapidly that five tons often went in eight hours on a grate of twenty-seven square feet area. This was a daily occurrence in the works, and nothing out of the ordinary course. A fan blast will give any practical rate of combustion; it is only a matter of supplying a large volume of air in a short period of time. In the slow-burning method it is just the reverse. Close up every crevice to prevent air reaching the fire, and very slow burning is the result, and, I may add, a very low temperature, too. I am not offering this to my beloved brethren as information; I am only calling their attention to facts they are well acquainted with.

In firing with any solid fuel the great difficulty I always encountered was how to keep obstacles out of the air passages, and, what was equally important, to let the burnt air have a free escape. I was never able to keep up a good heat with a dirty grate, and I never came across the man who could. My experience with a dirty, choked-up fire is that more coal is consumed and less heat given out. In this I am sustained by many practical firemen who could not give a rational answer to the question, Why? With dirty coal I found a great deal depended on whether it was a clinkering or a non-clinkering ash, the latter being the easiest to deal with. Some coals have an ash that clinkers so easily that it runs together and imbeds the coal. This is a very wasteful and undesirable fuel. A coal with 20 per cent. of this description of ash would be dear as a gift where high temperatures are in demand.

There seems to be no question about a clean fire being an indispensable condition for obtaining high temperatures and the maximum of heat from fuel, nor to the axiomatic statement that the dirtier the fire the less the heat.

When my brethren wish to check the action of a burning fire, to bank a fire or stove, for instance, do they not close up the passages that let in air? And to effect this do they not smother up the fire with ashes or dirt of some kind when they want it to remain quiescent for a certain time? They have all done this, and know how effectually it prevents the combustion of the fuel; yet they all advocate smothering up coal dust in clay, and claim that it assists in burning the brick and saves fuel. In justice to Brother W. R. O., I must say that it is only his "decided opinion." To Brother O. I would say that I am afraid the New York Board of Health and users of coal dust are wedded to their idols. With regard to the burner fooling mixer, setter and boss, I wished to convey the idea that he can spoil their best efforts if not very closely watched. Those discharged foremen you mention are evidence of opportunities for it in the past.

Vaccination, as a parallel, suits neither Brother C. nor O. To accommodate them I will suffer it to go without question, and substitute tobacco chewing, the uselessness of which I have never heard questioned. This pernicious practice antedates the coal-dust practice, and, from my point of view, rests on a similar foundation.

When I started this question last spring I requested that some patron of the process would furnish me with a good, sound reason for it. I did not ask for examples of it; I can see them all around me at home. I do not doubt for one moment but Brother O. could show me all he states at Hackensack, but my own neighborhood furnishes me with all the examples I need. I want to know if the practice rests on a scientific or rule of thumb basis. So far I have only found the latter. I have not found one user of coal dust who has given me anything approaching a scientific rationale of the practice and process.

Brother C. informs us that by mixing in three pecks of coal per thousand bricks, and by carefully heating, etc., they can produce vitrified bricks that are practically non-absorbent. Granted.

If Brother C. will leave out the coal and put in three pecks of salt—may be less—he may, with much less heat, produce vitrified non-absorbent bricks, having the appearance of having been subjected to an intense heat. So much for appearances.

Brother C. reasons that if a brick can absorb eight ounces of water "enough oxygen can enter to affect (effect, I presume) proper combustion of the coal dust." To me it is extremely doubtful, but the question at issue is, does it? not can it? The captain then crowns this bit of lucid reasoning with one of his peculiar laconicisms, "The reason I think so is because it does." Which is equivalent to saying, "The reason I think so is because I think so." The captain's reasoning, concisely stated, would be, "It can, therefore it does." Then he treats us to a meaningless definition of science, and, on this quasi definition, gallops to the conclusion "that coal dust does assist in burning brick," etc. All, or nearly all, users of coal dust maintain there is a great aving of fuel by it, but none have yet replied definitely to the question, How much? Brother C.'s reply to this will be esteemed a favor.

The coal imbedded in the bricks is generally consumed, not always. When it is consumed, there is no room for doubt in my mind that the coal received from some source a supply of oxygen sufficient to burn it, but it is extremely doubtful if more than one-third of its heat was generated by combustion under such adverse conditions, smothered in dirt (clay). This admission does not in the least support Brother C.'s illogical conclusion concerning oxygen entering into the brick to effect the proper combustion of the coal dust, to wit: "The reason I think so is because it does."

I presume it never occurred to our worthy Brother that the brick in itself might contain the source of oxygen, especially such clays as he and Brother O. refer to. I mention this as being, to my mind, more probable than oxygen entering the brick from the outside, and to show, also, how untenable his deductions may be as to how the coal inside a brick is supplied with oxygen.

Brother C. intimates that he may be ignorant and wasteful, etc. Why, of course he is, or he would never dig such a deep "scientific hole," neither for himself nor me; however, such a hole is at times very useful, especially when one wants to concentrate our view to one point only. Occasionally one degree or less is all

I need; they who are capable of taking in the 180 degrees are welcome; I am not.

Both Brother C. and Brother O. are addicted to using a kind of obscure phraseology that I am not very well versed in. I have managed to make out that "barking up a tree in which there is no coon" means laboring under a delusion, or its equivalent, but I cannot comprehend what is intended by "I expected him to go gunning for bear." The remainder of the paragraph appears to intimate that my reply to him made but little impression on him. I never deluded myself with the idea that it would; in fact, in the last paragraph but one of my letter, I furnish some scientific facts, and say, "in which Brother O., I presume, will take no stock," I may now add, for a very good reason. His repugnance to anything scientific crops out in each letter of reply to me. Now, if it is at all distasteful to him—which he intimates in the second paragraph of his letter, in which he also commiserates with the suffering editor and his suffering readers, and comments on the injustice of taking up valuable space by a useless controversy—why on earth does he encourage me by replying? Why cannot he let me enjoy my views and opinions quietly? There are other relics of barbarism to attack, other scientific problems to tackle, chemistry to write up, and any amount of other interesting subjects to some clayworkers. Now, really, Brother O., so far as you are concerned in this controversy, it would be doing me a kindness to quit, so if you think well to have the last shot by replying to this, do so, and consider that ends it between you and myself. I am quite satisfied to leave it with the editor when to order contestants to quit altogether.

WM. WAPLINGTON.

Questions About Burning Brick Answered.

To the Editor of the Clay-Worker:

I notice in last issue some questions put to me by "American" about burning my pressed brick. It gives me pleasure to answer the questions my friend puts to me. First, the machines we use are made by C. Whittaker & Co., Accrington, England. Second, we dry our bricks before setting them in the kiln. Third, we use fuel oil for burning. Fourth, all our kilns are down draft. Some of them are a patent, owned in part by our company, but the highest percentage came out of a kiln that is not patented, all of which were, I think, put up by a former superintendent, and have not undergone any alteration by me, and though they are not just the kilns I would put up myself, yet we get there all the same. It is red and buff burning clays we use. To your fifth question, in my humble opinion I should say no, though I don't know positively whether he would or no. One thing I do know: you need not go to England or any other country to get your machinery or kilns; you have all that right here, the best, all round, the world can produce, with a choice of fuel that is not to be had in any other country. But to get high percentages of hard-burned bricks you need something very much higher, deeper, away above and beyond these things. Machinery, kilns and fuel are only the handmaids to the clay industries, necessary, certainly, but yours must be the power and ability to make them give up there tale of high percentages of first grade brick. If you have the ability it will not make all the world of difference what kind of kilns you have; if you have not the ability, the best machinery, kilns and fuel your country can give will not make the bricks for you. So you see, my friend, how impossible it is for me to positively answer your last question yes or no. From my own experience and observation, I should say it takes one whole lifetime to make a fairly good, all-round brickmaker, but as it is information you are after I would very much like to help you, and the best way to do this is to refer you to the writings of the honored President of the N. B. M. A., Brother Morrison, and J. W. Crary, Sr., and to some short papers written for this journal, one by J. K. Caldwell on burning brick, in last July number; "Hints to Beginners," by our friend, W. A. Eudaly, August number; J. G. Greusel, "How to Burn 95 Per Cent. of Hard Brick," September number, and same date, by J. W. Crary, Sr. on "Kilns and General Observations Thereon." These are all probably safer to follow than I should be on this branch of brickmaking.

I. H.

The Trend of Events.

Inclosed please find amount due on subscription account for the Clay-Worker.

I was very much pleased with the report of the proceedings of the Convention at Atlanta. I have never had the pleasure of attending one of the Cenventions, but have carefully read the proceedings of each from first to last, and I cannot help but realize the giant strides which have been made in the clay industries in the last ten years. The quality and quantity of our product have been worked up beyond the demand. While clay manufacturers have been trying in every way to improve and cheapen their product, they have neglected to work up their market. Manufactories have increased on every hand, and, as a consequence, we are now cutting each other's throats on prices. The reason for this is, the supply is way ahead of the demand. This business is getting into the hands of large concerns, and it is only a question of a short time when the men of small means will have to step down and out or lose what little they have. This is pretty hard on the small fry (like myself), but we may as well look the matter square in the face and take our medicine. The tendency of the times is toward concentration of capital, and there is no use talking, with large capital and all the improved devices they can make a better article and lay it down at our door, at a profit, cheaper than we can manufacture. So I think that the sooner we get out of the ranks and seek some other business the less liable we are to get hurt.

Hoping you and the Clay-Worker will prosper in the future as in the past, I am, sincerely,

H. J. CAVENAUGH.

Brief Review of the Atlanta Convention, Continued From January Clay-Worker.

The next question (see December Clay-Worker, page 544) was, "What type of fire hole can be used to best advantage on the multiple stack down-draft kiln for paving brick?" Why the multiple stack kiln should be singled out as a shackle on the discussion for the best "fire hole" in down-draft kilns does not appear. The stacks of kilns relate to draft in kiln, or the exit of heat and air. The furnace relates to the making of heat, and its introduction to the kiln, and we cannot see what multiple stacks or single stacks have to do with the furnace, good, better or best. Necessarily when multiple stacks are named the mind at once reverts to those kilns which have a forest of chimneys in their walls, whether the kiln is round or rectangular. If that was intended by the author of this question he should have used the word "chimneys," not stacks, as chimneys built in the wall of kilns rising only eight or ten feet are not stacks, properly speaking. However, the answers to this question were amusing, if not specially instructive.

First—As to what a fire hole meant, some one or two thought it was the opening in kiln wall in the rear of the furnace. Mr. Ittner happily suggested that we call the "fire hole" a furnace. At the present day we do not think the term "fire nole" to designate a furnace is a happy one, although the time was when round down-draft kilns had no other furnace than a hole in the wall of the kiln, the bag wall forming the back part of the fire hole; and Professor Orton, usually clear cut and precise in his statements, in a recent article on the several kinds of furnaces for brick kilns, in describing the fifth and last kind he mentions, calls it a "fire hole," and this is measurably correct, because it is such as mentioned above, and is that referred to by Mr. W. S. Purington, which, he informed the Convention, was so effective in economising fuel and in the production of good pavers—better call it a "grateless furnace."

Second—What was meant by multiple stack kilns? We have referred to this above, but will venture this opinion, that a kiln having a central flue only, and a stack at each end is not, strictly speaking, a multiple stack kiln, for the reason that the draft in the central flue divides at the center, part going to the right and part to the left, and we have virtually two kilns end to end, but without a division wall. But this matter of multiple stacks as affecting the furnaces is not worth considering in the face of such an important question as "what style of furnace is best and most economical." And it is surprising after the statement of W. S. Purington that the question should have been dropped. He should have been put on the rack and sharply cross-questioned as to the kind of furnace in detail—the saving in fuel, and why, and lastly as to the improvement in the goods—what this consisted of, and why. Here we find a batch of omissions.

Repressing paving brick was discussed at some length. The chief object it was claimed was to round or bevel the corners; but on the long angle this can be done without cost and to any extent on any machine making an end-cut brick. But the bevel on the short angle at the end of brick cannot be done but by repressing. The advantage in the long angle is very apparent; as, first, furnishing a better foothold for horses, and, second, preventing chipping of corners, and, third, by facilitating the filling of the joints by grout, tar, or sand. But the advantage, if any, of rounding the corners on end is not very clear. Granting that the bevel on the long angle can be made perfectly by the machine that makes the brick, and granting further that beveling the end corners is not important, the benefit to the brick by repressing is reduced down to an improvement in the structure and its wearing qualities. That this is doubtless true, to some extent, we admit, but the discussions of the Association did not make it very clear. It is evident that if a brick is put into a mold that is necessarily larger than the green brick the pressure will spread it to fill the mold, and thus break to some extent the bond made by the machine, and a new bond must be formed by the pressure. This makes it an open question whether the bricks, as to their wearing qualities, are much improved by repressing.

It was claimed that repressing makes all the brick of the same weight. If so this implies that they were not of equal weight before repressing; and if the pressing equalizes the weight the excess of one over the other must escape around or through the plunger. Does it? The omissions under this head failed to prove conclusively the advantages of repressing, or to show the advantages of beveling the ends; and especially to show whether during the year any discoveries or improvements were made in the important matter of annealing paving brick.

At the Cleveland meeting of the Association Captain Williams reported his experiments with steam according to a custom of a semi-barberous tribe in Asia. This seemed to offer some hope of improvement. Whether any one else has tried it was not made known. During the year Mr. Sibley, from a suggestion from Prof. Orton, made an experiment in cooling paving brick, which he claimed was of no mean value. Of this nothing was heard; another omission.

The report of the Committee on Standard Specifications, etc., it is hoped, will throw some light on many misty points. In regard to using coal dust in clay Mr. Purington's remarks are to the point, and on the Hudson river, where it is so important to have nearly all hard brick, they would get along badly without it. This is also true in Chicago and other places. In the discussion of the question three names are used for the same thing, viz, coal screenings, coal dust and coal slack. The first of these is probably more accurate. It was not stated that the coal used was reduced to dust, although the word dust was used by Purington, McAvoy, Ferguson and others. The size of the particles of the screenings or dust was not stated, or whether any one had tested the matter of crushing the coal so as to have a dust, properly speaking.

An important question omitted was, "Why cannot soft coal dust or slack be used?" May it not be that either the dust was not fine enough, or else the proper quantity was not used?

We pass the subject of salt-glazing paving brick, as there is no evidence that it is of any benefit to paving brick, but rather an injury; besides, there are very few city engineers that would allow glazed brick to be used. The mater of using for fuel "Culm" for burning brick is only specially interesting to those living near anthracite coal mines. In regard to the use of soft coal slack: If the brick plant is far from the mines it will not pay to pay freight on the dirt and slate in soft coal slack. Where the freight costs as much or more than the coal at the mines it is better to have the best coal. In many cases nut coal well screened is better than lump, as the breaking of lump reduces part to slack. J. K. C.

(To be continued.)

An Important Clay Center.

T. A. Randall & Co., Indianapolis, Ind.:

Gentlemen—Inclosed please find amount due on my subscription to the Clay-Worker up to January, 1897.

You ask for clay news in our locality. We have one of the best inland cities in the country. Our stoneware is as good as any made in this country. We have four large potteries, two large sewer-pipe and tile companies, one of which was burned out last summer (the Macomb Sewer-pipe Company). They have nearly completed their new building, and will resume work in the early spring. Three brickyards, and the fourth incorporated.

We have an abundance of fine clay and shales, and are in need of a good paving brick company and fire-proofing goods. I don't know just how good our new brickyard will be, but they have formerly manufactured building brick, and I know that they have not the paving clay and shales on the land they have bought. We have a town of about six thousand inhabitants, situated on the C., B. & Q. railroad, forty miles below Galesburg, and prospects for a southern railway next summer. We have a good system of water works, and sewerage and street paving come next, and another summer will see some of that work done here, surely.

I have a farm of over three hundred acres, a portion of which is in the city limits. One of the brickyards is on property of mine. The lease runs for eight years longer, with the privilege of extending the time. The situation is a good one and the firm can be bought out cheap, owing to the ill health of one of the partners. If you know of any one who would like to locate here in the manufacture of clay or shale into brick or pottery, I would like to furnish the locality for plant and clay or shale, and take pay in royalty on material used. I now have some clay at two of our potteries to be tested as washed clay. It has been tested without washing, took the slip and salt glaze all right and stood the fire all right, but had some black specks in it when burned. I have an inexhaustible supply of it, and think it is something fine, also acres and acres of black shale. Recently one of the proprietors of one of our potteries said it was a serious matter for a pottery to change clay, and to make a change they must be sure of getting something better than they were using, cheaper, and an inexhaustible supply. Should mine prove what I surely think it will, I hope they may find it a serious matter if they do not change.

I have spent many hundreds of dollars in prospect work; have personally watched the work, keeping samples and taking measurements. Your clay journal has been invaluable to me. I know that I have as fine clay and shales as are in any State, and can furnish a desirable location for a manufactory two blocks from our railway depot and just between two of our potteries or just outside of the city limits. Yours respectfully,

Macomb, Ill. MRS. M. A. WHEAT.

Wants to Know the Cause of Blisters on Brick.

Editor Clay-Worker:

I am anxious to know how to overcome or prevent blisters from coming out on the face of brick. We are using an auger brick machine, and in making brick that we have to set on flat blisters will show on the face of the brick. I would like to ask through the Clay-Worker what causes this trouble and what is the remedy. Is it the result of having too many or too few knives on the back of the auger? Or, if only an auger is used, can it be because the air has no other chance of escape and must go through the machine and so show on the brick? I would like to hear from some of the experienced members of the N. B. M. A. in regard to this matter. A NEW BEGINNER.

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The Present Drift of Thought Relating to Brickmaking.

Editor Clay-Worker:

It is quite evident, from a perusal of the columns of the Clay-Worker, that the inventive genius that is always on the alert for the best means of promoting the brick manufacturing industry is now centered on the best means for burning brick. This is as it should be. It does not seem the dictates of wisdom to spend thousands and tens of thousands of dollars on machinery making a product that is as perfect as a new-minted dollar, and then spoil, mar and deface its beauty by imperfect burning. Yet this has been done time and time again. But a change for the better has taken place, and we may soon look for the means of burning brick to be as perfect and satisfactory as the means of making now is.

The burning is the last process and often the largest single item of expense. If the burning is a failure, all labor and expense preceding are largely lost. Whereas, if the burning is good, it covers up a multitude of defects even in the making. How supremely important, then, is the matter of burning brick! It towers above everything else, as all else in the matter of manufacturing brick is subject to it. As good brick cannot be made without good machinery, so "good burns" cannot be had without good kilns or the necessary means to make "good burns." Good judgment is important, but this can never overcome defective methods. Take, for example, a machine defective in the essential elements necessary to make a good brick, and all the skill flesh is heir to will not bring out of it what is not in it. And so it is in the matter of kilns. If the principle of construction of the kiln is at war with the law of heat and its application so as to produce certain results, no amount of judgment will atone for these defects. Take, for example, the down-draft and continuous kilns—two of the best types in the market. The continuous will save largely in fuel, but this is only one of the essential qualities of a good kiln. The other chief essential that is lacking is the power to make a large percentage of first-class brick. This defect arises from the manner of supplying the fuel, by which it is brought in contact with so much of the material to be baked, and this contact reduces the quality of the goods produced. Another objection to this style of kiln that applies also to the down-draft, but to a less degree, is the first cost of kiln capacity for a given daily output. A further objection, and one that largely offsets the fuel saved, is the extra labor of setting the brick in such kilns. This arises from the large number of vertical flues that must be made in the green brick, and the small and cramped compartment in which the work must be done.

Now, let us see what is the matter with the ordinary down-draft. First, its good point, and that which gives it supremacy over all other kilns (except the special down-draft), is that it produces a larger percentage of first-class brick than any other kiln on the market. This qualification is what every progressive maker of fine clay goods should seek for. But we do not say that every progressive brickmaker should have down-draft kilns. It is not the best kiln for the man who is making from one to five hundred thousand common brick per day and must meet a low market price. Indeed, the first cost for such an output would be prohibitory, unless the market prices of his common brick respond to the increased cost of plant and method of burning, which is not the case at present, although there is some disposition on the part of the architects to insist on hard-burned bricks only being used. Whilst the large percentage of No. 1 brick produced by the down-draft kilns gives them supremacy over all others, they are, like the continuous, not free from objections. The first and chief objection is the amount of fuel required to do a given amount of work. This defect in the ordinary down-draft kiln arises from the fact that the heat evolved acts on but a small amount of material before it is discharged into the open air. This defect, it would seem, could be easily removed, and the wonder that this has not been done is heightened by the simplicity of the means necessary to accomplish the cure. The continuous kiln men struck on the right track to save fuel, but disregarded the deleterious effects of their system on the product. The down-draft kiln men struck on the right track to produce the best goods, but disregarded the cost of fuel necessary to accomplish this end. That these objections will be removed in the course of time there can be but little doubt.

Before closing this brief article we ask attention to the chief defect in the down-draft system, and a simple and inexpensive method of correcting it. Ordinarily the drying off and heating up of the down-draft is by down draft. The heat striking on the top brick, the moisture is carried down into the bottom brick, not only making them soft and unable to carry the load of other brick, but also retarding the draft, so that the heat is retained in the top brick, largely overburning them before the bottom brick can be brought under a settling heat.

This difficulty and the damaging effect on the top and bottom brick is readily removed by drying off and heating up from the bottom upwards. Then, when the down-draft burning commences, we have a hot bottom and a cold top, and the hot bottom draws the heat away from the top and so prevents it from being overdone, and the heat already in the bottom is reinforced by the heat from above, and hence the heat in top, middle and bottom of kiln is more uniform than it is otherwise possible to have it by either the up or down principle alone. This principle will be duly appreciated by the down-draft burners, but the importance of these facts is greatly heightened by the fact that the drying off and heating up is done without fuel or labor, but automatically the heat is taken from a burning kiln which, by the ordinary down-draft principle, would be wasted in the open air.

J. K. CALDWELL.

Ohio Valley News.

Editor Clay-Worker:

There has been a general shut-down of all the sewer pipe and brick works since November 1, the sewer pipe works having immense stocks of pipe on hand. They are all reducing their stocks by rapid shipments, and by March 1 there will be a general resumption. About five millions of brick were shipped by boat on the last rise of the Ohio river to Louisville and New Orleans, being the first river shipment for over seven months.

Mr. Joseph P. Mack, of Philadelphia, succeeded Col. Mart Powers as Superintendent of the Mack Manufacturing Co.'s brick and sewer pipe works at New Cumberland, W. Va., on Jan. 1. The Eagle Brick Works, of this company, is being converted into a sewer pipe works, and will be in operation on March 1. The Mack Co. now is one of the most important factors in the manufacture of sewer pipe, as well as paving brick, having three sewer pipe plants and four brick works.

The Park Fire Clay Co., the purchasers of the John Porter Works, at Kenilworth, W. Va., are building ten new kilns, and will double the capacity of the works, and be placed in operation about April 1.

Several of the local sewer pipe manufacturers were heavy stockholders in the new sewer pipe works at Patton, Pa., lately completely destroyed by fire, resulting in a loss of about $30,000. The plant was just about completed and ready for operation when destroyed.

The paving brick works of Stratton, Hinkle & Stratton, at Empire, O., was completely destroyed by fire on Jan. 10, the loss being about $25,000. The plant is being rapidly rebuilt, and will be running about the middle of May.

The Central Sewer Pipe Co. met in Toronto, O., on Jan. 15 and re-elected the same officers as last year, and reports showed the combine to have been very satisfactory in its workings, and the prospects for a very profitable, busy future very flattering.

The Markle Fire Clay Co. will begin operations at their sewer pipe works at Markle, O., on Feb. 10. This plant has been idle for two years, the present owners having purchased the same at receiver's sale.

The Calumet Fire Clay Co., of Calumet, O., are sinking a new clay shaft at a cost of about $4,000, and have one of the best veins of pipe fire clay in the valley.

The Toronto White Ware Pottery, of Toronto, O., will be placed in operation in the near future. This works went into the hands of a receiver over three years ago. The stockholders are reorganizing the company, and as this is one of the best equipped and convenient plants in the valley, under able management it will again be an important factor in Toronto's prosperity.

The sewer pipe works of this region have given up the hope of being able to supply the city of New Orleans with the immense amount of sewer pipe required for the proposed new sewer system of that city. Owing to the reduction of the tariff on sewer pipe under the Wilson bill, English and Scotch manufacturers can place their products in New Orleans at a much less price than the manufacturers of the United States.

BUCKEYE.

RESOLUTIONS IN MEMORY OF ASA A. MATTESON.

The annual meeting of the Purington Paving Brick Co. was held on the 21st of January, and the following Directors were elected for the ensuing year: D. V. Purington, George C. Prussing, S. S. Kimbell, O. F. Price, W. E. Phillips, F. G. Matteson, W. S. Purington. The Directors elected the following officers: D. V. Purington President and Treasurer, W. S. Purington Vice President and General Manager, Charles H. Chamberlain Secretary. The company met with a severe loss in the death of Asa A. Matteson, who has been Treasurer of the company since its organization, and the following resolutions were passed unanimously by the stockholders and Directors at the annual meeting:

"On the 4th day of January, 1896, Asa A. Matteson, the Treasurer of this company, passed from the strife and turmoil of this life into eternal rest and peace. The Directors of this company, who were his friends and business associates, desire to give formal expression to their grief and sorrow for the loss of one whose services had been so invaluable. They therefore desire to have the following resolution placed upon the records of this company:

"Resolved, That in the death of Asa A. Matteson, the Treasurer of this company, we are compelled to mourn the loss of one who may with truth be called its founder. His clear business vision early recognized the possible future of brick as a paving material, and he never wavered in his endeavors to promote its interests. Careful, sagacious and conservative, with long experience as a lawyer and banker, an extensive acquaintance with business men throughout the State, he was a rare combination of those qualities so requisite to a successful business career. To his sorrowing wife and family, to the stockholders of this company, to the citizens of Galesburg and his large circle of friends elsewhere, we tender our sincere sympathy for the great loss we mutually share.

"Resolved, That these resolutions be spread upon the records of this company, and a copy, suitably engrossed, be sent to the widow of our departed friend."

A NEW BOOK.

ENGINEERING CONTRACTS AND SPECIFICATIONS, by J. B. Johnson, civil engineer. Engineering News Publishing Co., New York. This most useful book gives a synopsis of the law of contracts and illustrative examples of the general and technical clauses of various kinds of engineering specifications. It is designed for the use of students, engineers and contractors. The author is professor of civil engineering at Washington University, of St. Louis, Mo. He is a member of the Institute of Civil Engineers, of the American Society of Civil Engineers, and of the American Society of Mechanical Engineers, and is also the author of a very valuable work on the theory and practice of modern frame structures—a standard work. This new book is divided into four sections. The first gives a synopsis of the law of contracts, dealing with competency, legality of agreement, the agreement, consideration, contracts under seal, parol contracts, assignment of contracts, their construction, contracts required to be written, subsequent changes in agreements, discharge of contracts, remedies for breach, specific performance and discharge of right of action. Part two deals with specifications and the accompanying documents. It considers advertisements, instructions to bidders, forms of proposals, engineering specifications, the general clauses of specifications. Part three is specifically descriptive of technical clauses in specifications, and in a detailed way considers illustrative specifications of various elementary portions of engineering work, specifications for excavations and embankments, cement, mortar, concrete, masonry, street pavements and materials, sewers, water pipe, lumber grading and classification, iron and steel and other miscellaneous specifications. Part four is illustrative examples of complete contract specifications, and includes contract and general specification for pumping engines, boilers and settings, an engine house, architectural steel construction for Astor Hotel, form of a contract bond, and an indemnity bond. This work is a satisfactory text-book upon the subject matter treated, and while it is constructed for the laymen, it is by a competent theoretical engineer. It should be in the hands of every contractor, builder, architect and engineer.

THE CLAY-WORKER

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5 Monument Place.] T. A. RANDALL & CO., Indianapolis.

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CURRENT COMMENT.

Full reports of both the Iowa and Ohio State Conventions will be given in our March issue.

* * *

Nearly all of the leading manufacturers of clayworking machinery were well represented at the Illinois Convention. Several of the "missionaries" took part in the discussions following the papers, adding materially to the general fund of information. This is as it should be. Information is what is wanted, and it is just as valuable coming from a machine-maker as from a machine-user.

* * *

A large majority of our subscribers have promptly remitted for '96, and a great many, in addition to that substantial token of appreciation, have added warm commendatory expressions that are highly gratifying. There are still a great many, though, who have not yet responded to our annual call. Before each and all of these we hope this little paragraph will loom luminously. Don't forget that NOW is the time to subscribe.

* * *

There was an interesting display of clays and clay products in the Convention hall at Streator. Most of the exhibits were by local companies, and comprised samples of the raw clay and specimens of the ware being made or for which it was especially adapted. There is an inexhaustible supply of all kinds of clays in that immediate neighborhood, including common brick clay, potter's clay, fire clay and several varieties of shale. Streator is destined to be a great clay center.

* * *

There will be a larger demand for colored brick other than red this year than can be supplied. The public taste has been turned in that direction, and this turning should not be regarded as a fad. It has only been recently, through improved methods of manufacture, that the public could satisfy itself in the way of color. Now as the opportunity has been presented and the start has been made, the movement is certain to be great, and we think permanent in a large degree.

* * *

The Ohio Brick and Tile Manufacturers' Seventeenth Annual Convention, to be held at Columbus, Wednesday and Thursday, Feb. 12 and 13, bids fair to be the largest attended of any meeting for several years. The programme, which appears in full on page 61 of the Clay-Worker for January, is an unusually good one.

* * *

Nebraska brick manufacturers are progressive. They have made a brave start, and though not now strong in numbers, their State organization will in time prove a potential factor in the achievements of the craft in that section. President Cotton writes that they started with a membership of thirteen, which has since increased to more than twenty, and that he is confident of having sixty or more at their next convention. So mote it be. "Great oaks from little acorns grow."

* * *

We commend to the earnest consideration of those interested in agriculture—and a great many brickmakers are owners of farms—the paper on page 149 entitled "The Utility of Drain Tile," by Mr. A. S. Kempton. The benefits of tile drainage are so clearly set forth that we think drain tile manufacturers will find it greatly to their advantage to put this paper in the hands of prospective patrons. To enable them to do this, we have printed the paper in pamphlet form, and will send any desired number at a nominal price, with or without the imprint of manufacturer, as preferred.

* * *

While the brick and tile men of Illinois were exploiting their interests at Streator, the National Association of Manufacturers were perfecting their organization at Chicago. The attendance at the latter was large, and included many representative manufacturers from all the chief industrial centers of this country. Their deliberations assumed decided political coloring at times when tariff measures were considered. That they are not in favor of a tariff for revenue only is quite evident. A permanent organization was effected on lines that will make it a power in advancing the interests represented. Mr. Theo. C. Search, of Philadelphia, was elected President, and the next annual meeting will be held in the City of Brotherly Love a year hence. E. P. Wilson, of Cincinnati, who has served so efficiently in that capacity, was re-elected Secretary.

* * *

It may be, after all, that the United States will have to annex Turkey. Our minister plenipotentiary has informed the Sultan that we want $100,000 to pay for the loss sustained by American missionaries, and we intend to have it. Now, suppose the Sultan has not that much by him, and Russia will not advance it—what else can we do than levy upon his empire and sell it to the highest bidder? But suppose no one bids; we will have to bid it in ourselves. Then what? Not wishing to commit the Clay-Worker to either side of this momentous question, we are free to express our undivided opinion that the whole empire would not be worth half that to us as an investment, but if we must take her, we can have the satisfaction of freeing the beautiful daughters of the harem, and in that event we will have a new copyrighted design for a calendar next year ourselves.

NOT OF THE COMIC SORT.

Good old St. Valentine must have been a jolly soul. Just how a priest, unmarried, could ever have given so much good advice and contrived so many schemes relating to love affairs we never could imagine, but so it is. Even the birds are said to choose their mates on this day, Feb. 14, and no doubt it is true. As for giddy boys and girls, we need not say. Our young readers know how it is, and our old readers well remember how it used to be. We venture no advice for the occasion, for the young would not heed it and the old do not need it. Certainly we do not intend to abolish St. Valentine's day, though the postal clerks and the mail carriers are glad that there is but one Valentine's day in 365. The valentine is properly a message or token of affection, so we trust this, the valentine issue of the Clay-Worker for '96, may bring good cheer to every reader, for there exists between us a real bond of affection.

ILLINOIS CLAYWORKERS' ASSOCIATION.

The report of this Convention is given in other columns. It was a meeting abounding in good spirit and good material. The papers read were excellent. State organizations of this character do a work which is hardly possible with a National Association. On the other hand, they contribute largely to the development of the national body. They are feeders. It looks like a big undertaking to some of our brickmakers to pull up and go to a National Convention in a distant city. A short trip to a State body is accomplished with less strain. Both the papers and the discussions indicated a familiarity with the best methods of clayworking which could not have been possible excepting for the educational Convention work of recent years. This was particularly shown in the discussion of one of the papers, where a wide range of facts, large experience and abundant data were presented by the members in regard to the subject of the paper. This discussion was not all one way by any means.

* * *

Mr. Griffin's paper on hollow blocks before the Illinois Convention was of particular interest, because there is less general knowledge in regard to this material than some other branches of clayworking which were considered. Mr. Griffin touched at the heart of this subject when he said "the artist in clay work has been coming to the front of late." It is the artistic possibilities of clay work which must form a great part of its development during the years to come. This is one of the new movements in that line. The business of handling clay in the work of recent years first had to do with the better manufacture of an ordinary grade of brick. After this camo the higher development of pressed brick, and then the manufacture of paving brick.

* * *

The manufacture of terra cotta has been carried forward along other lines. There has not been the association of interest between brickmakers and terra cotta manufacturers that there might have been. During the process of the development of pressed brick of a uniformly high character, molded brick of generally indifferent design had been produced. But the results from an artistic standpoint have not been generally satisfactory. The manufacture of building blocks for better building purposes is in a measure the bringing together of the brick manufacturer and the terra cotta worker. Each has a good deal to learn one from the other. There are machine methods and other methods of economy in the brick plant which have not found their way into the terra cotta factory. Building blocks have only been successful in great buildings, where their forms and color have been directed by artists.

* * *

The ordinary type of building blocks which we see used in the smaller towns and cities have a structural value merely, and while they are of great commercial importance, their manufacture is not in the line of artistic result, and for the most part their use in the present manner will operate against their use for artistic purposes. However, anyone who has seen the Stock Exchange building in Chicago, the Rand & McNally building, and others throughout the country, cannot doubt their possibilities. The manufacture of building blocks will assume widespread importance only when the business is given an artistic direction, and when the plain and decorated parts be duplicated in such a way and in such numbers as to enable the builder of the modest structures of our towns and cities to secure artistic results at a moderate price. With the exception of the instances named, where building blocks have been directed by the architect for a particular structure for which they were intended, nearly all building blocks have been failures, because the buildings produced were ugly. We have seen many building constructed from the ordinary commercially made building blocks, but very few of them were in any great measure successful. The manufacture of a successful building block must have an artist associated with it.

MAKING BRICK IN COURT.

The novel scene of a brick machine in operation in a United States Court room was witnessed at Cleveland, recently, when the patent suit of Chambers Brothers Co., of Philadelphia, against J. W. Penfield & Son, Willoughby, O., was tried before Judge Severance, of Michigan. The brick machines were miniature affairs, but exact models of those in controversy. They were run by electricity, and tiny brick about two inches long, one inch wide and half an inch thick were made of clay brought from New Jersey for the express purpose because of its adaptability. These little brick were turned out by the hundred, many of the spectators carrying them away as curios. This noted case, which has been pending for several years, is now in the hands of the court, and a decisive verdict is expected in a few days.

A FINALITY.

The past winter has been unusually favorable for all kinds of outdoor work, hence the finishing up of buildings which were begun last summer and the preparation for building next summer has gone on to an extraordinary extent, preparing the way for the building season just ahead of us; and now comes the ground hog with his promise of an early spring. His hogship never looked out from his hole on a cloudier and darker Candlemas day than was the second of February, 1896. Not a single ray of sunlight was seen from morning to night, which pleased the ground hog well, and he went forth to the nearest clover field to break his long fast on the tender buds which the farmer had intended for larger hogs, returning late in the evening to rejoice that winter was gone, not to return again. Let all brickmakers take notice and govern themselves accordingly. We challenge the oldest brickmaker to recall a single occasion in which the ground hog ever made a mistake. He understands his business and may be relied upon. There may be a blustery day now and then, but winter is gone and spring has come—the ground hog says so.

It may not be amiss for the Clay-Worker to settle at once and forever the question so often discussed by the uninformed as to the proper date for the ground hog to make his appearance. It is and always has been Candlemas day, and that day comes on the second of February, and always has since its first invention. More than three hundred years ago one of England's greatest poets wrote:

> If Candlemas day be fair and bright,
> Winter will have another flight;
> But if it be cloud and rain,
> Winter will not return again.

This settles it, and we hope all the world will take notice.

MOLDED BRICK.

An architect who watches these things closely recently said: "Thousands of dollars have been wasted and much ugliness perpetuated through the manufacture of dies and molds of ugly design for decorative brick. The concern which probably has the smallest number of forms in its catalogue has those which are the most artistic. Some of the brick manufacturers have gone before the architect and said: 'We will manufacture anything you want.' But for the most part the designs asked for were very ugly, and added nothing to the stock in trade of the concern which made them. The firm which makes the most artistic molded brick in this country has adopted a few classic designs. The models for them were made by a distinguished artist; their value was at once recognized by the best architects in the country, who from the combinations presented could get almost anything which was wanted, so that from a relatively small number of forms and from a relatively small investment very substantial returns have been received. It costs no more to mold a beautiful form than it does an ugly one. It takes no more material and labor for the one than the other. The manufacturer who puts his money into ugly molds is loth to discard them because of the investment."

The architect who expressed the above thought may be a little radical, but nevertheless it is deserving of serious consideration. There can be no question but that there is an increasing demand for artistic forms, and that the manufacturer who is first to supply this want will reap the benefit. The fact that a man can make a mold or knows all about manufacturing brick does not imply that he can design good forms. It requires a well-trained architect to do work of this kind.

KEEP UP WITH THE PROCESSION.

We cannot be too emphatic in our advice to brickmakers to keep their State and local associations not only alive, but progressive. We must not rely too much upon our National Association. The inspiration received there must be carried to our home associations and diffused among our respective local interests, that in turn these will give vitality and influence to the head center. We may not have as many at the State Conventions, and these meetings may lack the enthusiasm which the assembling of three hundred or more, all of one mind and heart, inspires, but they can be made profitable and pleasant. What if we make these local associations chiefly business meetings, looking mostly after local interests? We can listen to one or more papers, discuss one or more topics relating to the craft, talk of methods, make local acquaintances, and put in a day or two to profit. Let no one say he has not the time for that. Make allowance for it in your plans for the year, and you will have as much time for that as for anything. If the time for your yearly meeting is not past, resolve at once to go. Keep up your membership in your State Association, attend its meetings and keep in touch with your enterprising neighbors, and profit, as well as pleasure, will be yours.

THE FABLE OF IMPORTED BRICK IN COLONIAL TIMES.

We are indebted to Mr. W. H. Copeland, Secretary Warren Brick Co., for the accompanying item from the Pittsburg Times, which effectively explodes the idea that it was quite a common thing in "ye olden times" to build houses of brick imported from England and Holland. The origin of this mistaken notion is clearly set forth in the following:

> "When some people get a notion in their heads there is no getting it out." That is true of many. Day before yesterday a gentleman who called in this office remarked during the conversation that the bricks in Bouquet's redoubt were made in England, imported at Philadelphia, and brought over the mountains on pack horses. He had heard that from childhood. Last fall some gentlemen visiting the redoubt from Ohio held that view, and one of them added that he remembered learning it when he was a boy. If you go to the old Virginia town of Norfolk the proud citizen will point out to you the ancient St. Paul's, with the cannon ball embedded in one corner, a memorial of the bombardment of the town on New Year's day of 1776, and tell you that the bricks in that church were brought from England. In Maryland you will be shown plenty of houses the bricks of which are said to have been brought from England, and perhaps in the State of New York you might find houses the bricks of which are said to have been brought from Holland.
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> * * *
>
> It is a fact that in New York houses there are bricks from Holland, but only a few, used for hearths or for ornamental purposes. Why should those for ordinary purposes be imported from Europe, when they could be made on the spot for a fraction of the cost? Before Bouquet's redoubt was raised there was a blacksmith shop in Pittsburg, a cooper shop a tanyard, a boat building establishment, a saw mill, or, if not in Pittsburg, near it, and with abundance of good clay and of fuel, it is absurd to suppose that bricks had to be brought from Philadelphia, after having been imported from England; and yet for probably a century that has been believed, and probably will be for a century to come. A lot of people have the notion in their heads, and there is no getting it out.
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> * * *
>
> How did they get the notion? Among the open letters in the February number the Century magazine, is one from Lyon G. Tyler, president of William and Mary College, in which he answers the question. The occasion of the letter is a statement by an earlier contributor that in Maryland "stood the sturdy domicile, broad and square, built of bricks brought over from England in ships that came for tobacco." President Tyler says that Maryland was settled largely by Virginians, and that what the contributor stated is accepted tradition in Virginia; but "in spite of the tradition there is not a case to be found in the annals of Virginia of bricks imported from England." From Maryland and Virginia the tradition came to Pittsburg, which was on Virginia territory, or what was claimed as such to the beginning of the Revolution and later. After showing that there was no more necessity for importing bricks there than here he proceeds to explain the origin of the notion. In the colonial period two kinds of bricks were manufactured, the English and the Dutch, the latter being the larger, of a yellowish color, but harder than the English, and so used in pavements, but also in house walls, as is said may still be seen in old houses in Charleston, S. C. Contracts sometimes called for English and sometimes for Dutch bricks, and out of this designation of the kinds arose the notion that the English bricks meant those made in England. In 1662 a law relating to building in Jamestown "called for 'statute brick,' which meant brick made according to the English statute. In the early days of the colony, previous to the passage of the navigation law, there was a large trade with Holland, and a great many Dutchmen came to Virginia. * * I find in the Virginia records mention made of 'Dutch brick,' meaning brick made after the Dutch fashion," often preferred by the colonists, "and the reason for the distinction between the two kinds was obvious to them. When in the course of time the circumstances of society had changed, the phrase 'English brick,' came to be understood as 'brick imported from England.' "

Those of our readers who inspected the caravels at the World's Fair will readily concede that brick could not have been imported in any considerable quantities in such ships. A few thousand ordinary brick would be a cargo for vessels of that size. Evidently, Mr. Tyler is correct. The "Dutch" and "English" brick were foreign in name only.

GERMAN VS. AMERICAN METHODS.

In discussing the feasibility of washing clay for common brick, Mr. W. D. Richardson suggests that it might be well to investigate what the Germans are doing in this direction, which is very true. While the controlling conditions in Germany, such as the relative cost of labor, fuel, etc., are so radically different from ours that we may not be able to follow their methods, yet we may learn something of value by studying their processes.

With this purpose in view we sent an able representative to that country the past season, who visited many of the leading clayworking establishments there, and will lay the results of his investigations before our readers in a series of illustrated articles, the first of which will be given in our next issue.

The processes of manufacture, including all the details of the business, will be accurately described, so that when the series of papers are completed our readers will be able to form an intelligent opinion of the relative merits of the German methods compared with our own. We trust some good may result, but do not anticipate any very radical changes. American manufacturers will, in all probability, continue along present lines for some years to come.

THE WELLINGTON (O.) MACHINE CO. are out with a new catalogue of their "Monarch" and "Quaker" brick machines that contains some valuable pointers to brickmakers who use soft mud or tempered clay machinery. Their "Quaker" for '96 is an all-iron machine, in the construction of which is embodied several improvements that will add to this already very popular machine. Their catalogue also illustrates a large line of brick barrows, carts, disintegrators, mold sanders, and all brickyard supplies. Write them for a copy.

J. C. Steele & Son, Statesville, N. C., have enlarged their shops to enable them to meet the increased demand for their machinery. They are now shipping their machinery to Florida, Alabama and Georgia, and say that the prospect for spring trade is the best they have ever had.

CULLS.

"All things come to him who waits,"
Perhaps was once a saying true;
But now you'll have to advertise
To make the dollars come to you.
—Printer's Ink.

J. C. Woodruff and others will start a new brickyard at Watertown, N. Y.

Theodore Belting, Illiopolis, Ill., is looking for a suitable location for a brickyard.

Reardon & Son are contemplating quite a number of improvements in the brick plant at Ottumwa, Ia.

We are indebted to the British Clay-Worker for a combination calendar and wall pocket, which now adorns our sanctum.

Mr. F. G. Pfeffer, for many years a brick manufacturer of Gettysburg, Pa., died at his home in that city Feb. 4, in his sixty-ninth year.

J. W. Carroll, Fire Brick, Ky., writes for a sample copy of the Clay-Worker and for information regarding subscription price, and adds: "We are going into the brickmaking business this spring, and want to keep posted."

The Horton Manufacturing Co., Painesville, O., call special attention to their horse-power brick machine, which they think is superior to any similar equipment. They court correspondence, and will be pleased to have your full address. See their ad. on page 173.

The death of Bart White occurred at his home in Pendleton, Ind., the 9th of January. Mr. White was but forty years old, and his death was quite a shock to his many friends, he having been ill only a short time. He was proprietor of the Pendleton Brick and Tile Works, and was considered one of the best business men in the community.

The Tuttle brickyard, at Decatur, Ill., is being completely overhauled for the purpose of putting in new machinery and otherwise improving the plant, with a view of doubling its present capacity. A new machine, which will have a daily capacity of 60,000 brick, is being built for them by the Leader Manufacturing Co. They expect to have everything in readiness for a new start with the opening of the spring trade.

The death of Joseph H. Benjamin, a prominent citizen of Spring City, Pa., and a member of the fire brick manufacturing firm of Rogers, Benjamin & Co., occurred the 28th of January. Mr. Benjamin was well known throughout the fire brick industry, being a regular attendant at the meetings of the National Association of Fire Brick Manufacturers, and at one time President of the Stove Lining Manufacturers' Association.

A meeting of the Hudson river brick manufacturers was held Feb. 4 for the purpose of forming an organization, and the following gentlemen were appointed as a committee to formulate some plan for a permanent organization and report at a meeting to be held at Newburg, N. Y., in the near future: Edw. Brockway, Fishkill-on-Hudson; George W. Washburn, Glasco; A. S. Staples, Rondout; Theodore Peck, Haverstraw; H. N. Wood, Haverstraw, and F. Timony, Dutchess Junction.

SOFT CLAY EQUIPMENT.

An exhibit that attracted a great deal of attention at the Streator Convention was made by Mr. J. P. Kinkead, the inventor of the soft clay brick machine which bears his name and is manufactured by the J. C. Woodcock Co., whose ad. appears on page 190. Mr. K. showed a working model of this machine, and also a sample brick mold of an improved design by which greater strength and durability is assured. They have exceptional facilities for manufacturing brickmaking appliances, and are in position to offer the trade high-grade machinery, etc., at low prices. Write them.

WANTED—Position as foreman or manager of shale brick, stiff mud brick or drain tile plant, up or down draft kilns. Good knowledge of men and machinery. Best of references.
2 1 c W. C. B., care Clay-Worker.

WANTED—Situation as superintendent or foreman by a practical brickmaker of twenty-one years' experience in dry press, repress, etc. Well up in setting and burning all kinds of brick and terra cotta. Best of reference can be given. Address
2 1 c Box 34, care Clay-Worker.

WANTED—Situation as foreman or burner. Seventeen years' experience in setting and burning dry press, etc. Used to up and down draft kilns. Best of reference can be given. Four years in last situation. Can still stay, but desire a change.
2 1 c Address Box 37, care Clay-Worker.

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"BRICKMAKING and BURNING."—J. W. Crary, Sr........ 2.50
"TABLE OF ANALYSES OF CLAYS." Alfred Crossley........ 1.00
"VITRIFIED PAVING BRICK."—H. A. Wheeler, E. M........ 1.00

Mailed, postage free, on receipt of price. All of them to one address for $6.00. Address

T. A. RANDALL & CO., Indianapolis, Ind.

We also fill orders for the English work entitled "THE MANUFACTURE OF GLAZED BRICK," H. Greville Montgomery, $2.00; and "PRACTICAL FARM DRAINAGE," J. J. W. Billingsley, which treats on the manufacture and use of drain tile. $1.00.

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Orders for special designs and ornamental patterns solicited.

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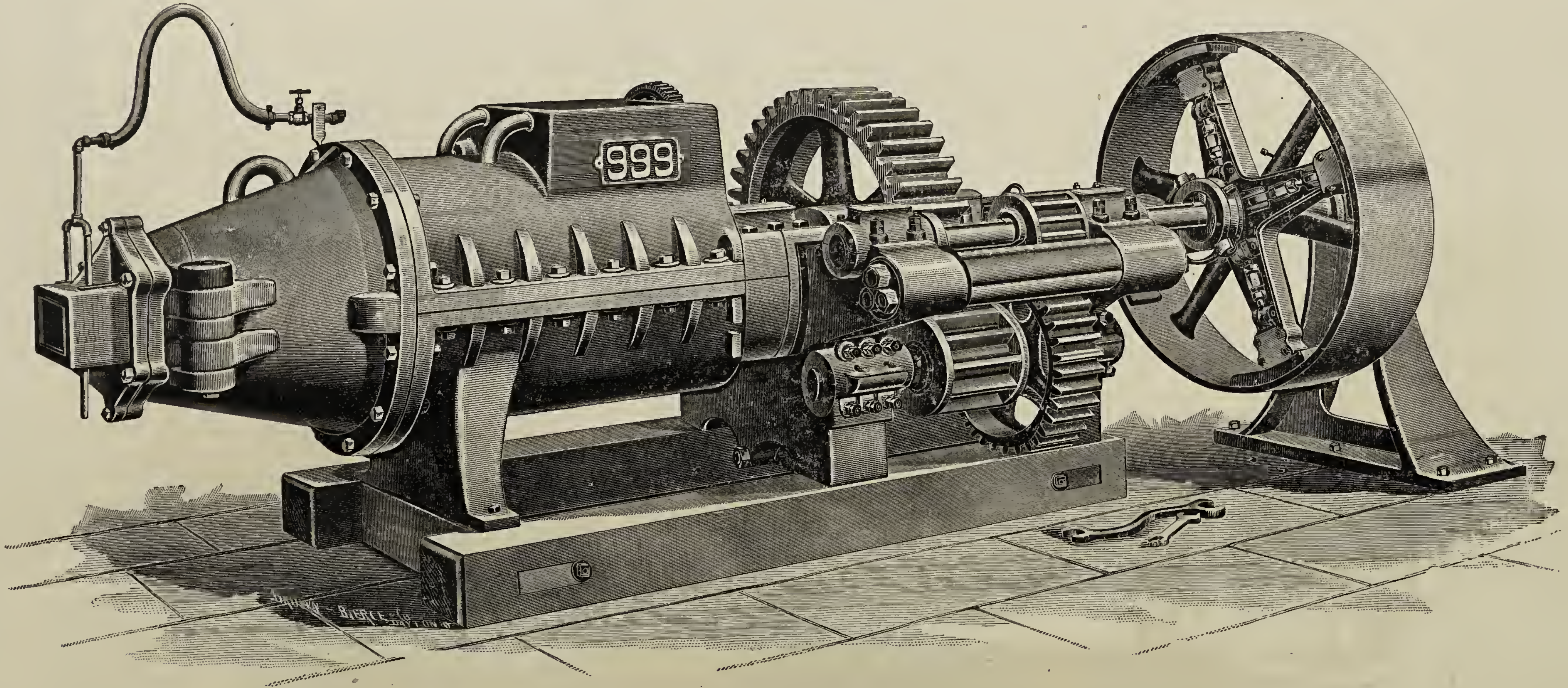

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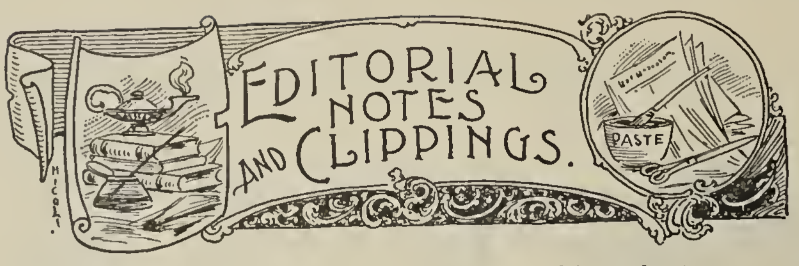


EDITORIAL NOTES AND CLIPPINGS.

Yoakum, Tex., will have a new brickmaking plant.

A new brick plant will be erected at Parkville, Conn.

Thomas Dewhurst & Son will start a brickyard at Sterling, Ill.

Edna, Tenn., is to have a new brickyard. E. Rocheford is interested.

Hancock Brothers are establishing a new brickyard at Peoria, Ill.

Elmore Uhl, Logansport, Ind., wants to purchase some hand presses.

A new brick plant is being established at Florence, S. C., by D. A. Layton.

Fire caused a loss of $1,500 at the brickyard of Mr. Conlin at Monongahela, Pa.

Henry Cadow will manufacture brick at Mt. Clemens, Mich., in the spring.

There are a number of good men advertising for situations in our Wanted columns.

Brick works will be erected at Fitzgerald, Ga., by J. D. Brown and J. D. Holmes.

The Clark Pottery, Oakland, Cal., will be remodeled and turned into a fire brick plant.

A stock company has been organized at Stockbridge, Mich., for the manufacture of brick.

We are advised that Dr. Umphrey will start a brick and tile plant at Hustonville, Ky., in the spring.

William H. Wallace, Bolivar, Mo., advises us that he will open up a brickyard at that point in the spring.

Good second-hand machinery can always be disposed of advantageously through an "ad" in our For Sale columns.

D. N. McChesney, Newport, Ida., writes that a company will soon be formed at Newport for the manufacture of brick and tile.

Frank Lynch, of the firm of King & Lynch, brick manufacturers, of Peekskill, N. Y., died at his home in that city, in his sixty-fifth year, Jan. 18.

James Moore, an employe at the Champion Brick Works, Wellsville, O., was caught in a belt and his head crushed so badly that he cannot live.

Excellent clay has been found on ground owned by John D. Whalen, of Sussex, N. B., and a plant will be established for the manufacture of brick, drain tile, etc.

The brick works of the Stratton Brothers, at Empire, O., and that of the Congo Fire Clay Co., both of which were recently destroyed by fire, will be rebuilt at once.

The Hennepin Brick Co. has been incorporated at St. Paul, Minn., with a capital stock of $50,000. Herman Vogt, Alva L. Martin and Joseph H. Morton are incorporators.

Andrew Craig, for years connected with Montague & Co., Chattanooga, Tenn., will establish a pottery, and will manufacture crockery, flower pots, terra cotta goods, etc.

The Ohio Brick Supply Co., in which B. H. Busse, F. L. Griley, W. C. Powell and others are interested, has been incorporated at Cincinnati, O. Capital stock, $10,000.

George Cowden has purchased a large tract of land at Lancaster, Pa., and will erect thereon a first-class modern brickmaking plant, which he hopes to have in operation March 1.

Mr. William Ferguson, of Bloomsburg, Pa., is making valuable additions to his plant by putting in another Henry Martin outfit of new machinery.

Do you want a competent superintendent, foreman, setter, burner, sorter, or a man for any department? If so, put an "ad" in the Wanted columns. It will bring you the desired results.

George W. Buxton is erecting a brick plant at Martinsburg, W. Va. The plant will be equipped with modern machinery and appliances and have a capacity of 30,000 brick per day.

J. H. Thompson, San Antonio, Tex., in sending in subscription to Clay-Worker, says a company in which he is interested will commence the erection of a plant at that place in a very short time.

A new company has been incorporated at Chicago, to be known as the Shermerville Brick Co., with a capital of $50,000. The incorporators are William R. Abbott, Edward A. Abbott and Eva A. Blattmer.

If you are in need of something in the way of second-hand machinery or brickyard appliances, look through our For Sale columns.

The large brick and tile factory at Elwood, Ind., owned by Luther Hedrick was completely destroyed by fire Jan. 22. Loss, $10,000, only partly covered by insurance. The fire was caused by the bursting of a gas pipe.

The Zanesville (O.) Roofing Tile Co. is the name of a new firm organized at Zanesville by J. C. Harris, Gilbert Snyder, David Schmid and others. The new company has a capital stock of $20,000, and, as the name implies, will manufacture roofing tile.

The brick manufacturers of McKeesport, Pa., have started the new year by forming a local organization which includes eight firms. Edwin Soles was elected President, T. D. Gardner Secretary and C. M. C. Harper Treasurer. May theirs be a successful organization.

F. L. Fike, of Corning, N. Y., in a recent letter, says: "I can hardly wait from one month until the next to get the Clay-Worker. I am so anxious to see what the old war horses have to say in regard to making brick. I do not believe I could get along without the Clay-Worker."

H. B. Pohlman, of the brick manufacturing firm of Pohlman & Bro., Davenport, Ia., died at his home in that city Jan. 7. Mr. Pohlman, though a young man, having only passed his thirty-first year, was a successful business man, and will be sadly missed by a large circle of friends.

Mr. Daniel F. Gohn, of Columbia, Pa., is putting in another Martin outfit. Mr. Gohn is increasing the capacity of his plant by putting in one of the latest improved Martin letter A machines of 40,000 capacity, in connection with the latest improved pug mills, elevators and crushers compete.

The brick manufacturers of Quincy, Ill., have fallen into line and formed a local organization, which includes sixteen manufacturers. One of the main objects is the maintenance of a uniform price. Mr. John Hummert has been appointed salesman, and all brick must be purchased through him.

The D. J. Chandler Brick Works, at Chattanooga, Tenn., which have been idle for some time, have been purchased by Wells Brothers, who will immediately set about to equip the plant with new machinery and add other improvements necessary to a first-class brick plant, all of which they hope to have completed by March 1.

J. L. Easley, Bloomdale, O., writes that he has gone out of the brick business for the present, and closes his letter by saying: "I think very highly of the Clay-Worker, and in my judgment it stands head and shoulders above any other paper devoted to the clayworking interests published in the United States. I wish you a still greater prosperity in the future."

Quite a destructive fire occurred at the plant of the Frederick (Md.) Steam Brick Works, Jan. 11, causing a loss of $20,000. The fire originated in the dry house, and the firemen succeeded in confining the flames to the dryer and machine room, both of which were totally destroyed. The loss is partly covered by insurance. The works will be rebuilt at once.

Mr. A. G. Collom, one of the most successful young Philadelphia brickmakers, is equipping his new plant with a complete outfit of the latest improved Henry Martin brick machinery, including one of their 40,000 capacity letter A steam power machines, with pug mills, elevators and crushers. This makes Mr. Collom's second outfit of machinery which has been put in by this well-known firm.

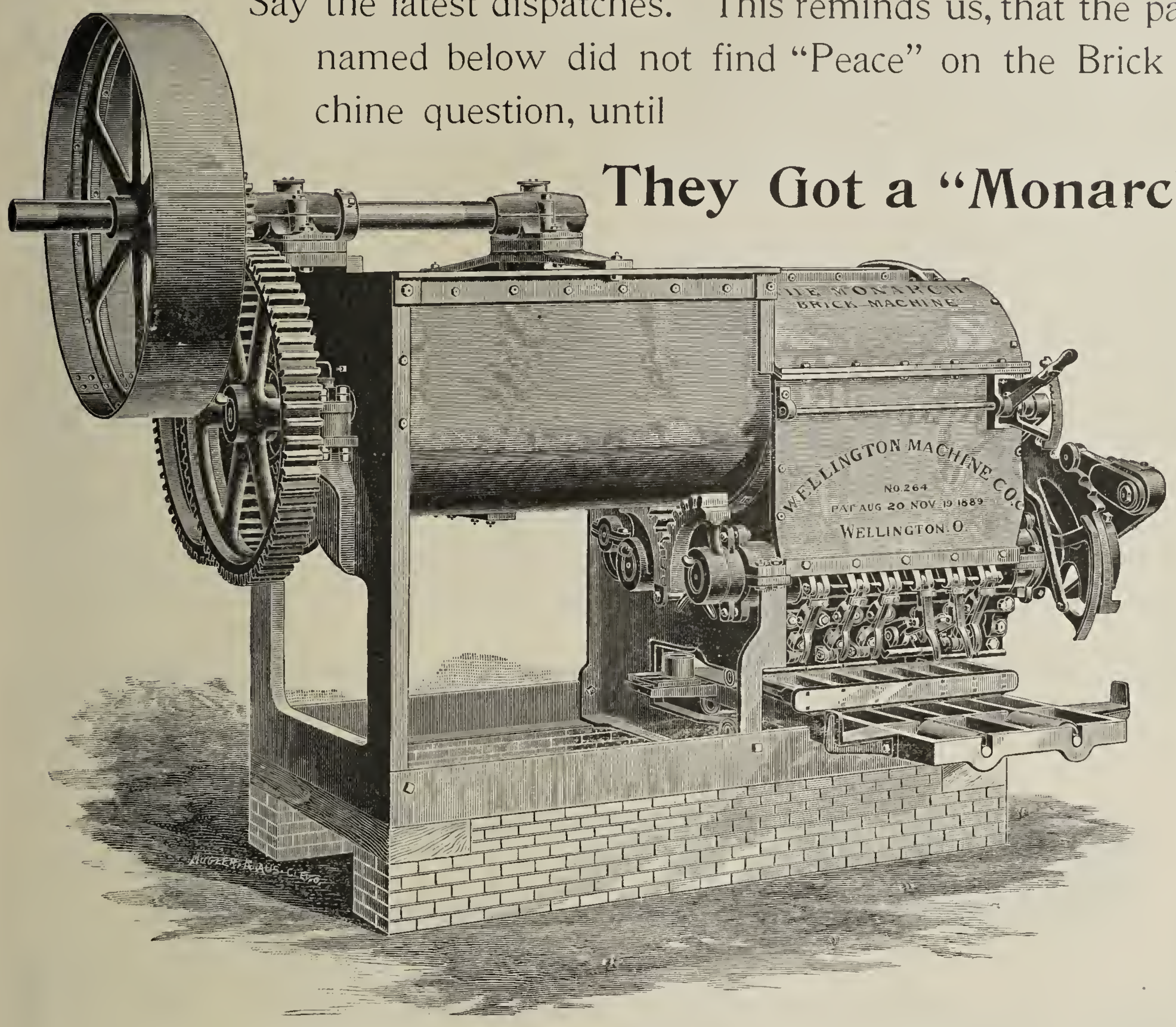
The Onondaga Vitrified Brick Works, Warners, N. Y., have changed hands. Messrs. W. K. Nivers, S. E. Bowman and H. Lacey have purchased the plant from A. C. Belden, J. C. Raun and E. H. Callaway. There will be no change in the firm name, and F. S. Naugle will be retained as Superintendent, but the capacity of the plant will be greatly increased, new machinery being put in and the plant generally improved.

"R. Brick" Morrison, President of the N. B. M. A., advises us that he has sold his interest in the Rome Brick Co., and now retires from the management after eight year's successful service, during which that company has established its trade in six states, and has been a dividend paying plant. Mr. Morrison has purchased a half interest in the Morrison-Trammell Brick Co., a new firm which will establish a steam plant near Rome, Ga., to be equipped with Chambers Machines, hot floor dryers and Morrison's kilns. President Morrison will have charge of the general management of the works and Mr. Geo. W. Trammel, a skilfull contractor, will be business manager and superintend the contracting and building, in which they will also engage.

NO WAR, BUT PEACE,

Say the latest dispatches. This reminds us, that the parties named below did not find "Peace" on the Brick Machine question, until

They Got a "Monarch."



YOU WANT THE BEST? These parties know something about it. Write them. Send addressed envelope for reply. Several have written us since we commenced publishing this list saying they are glad to reply, but postage is getting to be "an item."

The Akron Fire Brick Company	Akron,	Ohio.
McCausland Bros	Akron,	"
Edward Reid & Sons	Ashtabula,	"
William Harrison	Cleveland,	"
The Eaton Brick Company	Eaton,	"
John A. Hoesman	Walnut Hills, Cincinnati,	"
Rowland, Mulcahy & Co	Mansfield,	"
Belmont Brick and Tile Company	Martin's Ferry,	"
Thompson Bros	Painesville,	"
D. B Chambers	Sandusky,	"
Piliold Lumber Company	Swanton,	"
A. E. Macomber	Toledo,	"
Frank E. Tracy	Toledo,	"
Joseph Gates	Toledo,	"
John T. Chambers & Co	Blair Station,	Penn.
C. M. C. Harper & Co	Boston,	"
A. A. Thompson	Carlisle,	"
H. C. & W. G. Price, Jr	Chester,	"
Pfeffer & Co	Gettysburg,	"
Tobias Bros. & Co	Hamburg,	"
E. H. Snyder	Hanover,	"
Joseph Hart	Hollidaysburg,	"
Joseph E. Rapp	Norristown,	"
Simon Kline	Reading,	"
John Sullivan, Fifty-second and Market Sts	Philadelphia,	"
W. and J. Francis & Co	Pittsburg,	"
Diehl & Schantz	Spring City,	"
Brownfield & Boyle	Uniontown,	"
Brush Bros	Buffalo,	N. Y.
J. F. Stengel	Buffalo,	N. Y.
Jewett & Reynolds	Buffalo,	"
Thompkins & Smith	La Salle,	"
Niagara Brick Company	Niagara Falls,	"
Callahan & Doyle	Utica,	"
Kilkenny & Davis	Utica,	"
George F. Weaver's Sons	Utica,	"
A. L. Hatch	Central City,	Iowa.
J. M. Crabill	Clarinda,	"
Wickham Bros	Council Bluffs,	"
Newman Bros	Des Moines,	"
The Franklin Brick Company	Marion,	Ind.
B. W. Bennett	Muncie,	"
F. Lehman & Co	Chicago,	Ill.
Citizens' Coal Mining Company	Lincoln,	"
C. A. Peck	Woodhull,	"
Wisconsin Red Pressed Brick Co	Menominee,	Wis.
Cook & Brown Lime Company	Oshkosh,	"
Missouri Reform School	Boonville,	Mo.
Skoog & Johnson	Springfield,	"
Monarch Brick Company	Los Angeles,	Cal.
Sacramento Transportation Company (two)	Sacramento,	"
C. B. Oldfield	Norfolk,	Va.
Wallace House	Hanson,	Mass.
Hart Bros	Northfield,	Minn.
Dalton Bros	Hopkinsville,	Ky.
Monroe Brick Co	Monroe,	La.
M. Butler	Houston,	Tex.

The WELLINGTON MACHINE CO., - Wellington, Ohio.

(Also See Page 198.)

THE NEW YORK MARKET.

"WHAT ARE YOU going to do about it?" is quoted as the saying of Boss Tweed when he found out that S. J. Tilden and others were determined that New York city should be freed from him and his followers, for he thought that no court could or would convict him.

As one reads the addresses at the meeting in Atlanta the quotation is "pat" as regards the brick trade and low prices. Some of your readers, no doubt, will say, "Before lecturing us you had better do some missionary work around home." No one could admit that fact quicker than your scribe. I have placed before all, from time to time, the efforts made to reach a basis that would benefit all, with failure at each attempt, caused by a class of men who are called shrewd business men by the public, till, like a flash of lightning out of a clear sky, the same public hears that the end of the rope has been reached, and on all sides is heard, "Why, I thought they were making money, to hear them tell it." It is quite evident that the Western brickmakers have the same class of men among them, shown by the remarks made at the last Convention. The cut in prices is convincing.

If this is the first year that you have felt the low rates you deserve praise that you come out like men and said that you were being squeezed in the house of your friends or by men in the same line of manufacture. One gentleman remarked that this was his "maiden" experience in hard times in the trade. Stick to it, and if all signs do not fail he will have the experience of many more, and the quantity of shekels that he will leave to his family will be small.

The condition of the brick trade in the West is only a repetition of what our local dealers have to contend with; it is a go-as-you-please trade, and no manner of argument can get the manufacturers together and make a price for the home trade, for fear that some of the others might sell to their customers. What is the result? From time to time one will offer a customer of another brick for 25 cents less per thousand than he is paying. He will drop to that figure, only to have to repeat the same till cost is in sight, with no profit. From personal experience in the home trade, a case or two will show. A party who was buying brick from an adjoining yard came under the shed and looked at the stock, and said: "I would like to buy of you, as your brick are better, but you ask too much." "No," was the reply, "you are paying that for what you are drawing," taking the word of the manufacturer as his guide. "No, I am not, and, to convince you that it is not so, will show you the last bill," and he did. The brick were sold at the reduced rate. He took a few thousand, and was back to the other yard. When asked what was the matter, didn't the brick suit, he replied: "Yes, but I can buy for less." The present season the same party on the same yard said to the proprietor: "The brick I am getting do not suit me; would like some of yours if you can sell for what I am paying at the other yard." He gave the rate, came and drew some, and, in the presence of several men, said that he did not want any more of the other brick; that those he had on the wagon were just the kind he wanted. In less than a week he was again drawing from the other yard. The reason your readers can guess for themselves.

I could quote cases of similar complexion for a week. To-day not much doing in local trade, and rates a dollar per thousand less than they should be. As one looks for their children to have the mumps and measels, just so all parts of the country will have the same experience sooner or later. When five cents per thousand difference will take a contract in a few thousand it will spread.

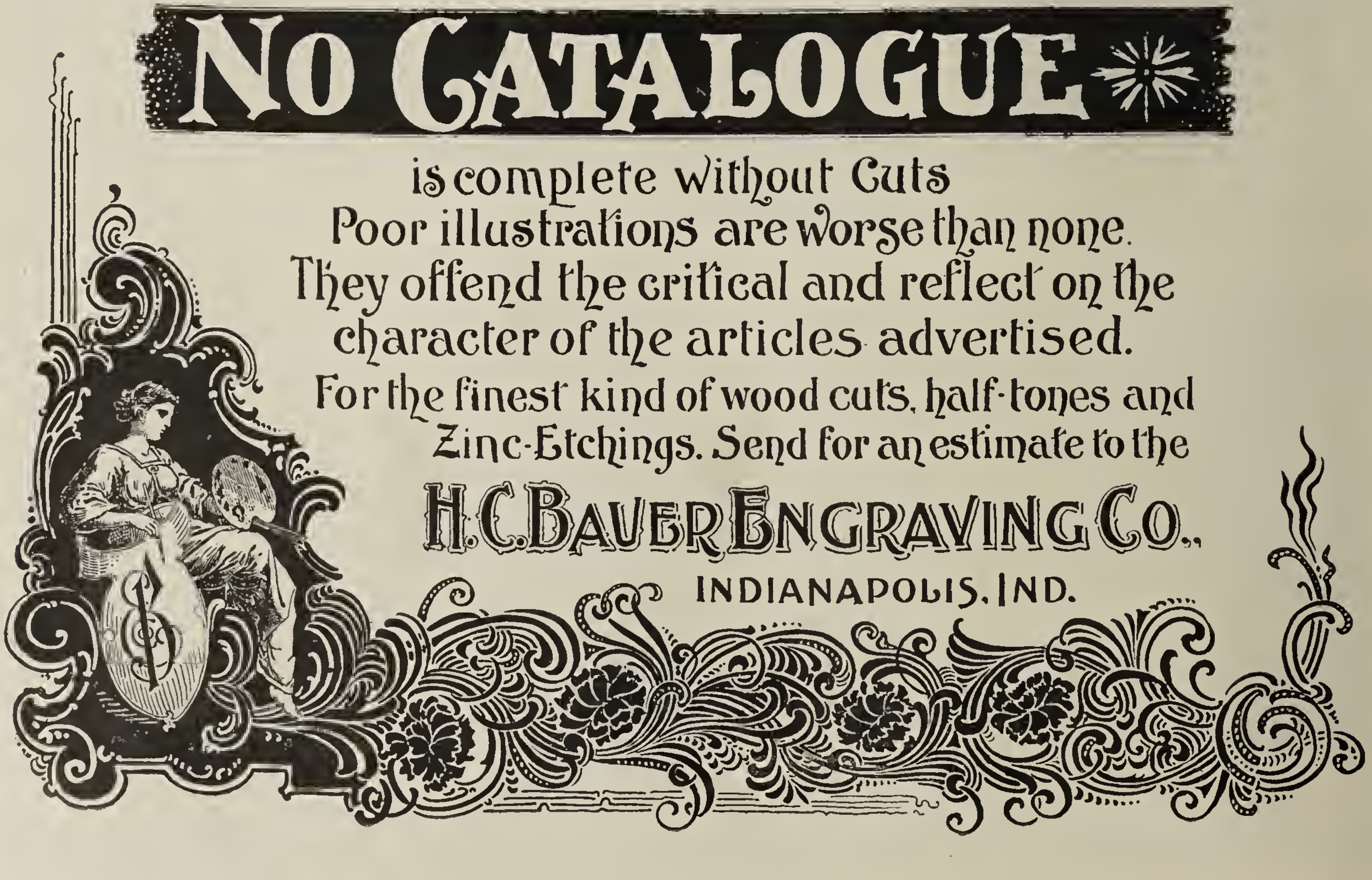
—Open Confession—

Is good for the soul, and the confession of Mr. Eggers was manly. The prices look as though some of the cutters of rates in Hackensack had transplanted their method to Cleveland. I do not think there is any line of business that tries to do the greatest amount of work for the smallest amount of money, both in labor and price, as do brickmakers. One thousand brick to the load for a pair of horses is a good load. Very often 1,250 are put on. One of our manufacturers, the present winter, put 1,400 on at a load so that his brick would cost him on cars about $4.50. They had to be drawn a mile, and the teamster had to make seven loads a day. The brick had to be stowed in the wagon and picked up and passed on the car and stowed there. How is any money to be made?

The confession of one member of the N. B. M. A. that, after an attendance of ten years, he was not aware that the discussion which was in progress was about a different kind of material from what he was using, was good; there is hope for him; he admitted his mistake. Another confession lets in a whole flood of light on the subject of why the cry of low rates exists. A man made seventy-four thousand per day, with seventy-six men and four horses; he is now making 160,000 per day (to sell for a lower figure than his 74,000), as his neighbors were doing the same; in fact, all the brick men were enlarging. Now the effect is beginning to show. Another surprising confession is that competition has made it possible for a dollar to buy too much. Competition, being the life of trade, can find no home there.

—The Quantity Made.—

The past year was a phenomenal one for making brick. There was a general increase in output, and the exceptional dry weather helped all along the line. It has also caused a better run of brick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Poor illustrations are worse than none.
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Zinc-Etchings. Send for an estimate to the
H. C. BAUER ENGRAVING CO.,
INDIANAPOLIS, IND.

than usual. The increase of 100,000,000 is a tidy sum: 1894, 900,000,000; 1895, 1,000,000,000.

—The Stock on Hand Jan. 1.—

1895.		1896.
89,000,000	Haverstraw Bay	87,400,000
104,000,000	Other points on North river	96,000,000
44,000,000	New Jersey	49,600,000
3,750,000	Long Island	3,000,000
3,000,000	Staten Island	3,000,000
243,750,000	Totals	239,000,000
	With barges under cover on the market	6,500,000
	Total	245,500,000

It is seldom that stock on hand will show such a close comparison. Last year there was lots of old stock under the shed on the 1st of July, so that if the demand should be better in the spring there will be no fancy prices, as there are enough to go around and have some to spare.

—Prices Jan. 1.—

1895.		1896.
$2.00@ 2.50	Pale	$1.75 @ 2.25
5.00@ 5.75	New Jersey	4.75 @ 5.25
5.50@ 5.75	North River	5.12½@ 5.62½
10.00@12.00	Croton fronts	11.00 @12.00
22.00@24.00	Philadelphia fronts	18.00 @20.00

Certainly the closing prices did not tend to make it a "Happy New Year." On Jerseys from 25 to 50 cents a thousand lower than the same date of the year before. North rivers show a loss of 3 shillings per thousand, and, take the scale the season through, the range of price was lower than in 1894. Only think of it! The finest stock which reached the market should sell at the low rate of $4.50 per thousand, and that it has only at the end of the season climbed up to one dollar above low-water mark. If that class of stock was so low, how about some which were about the four-dollar mark and under?

Well, some will say, do not ship to the New York market. Make less. Now, how much less output would regulate the price. Demand will show that. To all who use this argument I will say that in twenty-eight years the year 1895 stands third in the number of buildings erected or in course of construction. Strange as it may seem, output may bear some of the blame. Where is the "joker" who does the rest of the act?

—Projected Buildings.—

1886, 4,097; 1887, 4,385; 1888, 3,076; 1889, 3,621; 1890, 3,507; 1891, 2,821; 1892, 2,967; 1893, 2,272; 1894, 2,592; 1895, 3,838.

Twelve hundred and forty-six more in 1895 than in 1894. Two hundred and fifty-nine less than in 1886; 1887 leads it by 547. Not many when you compare the production of those years—about forty million less. As the figures show, the stock on hand in 1887 was only three million less under sheds, as no barges were covered for the winter.

Some other cause is to blame; it is the skeleton frame. If so, Chicago, like New York, will have to take the same medicine. Fire and wind have dealt gently with the skeleton frame. No falling or burning thus far has caused the people to call a halt. The firemen are always saying that if any of the tall structures take fire they cannot force the water so high. The day will come when the test will take place, and we must wait for the battle of fire against man's construction; if fire wins, brick will gain. If the architect wins, iron will be king, and the poor, common brick manufacturer will have to plod along, looking and hoping for something to turn up which will help him or profit by the past lesson. He can help himself by making a lease that, in point of numbers, will not compel him to sacrifice his stock to get room to put in more. It looks as though the day of a dollar per thousand rent was a thing of the past.

—The Market—

Is supplied by drawing from the barges, which are loaded and covered, as the points of shipment are closed with ice. The dealer buys as he requires, so that he can place a cargo where the cartage will be a shorter distance from where he may have his winter stock piled up. If the weather continues mild it will not be long before navigation will open.

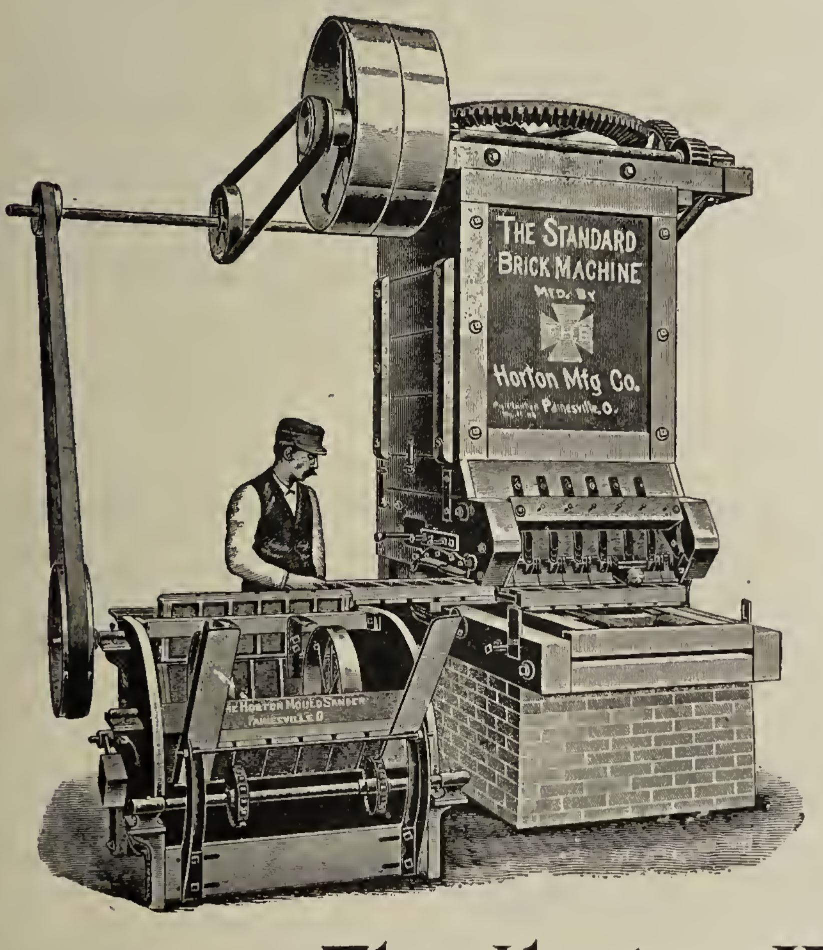
The past week, ending with Jan. 25, the rate had reached top—$6.25 and $6—on very small sales, and it would not be a surprise if some barges now on the market would sell for a less figure. All depends on the weather. A. N. OLDTIMER.

REDUCED RATES TO HOT SPRINGS, ARK.

The Vandalia line has on sale excursion tickets, good ninety days, to the famous Hot Springs of Arkansas, at very low rates.

Hot Springs is the only health resort owned, indorsed and conducted by the United States government. Climate like that of Italy. This is the best season to go. Over three hundred hotels and boarding houses at rates to suit all visitors. The hot waters have for fifty years been found unexcelled for the cure of rheumatism, blood and skin diseases, female complaints, troubles of the stomach, liver and kidneys, insomnia, nervous prostration, etc. For illustrated pamphlets and full information call on nearest Vandalia line ticket agent, or address E. A. FORD,
General Passenger Agent, St. Louis, Mo.

IT WILL PAY YOU to examine the



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Horse and Steam Power.

Has been in use more than 10 years and is perfectly reliable in every way.

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REPRESSES and SANDERS.
TRUCKS, BARROWS and MOLDS,
ENGINES, BOILERS and FRICTION
CLUTCH PULLEYS.

First-class supplies of all kinds.

Catalogue. The Horton Mfg. Co., Painesville, Ohio.

7,000,000

Street Paving Brick.

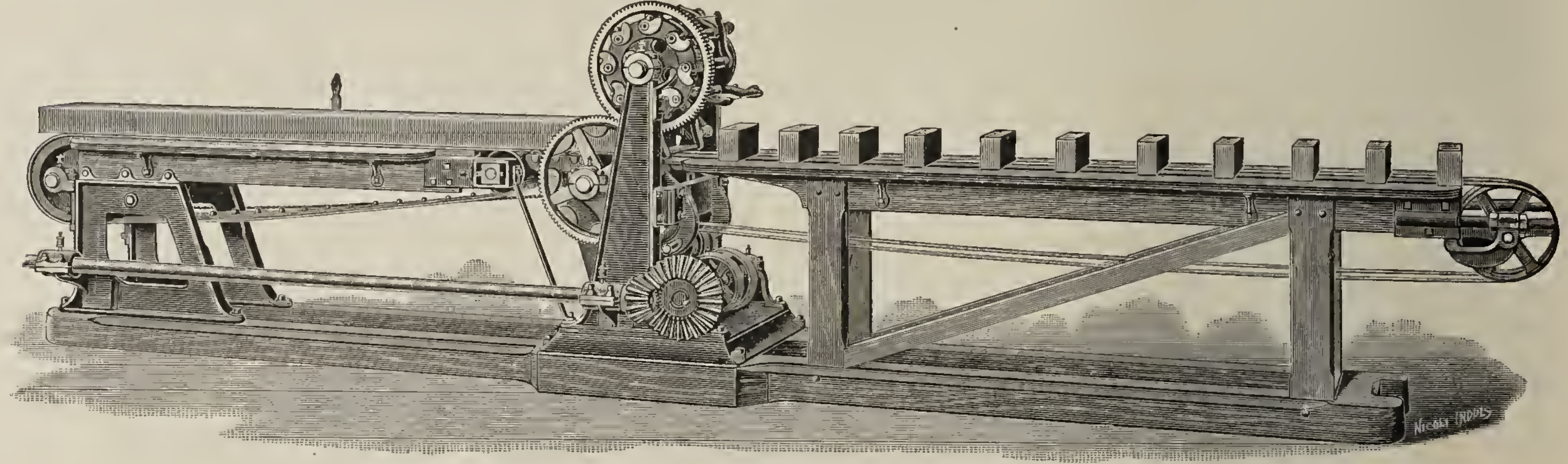
Office of THE GALESBURG PAVING BRICK CO.

Galesburg, Ill., November 1, 1895.

The Wallace Manufacturing Co., Frankfort, Ind.

Gentlemen:—Thinking you would like to hear how we are getting along, I wish to state that the Big Wonder machine is doing splendid work. We made over 7,000,000 brick this season without a break of any kind, or a cent of cost in repairs except for augers, and from all appearances will keep on right along.

Wishing you every success, we remain,
THE GALESBURG PAVING BRICK CO.,
H. Haigh, Supt.



Cunningham's Automatic Rotating Side Cut Brick Cutter.

Office of STREATOR TILE CO.

Streator, Ill., January 2, 1896.

The Wallace Manufacturing Co., Frankfort, Ind.

Gentlemen:—We are not running our factory now, but will say that when we closed down, now more than a month since, your Cunningham's Automatic Side Cut Brick Cutting Table was doing excellent work.

Hoping to see you at the Illinois Clayworkers' Association this month, I am, Very truly yours,
STREATOR TILE CO.,
Per F. Plumb.

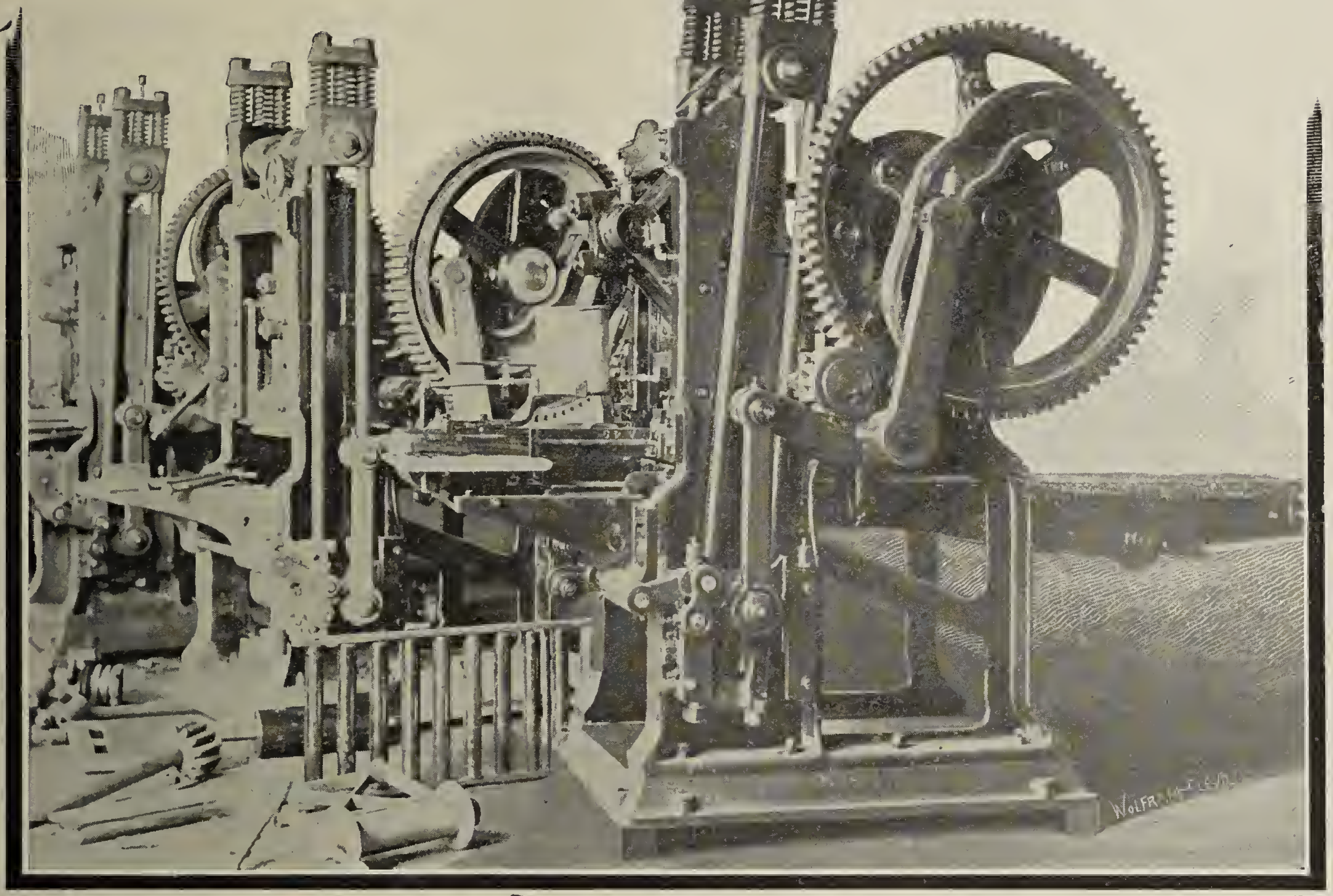
What more convincing argument do you require than the testimonials of these, the leading paving brick manufacturers, that the Big and other Wonder Brick Machines, Cunningham's End and Side Cut Automatic Brick Cutters are not excelled either in high grade material and workmanship, quality of product, capacity and ability to turn out MILLIONS of brick without cost for repairs

The Wallace Mfg. Co.,

CATALOGUE FREE.
See back Inside Cover Page

FRANKFORT, INDIANA.

The Richardson * * Double Pressure Repress.



Building RICHARDSON REPRESSES AT THE EXCELSIOR IRON WORKS, CLEVELAND.

Not a very clear picture, but one that shows the demand for a superior machine for repressing brick.

Furnished on trial to intending Purchasers. Send for details.

W. D. Richardson & Co.,

809 Cuyahoga Building, —CLEVELAND.

P. S.--Do you know that you can improve the quality and increase the quantity of your brick by using the RICHARDSON SHAKING SCREEN and the RICHARDSON AUTOMATIC HOPPER and FEEDER?

FOR SALE, WANTED, ETC.

☛Advertising rates in this column 25 cents a line, or 4 cent a word, each. insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE OR TRADE—For land, the most complete vitrified brick plant in Kansas. Address
2 1 c R. B. D., care Clay-Worker.

FOR SALE—At a bargain, only pottery in city of 30,000 people. No other within 100 miles. Also 80 acres of clay and shale. Address
12 3 c 1909 Broad St., Springfield, Mo.

WANTED—A situation as superintendent or foreman of general brickmaking. Have an experience of thirty years; give good reference if needed.
2 1 d L. W. B., care Clay-Worker.

WANTED—By practical brickmaker and salesman position as general manager of a dry press brick plant. References first-class for first-class work. Address
2 1 1p A., care Clay-Worker.

WANTED—Situation by a man of over fifteen years' experience as setter and burner, paving and pressed brick, up or down draft or continuous. Address
2 1 1p P. B., care Clay-Worker.

WANTED—Position as superintendent of brick works. Understands all kind of machinery and kilns; can remodel a yard. Good references. Adddress
2 1 c GOOD MAN, care Clay-Worker.

WANTED—Pratical man to take interest in dry pressed brick plant. Best body of shale and soft clay in the South. Investigate. Address H. P. M., care Clay-Worker.
2 1 c

WANTED—Cheap for cash, one or two good second-hand, large-sized Chambers or Penfield brick machines. Address, with particulars, CHICAGO,
2 1 d The Clay-Worker, Indianapolis.

FOR SALE—A four-mold Boyd press, latest improved, now located in the northwest. Parties gone out of business. Address
STOW,
Care of Chisholm, Boyd & White Co.,
2 1 1 Chicago.

WANTED—A practical brickmaker and burner, also in machinery twenty-five years' experience, wants position as superintendent. References. Address Box 34 Tappan, N. Y.
2 1 cm

FOR SALE Very cheap, half or all of a 30,000 capacity manufactory, two and a half miles from city, shale and plastic clays plenty and handy. Coal 80 cents per ton; two railroads. Also one Brewer machine. LAMMERS, care Clay-Worker.
2 1 c

FOR SALE—One of the best fire brick plants in New England. Will be sold cheap, either whole or half interest. Two hundred customers on the books; best location in New England. Address
G. H. COME, Herald Office,
2 1 dm Boston, Mass.

WANTED—A situation as setter or shader by a good reliable workman. Several years' experience. Thoroughly competent to set and sort the best of pressed brick. Best of references. Salary reasonable if situation permanent. Address
2 2 c "GOOD EYE," care Clay-Worker.

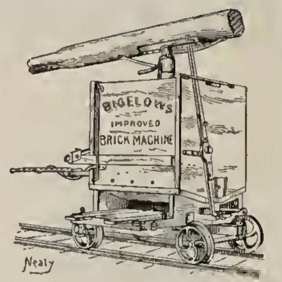
WANTED—Brick yard of from 10,000 to 20,000 capacity, in good locality, in exchange for three quarter sections of improved farm land in Antelope county, Nebraska. Farms are rented. Near town and railroad. For particulars address
2 1 cm T., care Clay-Worker.

FOR SALE—In thriving town, a first-class steam brick plant, capacity 30,000 per day, new machinery, ten acres of clay that will work eight feet deep, good market. Reason for selling, owners too much occupied with other business. A first-class chance for a live man. Address GUIRL,
2 1 dm Care Clay-Worker.

FOR SALE—Cheap, one No. 5 Nolan Madden brick and tile machine, one twenty-horse power engine and boiler, two carts, three trucks in good order. Also wants situation as foreman or engineer. Can give good references. Twenty years' experience.
2 1 1p I. W., care Clay-Worker.

FOR SALE—Or exchange for drain tile machinery, a Penfield soft mud machine with pug mill, nearly new; also a lot of wooden pallets and dryer cars. A full equipment for making soft mud brick.
THE BRANDT CLAY PRODUCT CO.,
2 1 d Binghamton, N. Y.

BRICK MACHINERY.



One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

A. E. BIGELOW, Spaulding, Ill.

An Actual "Pull" Brick Dried In 8 Hours Safely At no Cost.

Explains For Fuel or Power. More Fans, Less Pipes, Exhaust Only.

S. G. PHILLIPS, 161 Grand St., Rahway, N. J.

Send for Testimonials. Street Cars pass the Door.

FIRE BRICK, FIRE CLAY and FIRE CLAY TILES.

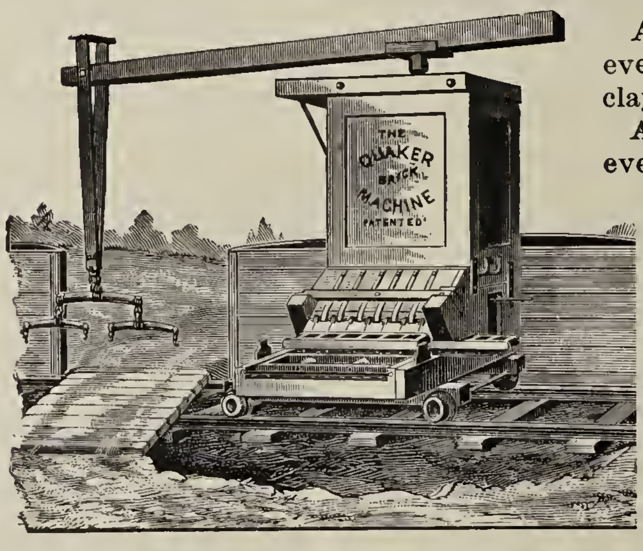
Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years.
Write for prices.

EVENS & HOWARD,

920 Market Street, - - - - ST. LOUIS, MO.

The New Model Quaker and Monarch Brick Machines



Also supplies and machinery of every character pertaining to the clayworking business.

A simple, practical, reliable every day, all round Brick Machine, either steam or horse power, at a reasonable living price to suit the times. We have it. No experiment. Over 1,000 in use all over the country.

We cannot give testimonials and particulars in a small advertisement, we simply ask you to write us for catalogue, prices, facts, etc. It will cost you nothing.

S. K. FLETCHER, **General Agent,**

Successor to Fletcher & Thomas. **INDIANAPOLIS, IND**

DO NOT BUY A [FOUNDED 1879.]

SOFT CLAY BRICK MACHINE

Until You Have Investigated Ours.

Send for Photo. **W. E. TALLCOT & CO., Croton-on-Hudson, N. Y.**

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Tests of the Strength of Materials

Of all kinds made by experienced and competent experts. . . . . .

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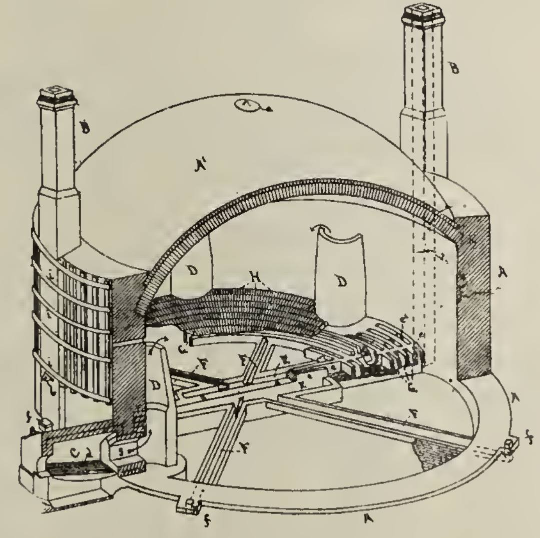
Holman's Down Draft Kiln.



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FOR SALE—Odd sizes of molds. Have not been used:
5 Molds, 8¾x4¼x2⅜.
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Second-hand, but used a few days only:
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All six-brick molds, with 9-16 partitions.
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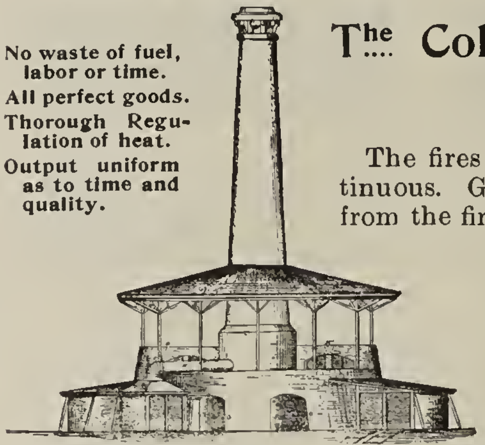

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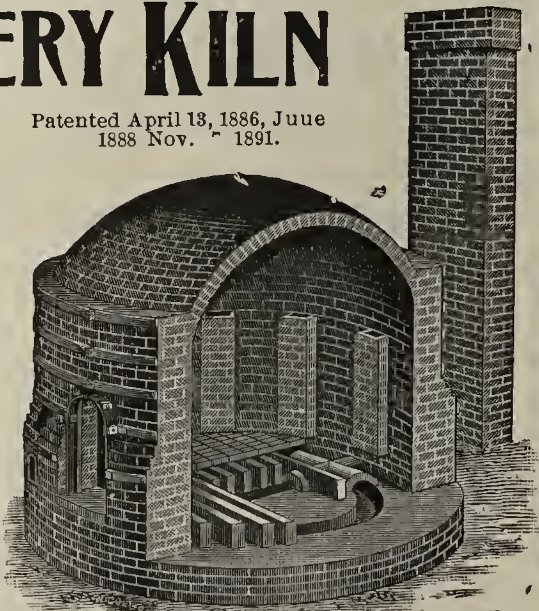

E. M. PIKE, Patentee

CAPT. G. H. ETTLA, Agt. Marietta, Pa. } **Chenoa, Ill.**

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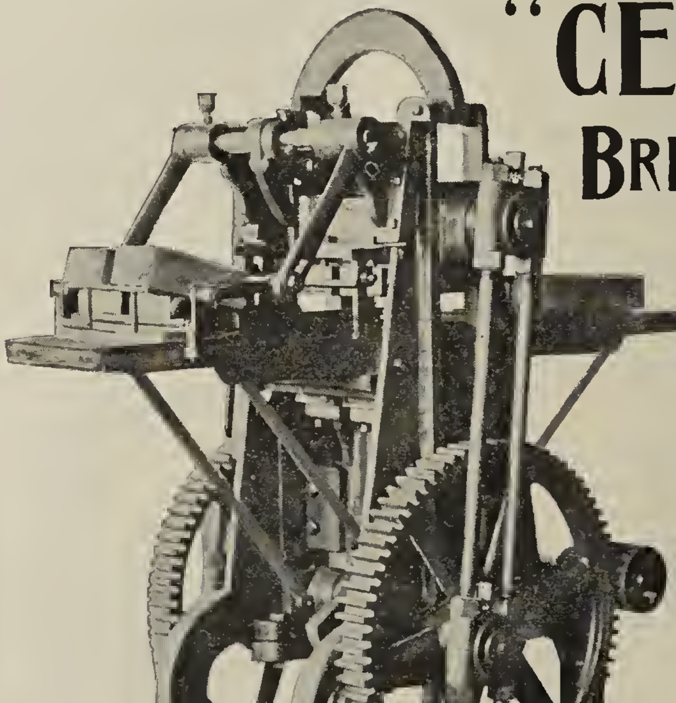

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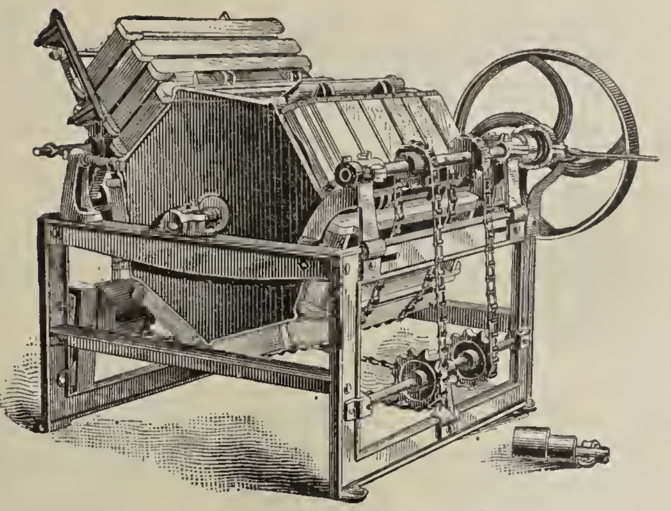

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The United States Circuit Court held at Utica, Dec. 3rd, 1895, overruled and dismissed the Plea filed by James A. Buck in my action against him for infringement. The Court gave Buck 20 days to file an answer and if not filed in that time judgment will be entered against him in my favor. If answer is filed the Court gave me the further privilege of taking my testimony at once and as soon as completed to renew my motion for a preliminary injunction restraining Buck and his agents from making, selling or using Champion Brick Mold Sanding Machines during the pendency of the action.

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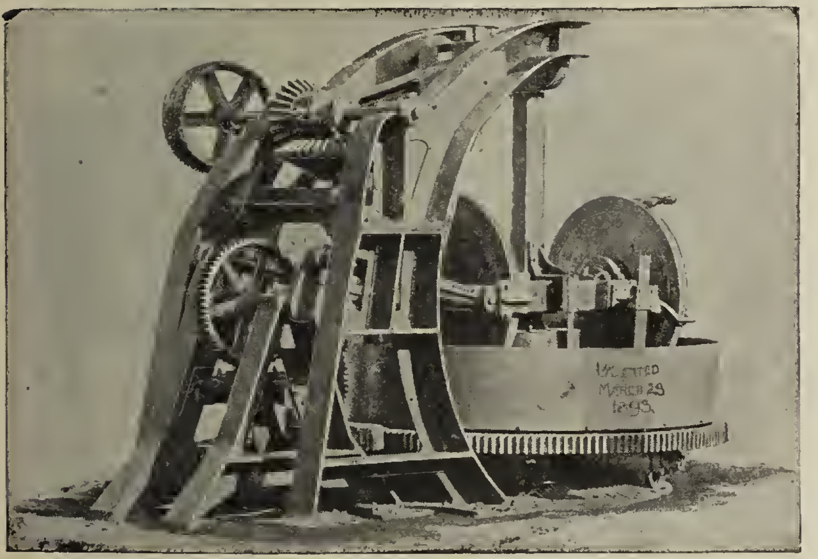

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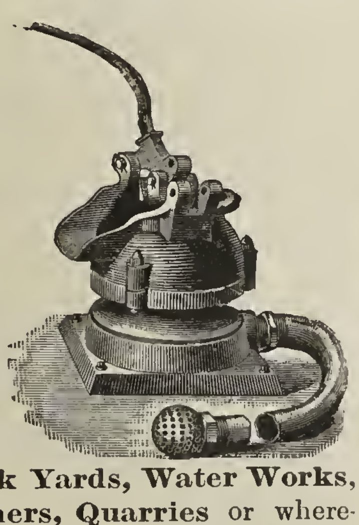

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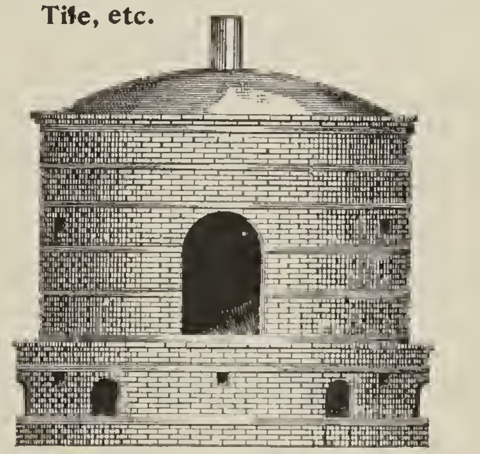

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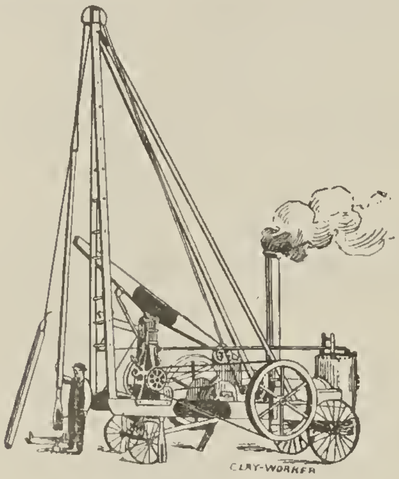

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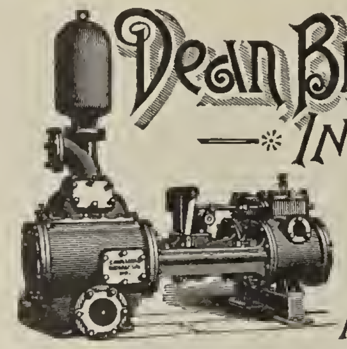

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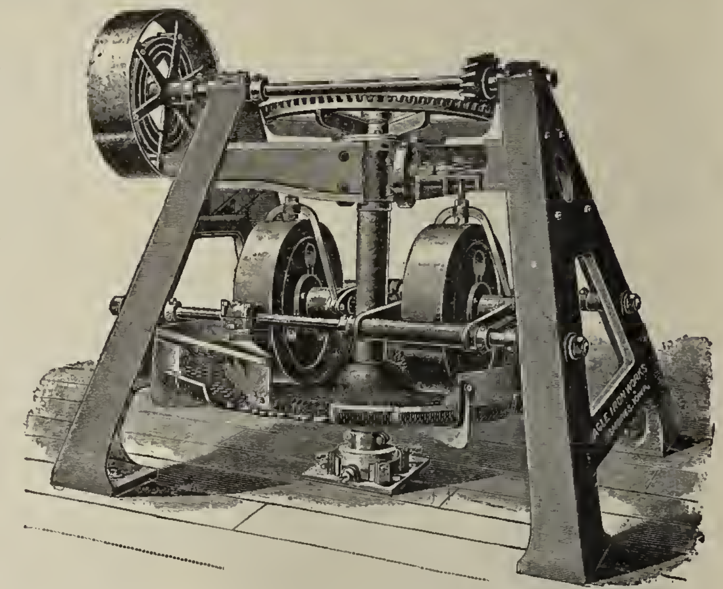

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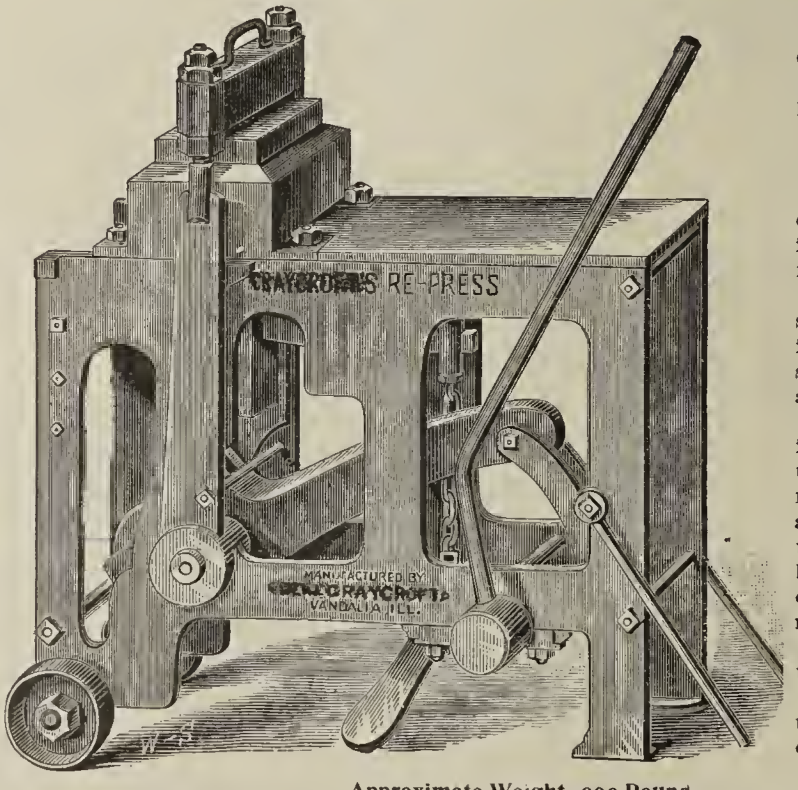

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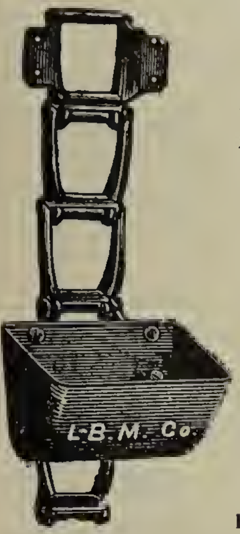

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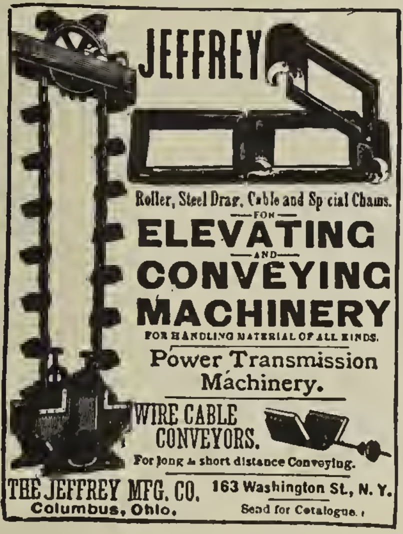

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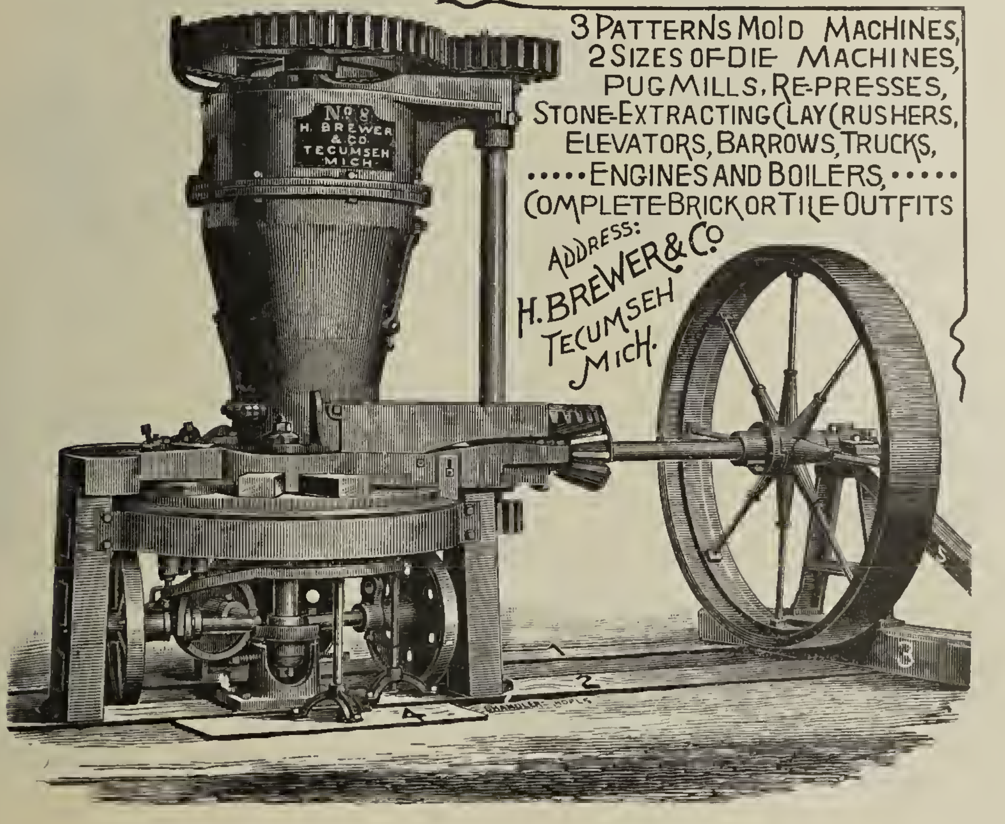

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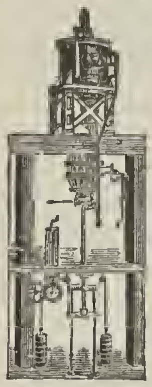

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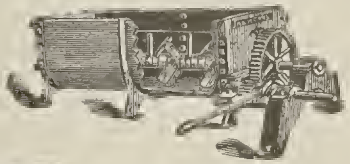

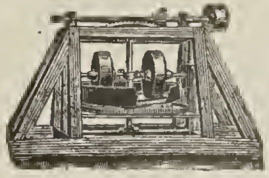

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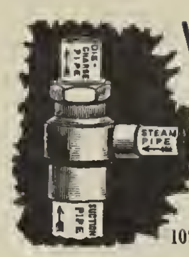

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The only line running Solid Pullman Perfected Safety Vestibuled Trains.

The only line running Dining Cars between Indianapolis and Chicago.

Magnificent Pullman Sleeping and Parlor Cars

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ALWAYS LEAD.

THEY EXCEL ALL OTHERS IN FINE MECHANICAL CONSTRUCTION AND PERFECTION OF DETAIL.

The strongest light wheel on the market.

VICTORS SPEND THEIR TIME ON THE ROAD, NOT IN THE REPAIR SHOP.

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Makers of Victor Bicycles and Athletic Goods.

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MANUFACTURERS OF ALL KINDS AND SHAPES OF

HAND and.... MACHINE **MOULDS**

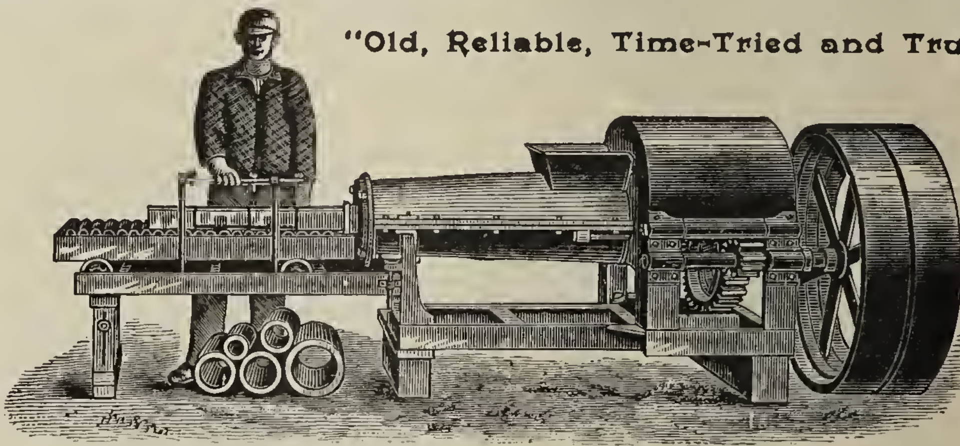
We manufacture the the most substantial Moulds known, and guarantee every Mould to be first-class in material and workmanship.

A Special Discount on all orders received on or before March 1st.

No. 829 Sixth St., Milwaukee, Wis.

KELLS & SON'S IMPROVED BRICK AND .... TILE MACHINES.

"Old, Reliable, Time-Tried and True."



P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

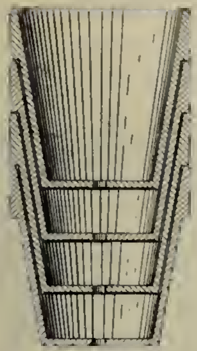
☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,

PARKHILL, ONTARIO,

Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.



Make Money

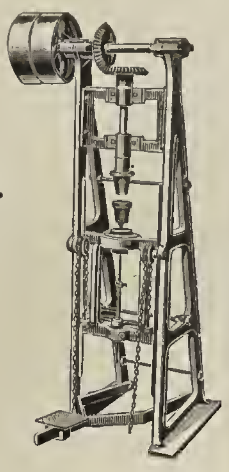
WITH THE ONLY SUCCESSFUL

Flower Pot Machine.

(PATENTED.)

No expert workmen required.
Capacity in 10 hours:
6,000 two-inch Pots; 3,500 five-inch Pots;
4,000 four-inch " 2,000 seven-inch "
Write for Circular and prices.

The Rockwood Mfg. Co.,
78 South Pennsylvania St., INDIANAPOLIS, IND.



THE "AJAX" BRICK MACHINE

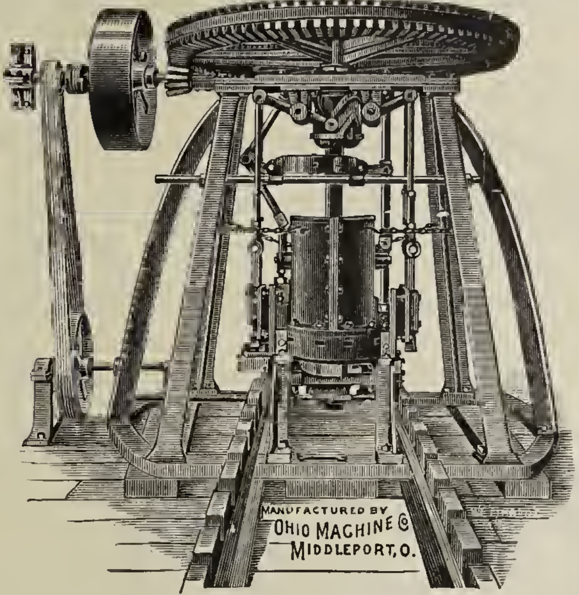
MANUFACTURED BY

Ohio Machine Co.,

Middleport, Ohio.

Under the very Latest Improved Grant-Murray Patent.

This machine is constructed with the object of giving to purchasers the very best results obtainable for the money invested. It is at once Simple, Durable, Convenient, and Easily operated. We claim these machines make the strongest brick in the market, a brick that is very superior for Street Paving and building purposes. Their superior quality as pavers may be ascertained by reference to some of the leading cities of Ohio and West Virginia. This machine works the clay very stiff, pressing all the clay into each brick that it will possibly contain, thus imparting the quality requisite to a No. 1 Paving Brick. We guarantee these machines to our customers, and solicit investigation as to their merits. For further particulars please correspond with



OHIO MACHINE CO.,

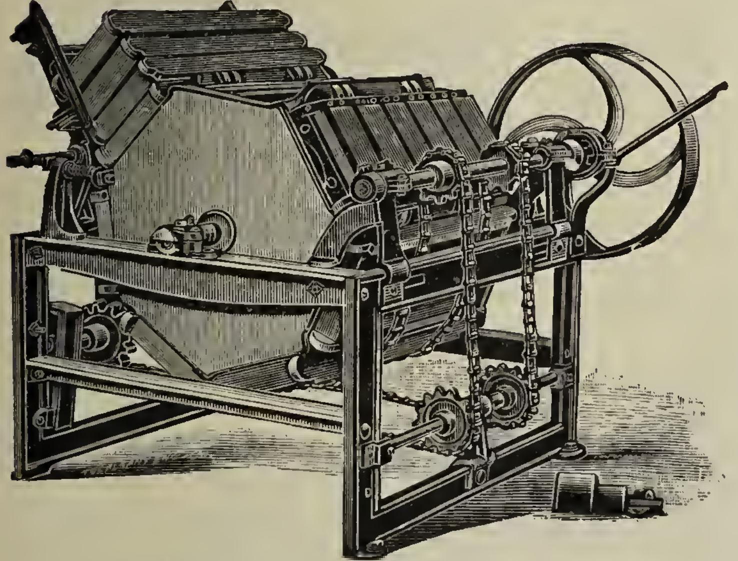
MANUFACTURERS.

We manufacture the Grant & Murray Patent Repress Brick Machine, pressing 4 brick each revolution and 40,000 per 10 hour day.

Middleport, Ohio

BUCK'S NEW CHAMPION

Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.

The F. F. V. Vestibule Limited via the Chesapeake & Ohio R'y, is the only Solid train with through Dining Car between New York, Philadelphia, Baltimore, Washington, Cincinnati and the West. Lighted with Electricity. Heated with Steam.

C. B. RYAN,
Ass't Gen'l Pass. Agent.
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H. W. FULLER,
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WASHINGTON, D. C.

LAKE ERIE & WESTERN NATURAL GAS ROUTE RAILROAD.

Solid Train Between

Sandusky and Peoria

—AND—

INDIANAPOLIS and MICHIGAN CITY,
FT. WAYNE and CONNERSVILLE.

Through tickets sold to all points in the United States and Canada.

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*No. 22 Passenger	1:20 p. m.
No. 24 Passenger	7:00 p. m.

SOUTH BOUND—ARRIVES.

*No. 21 Passenger	10:20 a. m.
No. 23 Passenger	2:50 p. m.
No. 25 Passenger	6:20 p. m.

*Daily.

Union Depot connections at BLOOMINGTON and PEORIA for points WEST, SOUTHWEST and NORTHWEST.

Direct connections made at LIMA, FOSTORIA, FREMONT or SANDUSKY for all points EAST.

Immediate connections at TIPTON with trains on Main Line and I. & M. C. Div., for all points NORTH, SOUTH, EAST and WEST.

For tickets, rates and general information, call on A. H. SELLARS, Agent, Lake Erie & Western R. R.

C. F. DAILY, Gen. Pass. Agt.,
INDIANAPOLIS, IND.

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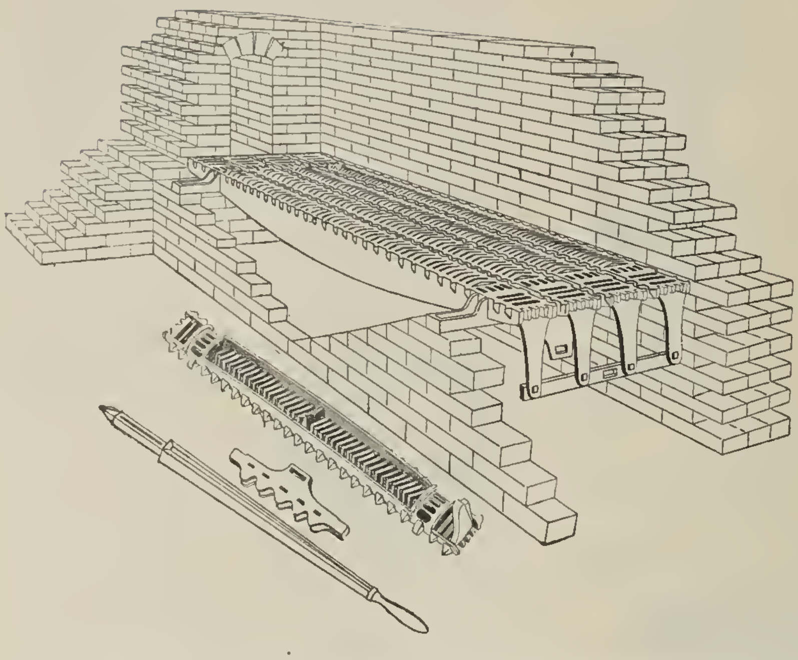
Fast Express	3.30 a m
Accommodation	10.40 a m
Mail and Express	4.50 p m

JNO. S. LAZARUS, Gen. Pass. Agent.

TAKE THE
BIG 4
TO
ST. LOUIS



A Rocking Grate for the Clayworker.

Our Grates give greatest economy of fuel. Cold drafts through furnace are greatly reduced. Why not make cheaper brick?

A good thing: Our Art Catalogue.

Write us.

The Fuller Engineering Co.,

New York,
Chicago,
St. Louis,
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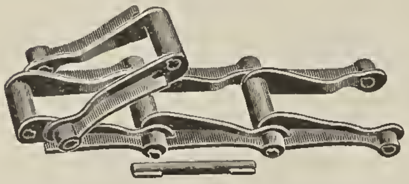
Charolett, N. C.

Engineers, Founders and Mechanics,
Builders of Oil Mills, Gin and Brick Machinery,
CALVERT, TEXAS.



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

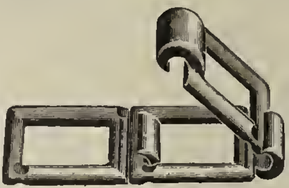
F. H. C. MEY,

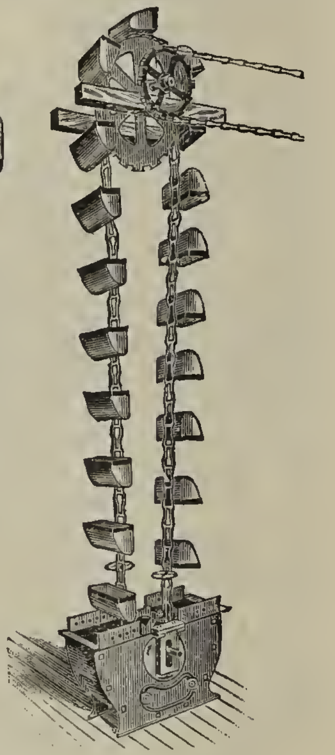
Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.

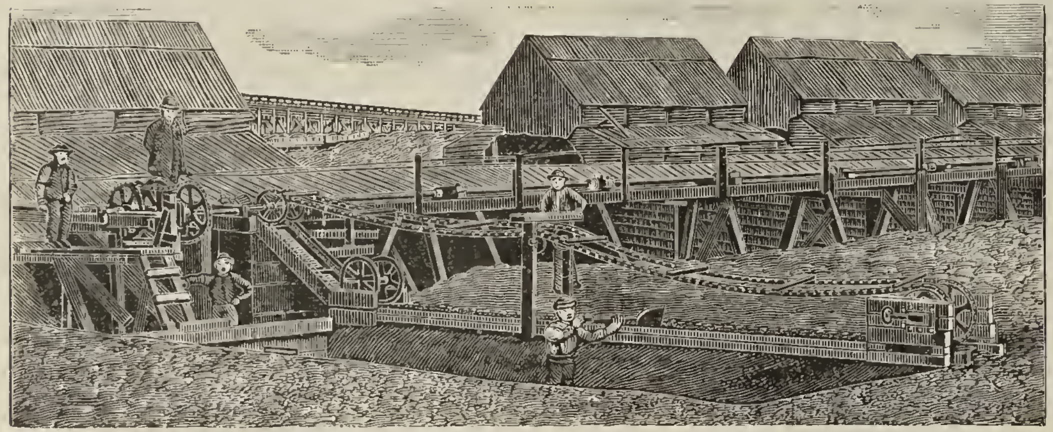




THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

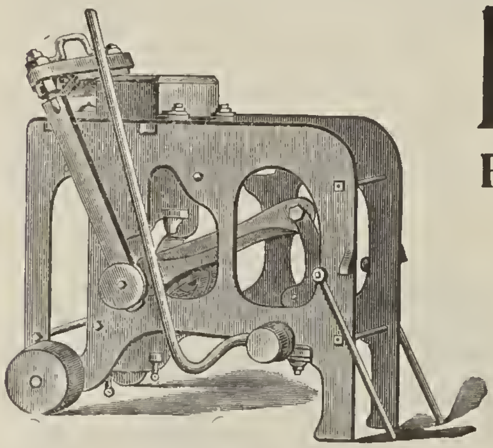
Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.



MEY PATENT CLAY ELEVATOR.

Send for Catalogue



RED BRICK PRESS.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

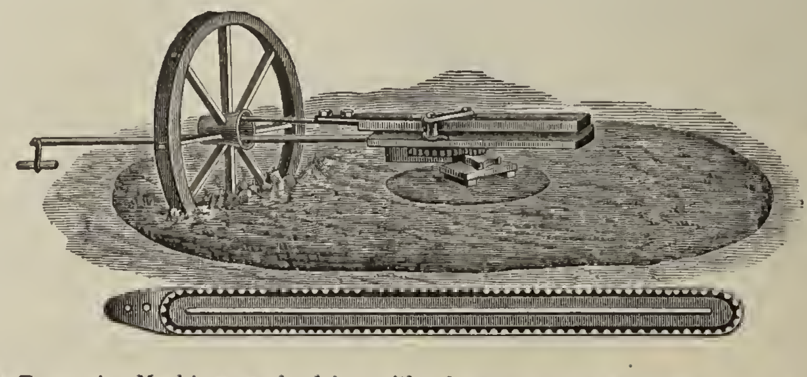
....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

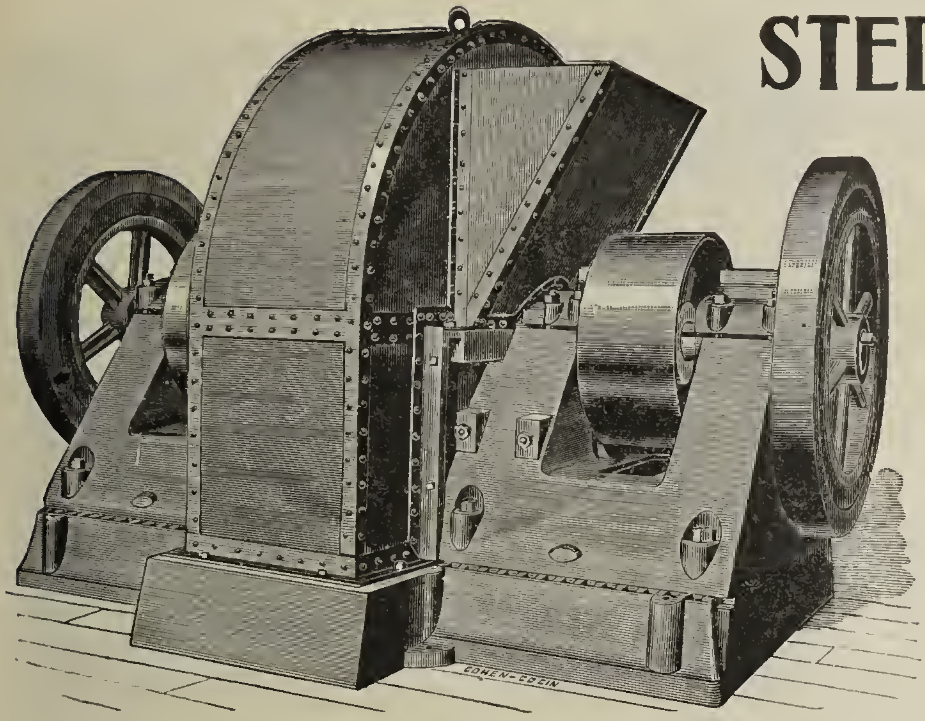
GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

☞Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.



STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it will not clog in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

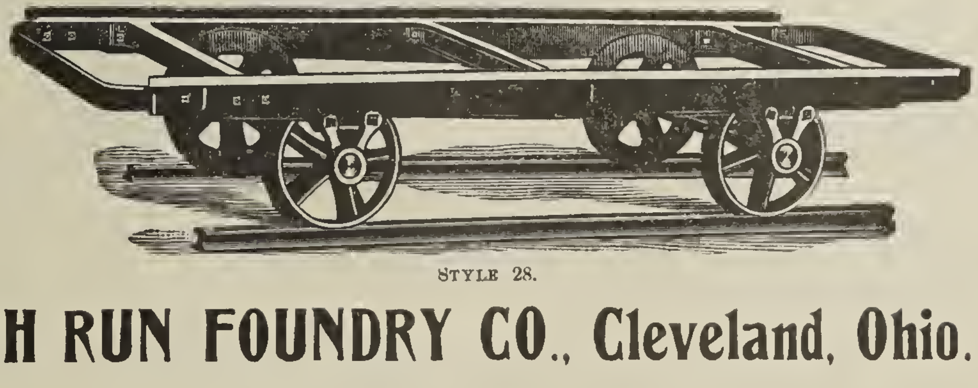
[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

BRICK CARS.

THE BEST!

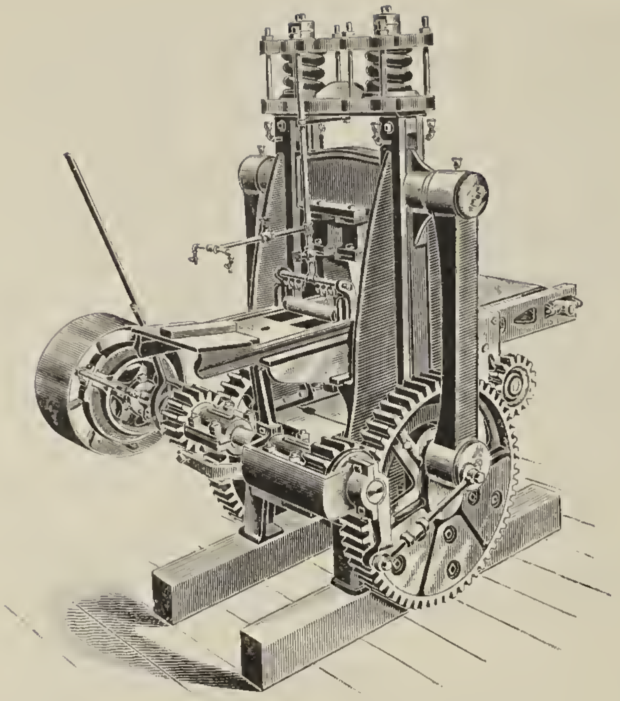
For carrying all kinds of brick. Over 15,000 in use. It will pay you to inform yourself fully.

Write Us.
Visit Us.



STYLE 28.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.



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MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
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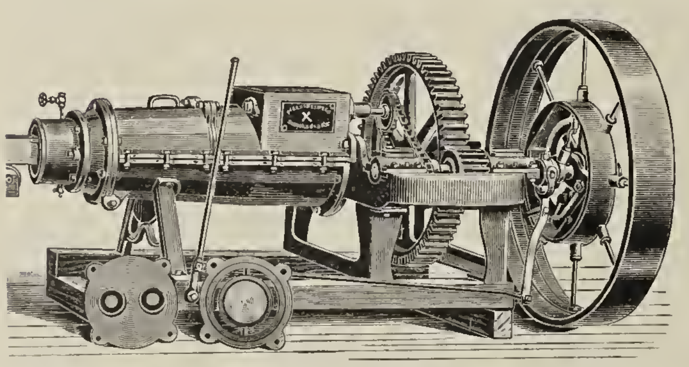
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.
SEND FOR PRINTED MATTER.

The New South Brick Machinery

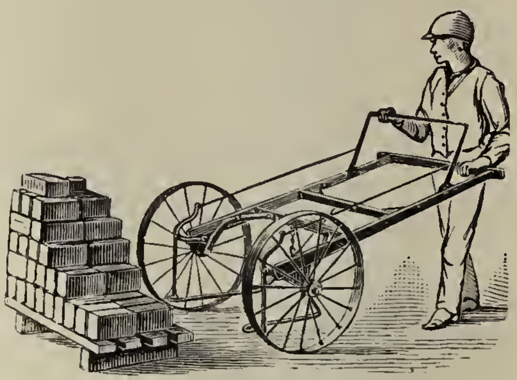
Is built on Scientific principles and is the most practical and economical machine on the market. Satisfaction guaranteed. We have a large number of testimonials like the following from Col. Norris, Central, S. C.:



CENTRAL, S. C.,
October 14, 1895.

MESSRS. J. C. STEELE & SON,
tatesville, N. C.

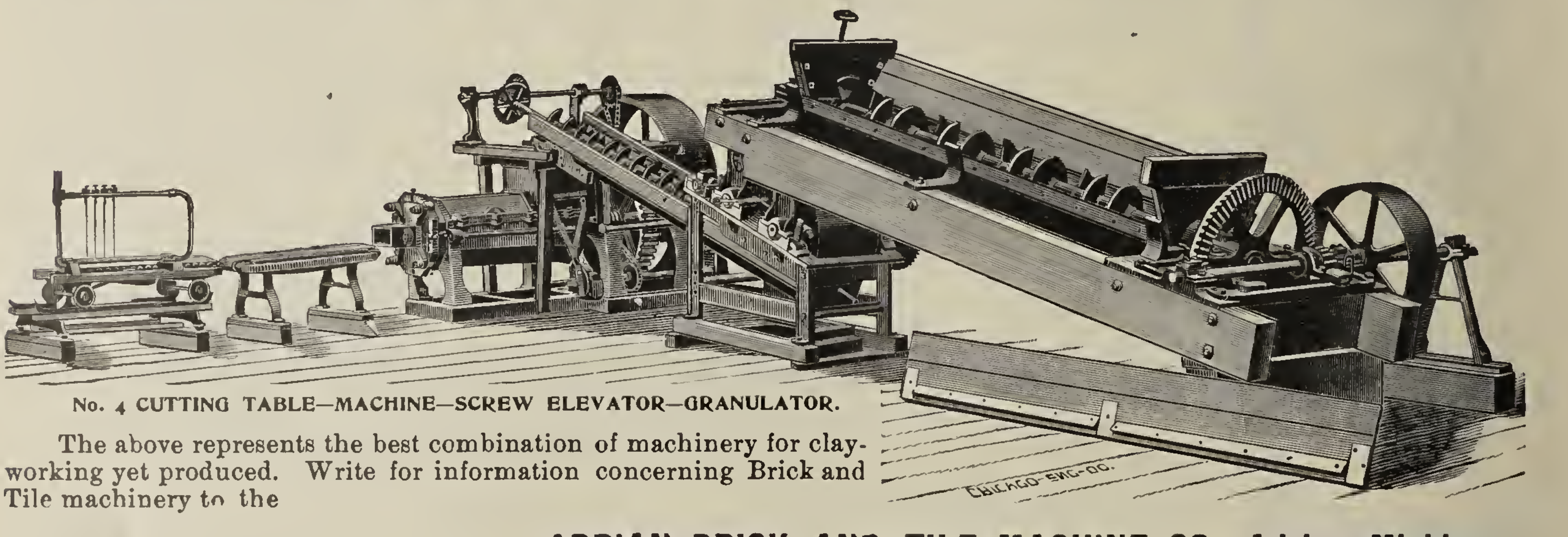
GENTLEMEN — Your Machines have given us great satisfaction, and we have had nothing but pleasure in our dealings with you. Yours truly,
NORRIS COTTON MILL CO.



Please write for prices and catalogue.

J. C. STEELE & SON, Statesville, N. C.

ADRIAN BRICK AND TILE MACHINE CO.


CHICAGO-ENG-CO.

No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

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A leading Ceramic weekly of Germany. Circulates throughout the world. An excellent advertising medium for manufacturers of clayworking machinery.

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DRAKE'S STANDARD MACHINE WORKS
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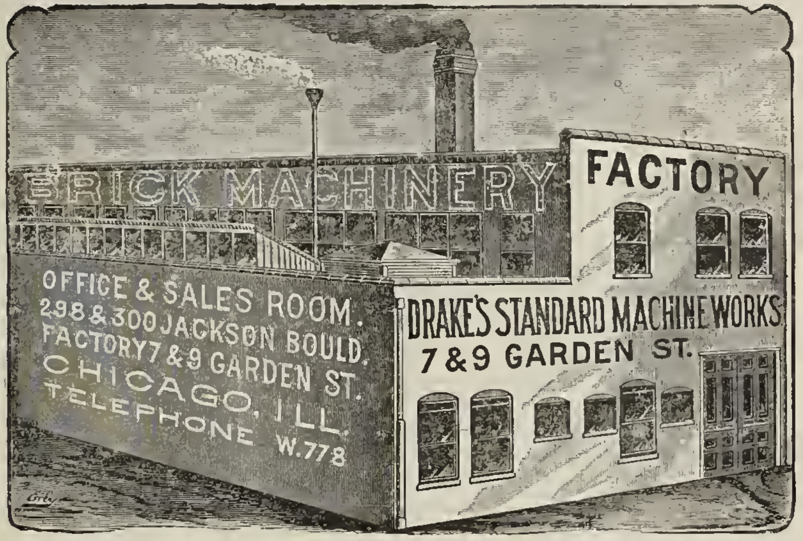

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TELEPHONE W.778
DRAKE'S STANDARD MACHINE WORKS
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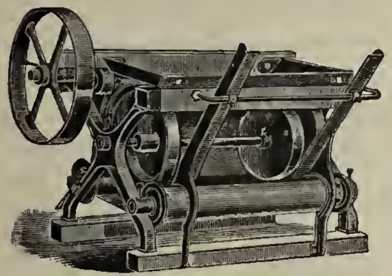
OUR NEW PERCUSSION SCREEN Is the Latest and Best Device for Screen Clay, Lime, Cement, Etc.

The Potts Mould Sander

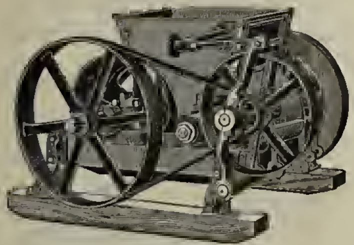


(Patented.)

HAS no sprocket wheels, chains nor gear to wear and break. There is less wear on moulds than when the work is done by hand. The work is better done, they are

Simple in Construction, Strong and Durable.

The Potts Disintegrators



(Patented.)
6 Sizes. Capacity 25,000 M to 150,000 M.

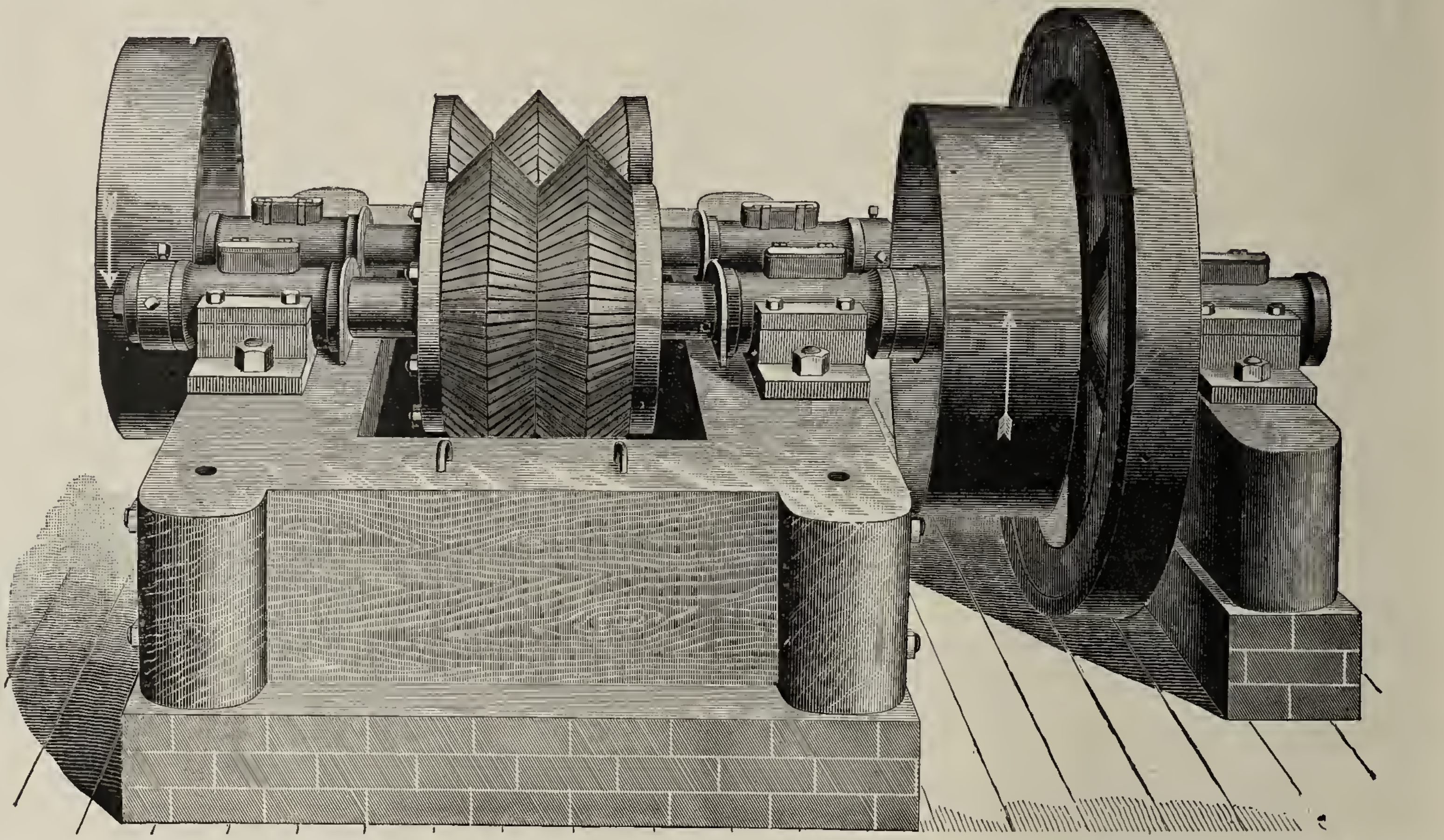
ARE the only machines made that will work any clay direct from the bank, and not choke or clog from hard, dry or wet, sticky clays. They are well built, of good material and will do the work claimed.

Beware of all machines using projecting bars working in combination with smooth roll or ridged abuting surface. **They are Infringement.**

C. & A. POTTS & CO., - Indianapolis, Ind.

NEWELL IMPROVED CLAY PULVERIZER

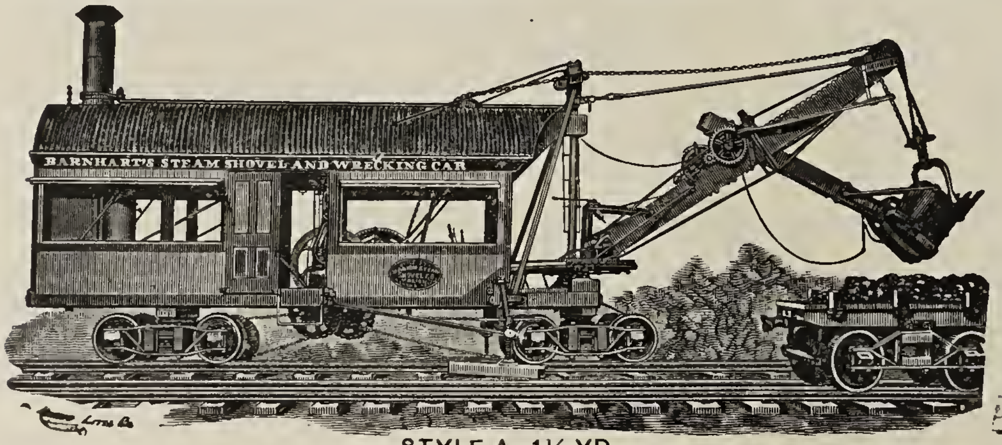
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building 26 Cortland and 21 Dey Streets, **New York, U. S. A.**

STEAM SHOVELS FOR BRICKYARDS.



BARNHART'S STEAM SHOVEL AND WRECKING CAR

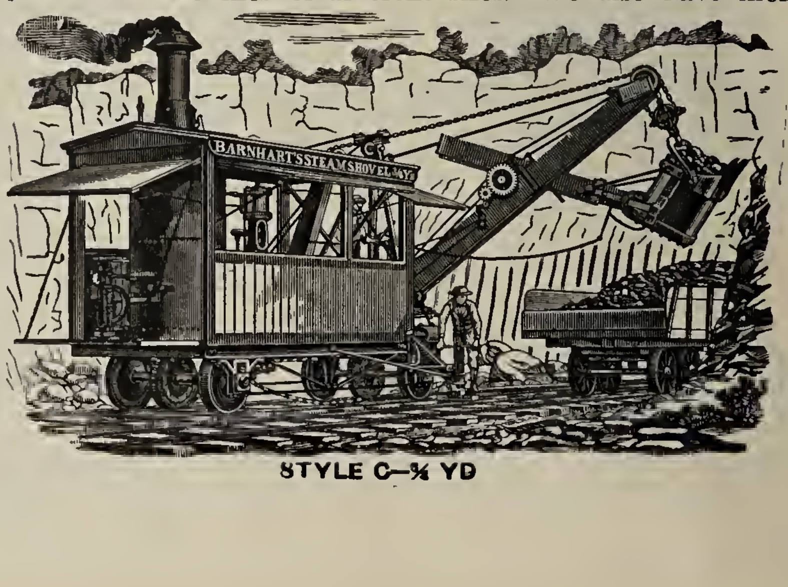
STYLE A—1½ YD.

Our large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brick yards of Chicago. We have in and around Chicago, about twenty of these machines of different sizes. We also have man elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work. Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

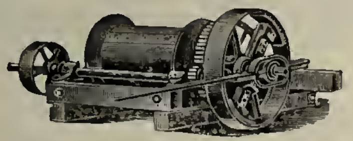
603 West Center Street.

MARION. · · · OHIO.



STYLE C—¾ YD

If You Want Supplies



Friction Winding Drums.
Spur or bevel gear to suit any location.

Trucks for Brick or Tile.
One or two wheels.

Brick Moulds.
Made from the best cherry, either for Hand or Machine.

Of Any Kind

Which are made from the best material, and the best workmanship, and at prices far below any, we can give it to you.

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We manufacture all our goods therefore know what grade of material is used in their construction. You buy from the manufacturer and save all commissions.

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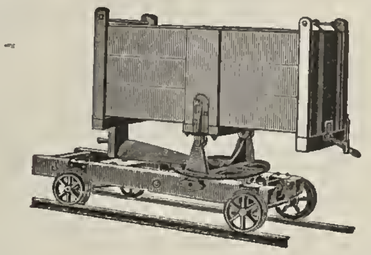

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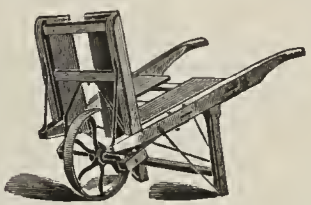
Side, bottom or revolving dump. Having chilled wheels, standard car boxes.



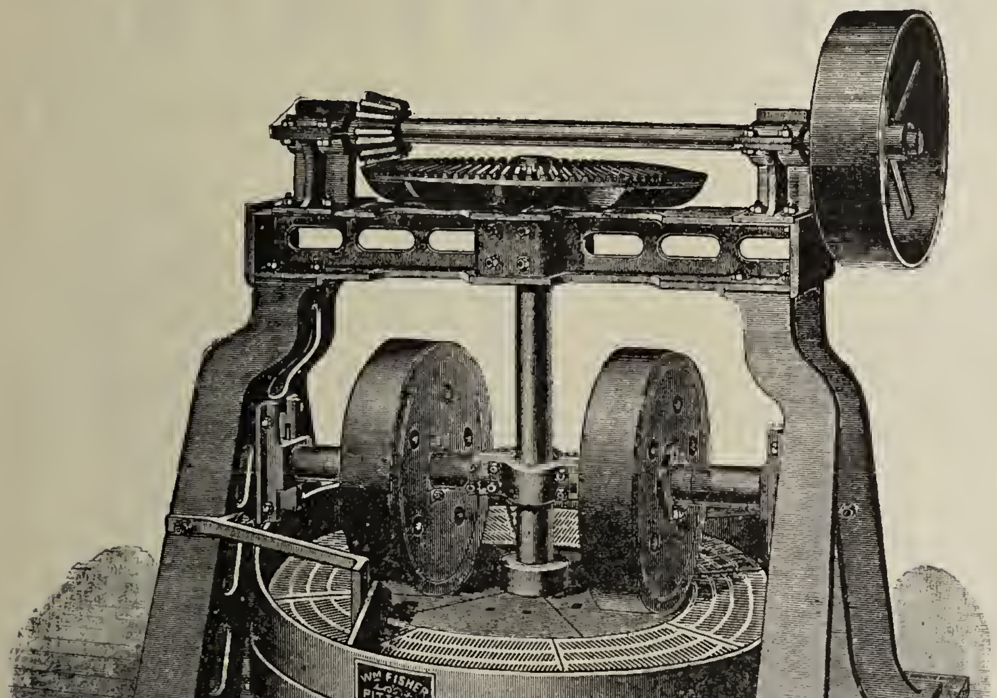
Brick Barrows.
With or without springs.

G. & A. POTTS & CO.,

420-428 West Washington Street, (Old National Road,) ***INDIANAPOLIS, IND.***

STANDARD DRY AND WET GRINDING PANS,

—IRON FRAME.—



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PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets,
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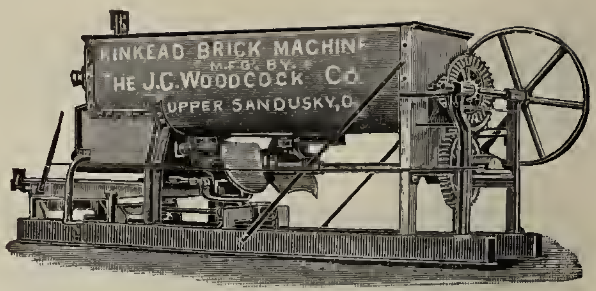
FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

A Good Brick Machine:

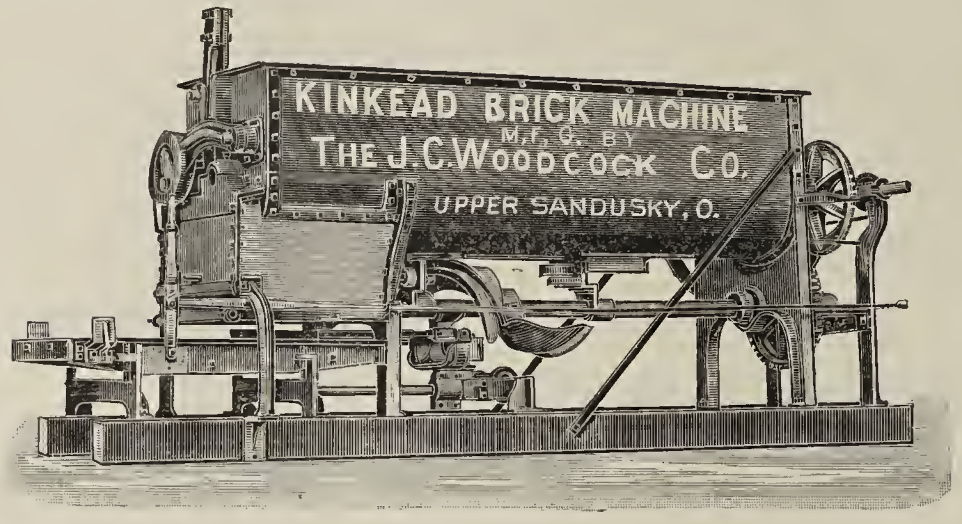

KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Rear View.

One that's Strong enough to withstand the severe strain of working stiff clay.

One that's Durable and will not only make good brick under favorable conditions but will make good brick under the varying conditions incident to brickyard work.

One that's Cheap because it is simple in construction and never breaks down or gets out of repairs but will turn out a desired quantity (30 to 50 M) every day, six days in the week is well nigh "worth its weight in gold." **We** offer it to you at a much lower price and also a line of excellent.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M.F.G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Front View.

Brickyard Supplies:==

Brick Moulds, Trucks and Barrows, Elevators, Pug Mills, Etc.

All warranted to be first-class and on reasonable terms.
Dont fail to get our prices.

**The J. C.
WOODCOCK CO.,
Upper Sandusky, Ohio.**

LEVIATHAN BELT.

"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

ZANESVILLE, OHIO, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. BURTON, Secretary and Treasurer.

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

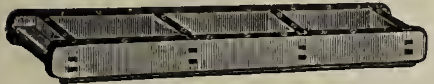
248 Randolph St., CHICAGO, ILL.

PHILADELPHIA:
1219 Carpenter Street.

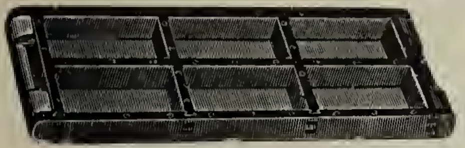
BOSTON:
120 Pearl Street.

ARNOLD'S BRICKYARD SUPPLIES.

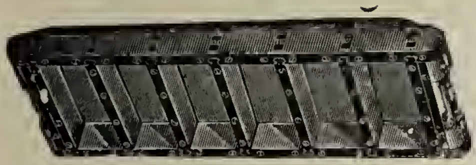
••⊰They are the BEST that are Made.⊱••



3 Brick Hand Mold.



6 Brick HandMold



6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moulds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

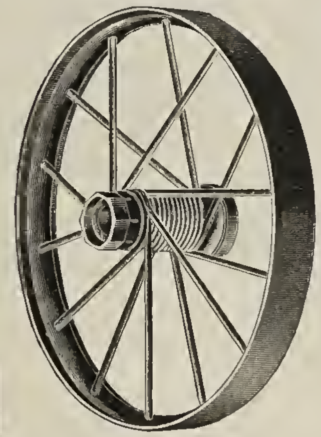
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.



METAL WAGON WHEELS

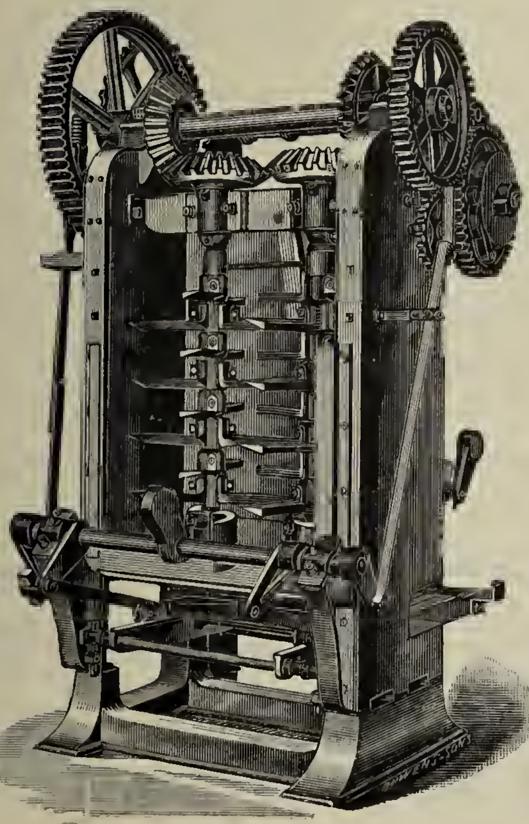
MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The *strongest* wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced.

Circular and prices sent on application. Address

The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

THE DUPLEX

Is the Standard of All Soft Clay Brick Machines.



•~•

It is made entirely of iron and steel, thus being very Strong and Durable, Simple in Construction, and makes a much stiffer brick than can be made with any other soft clay machine.

•~•

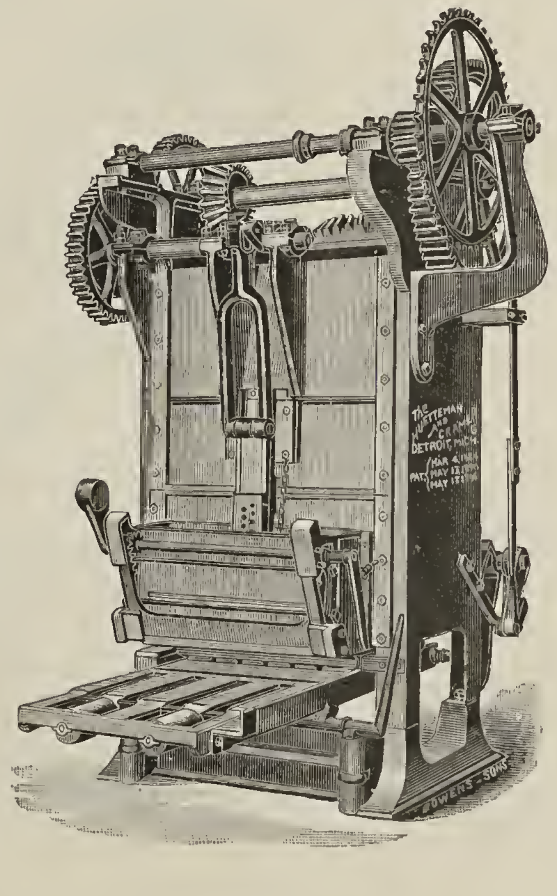
Write for Catalogue . .
. . . and Prices to

The Huetteman
& Cramer Co.,

Manufacturers of the Duplex Brick
Machine and general outfit
for brickyards,

12, 14 & 16 Sherman St.,

DETROIT, -- MICH.



ALSIP'S | LATEST IMPROVED DOWN AND UP DRAFT KILN

It Has Been Thoroughly Tested, and Every Kiln is Giving Perfect Satisfaction.

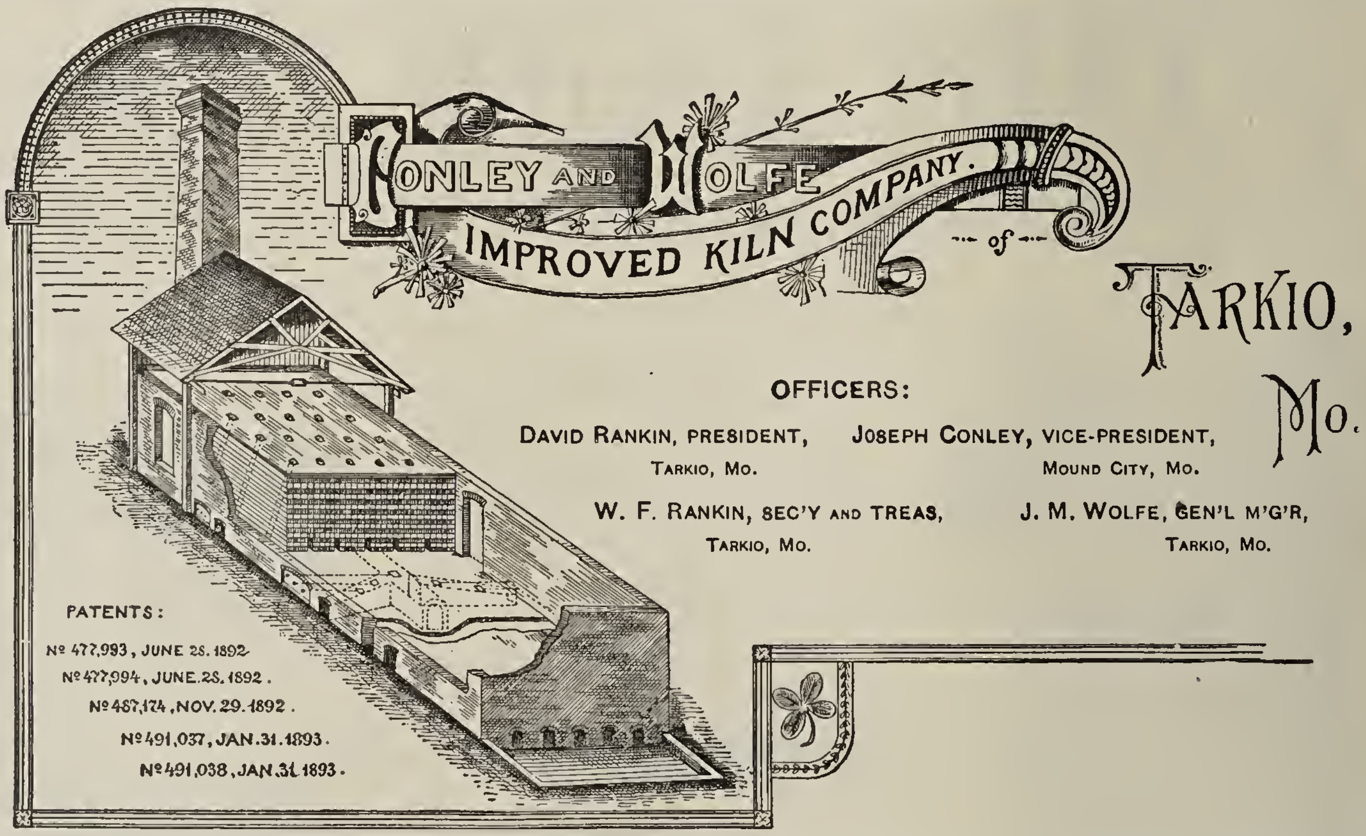
Why take any chances when you can buy a kiln that will burn the ware uniform from top to bottom, from side to side, and from end to end? This is just what the Alsip Kiln does.

It will save **time, labor** and **money,** if you will thoroughly investigate our Latest Improved Kiln before deciding on any kiln.

For descriptive circular and further information, address

Wm. & S. H. Alsip,
MENARD, ILL.

[Mention the CLAY-WORKER.]


CONLEY AND WOLFE IMPROVED KILN COMPANY.
of
TARKIO, MO.

OFFICERS:

DAVID RANKIN, PRESIDENT, TARKIO, MO.
JOSEPH CONLEY, VICE-PRESIDENT, MOUND CITY, MO.
W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.
J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

PATENTS:
No 477,993, JUNE 28. 1892.
No 477,994, JUNE 28. 1892.
No 487,174, NOV. 29. 1892.
No 491,037, JAN. 31. 1893.
No 491,038, JAN. 31. 1893.

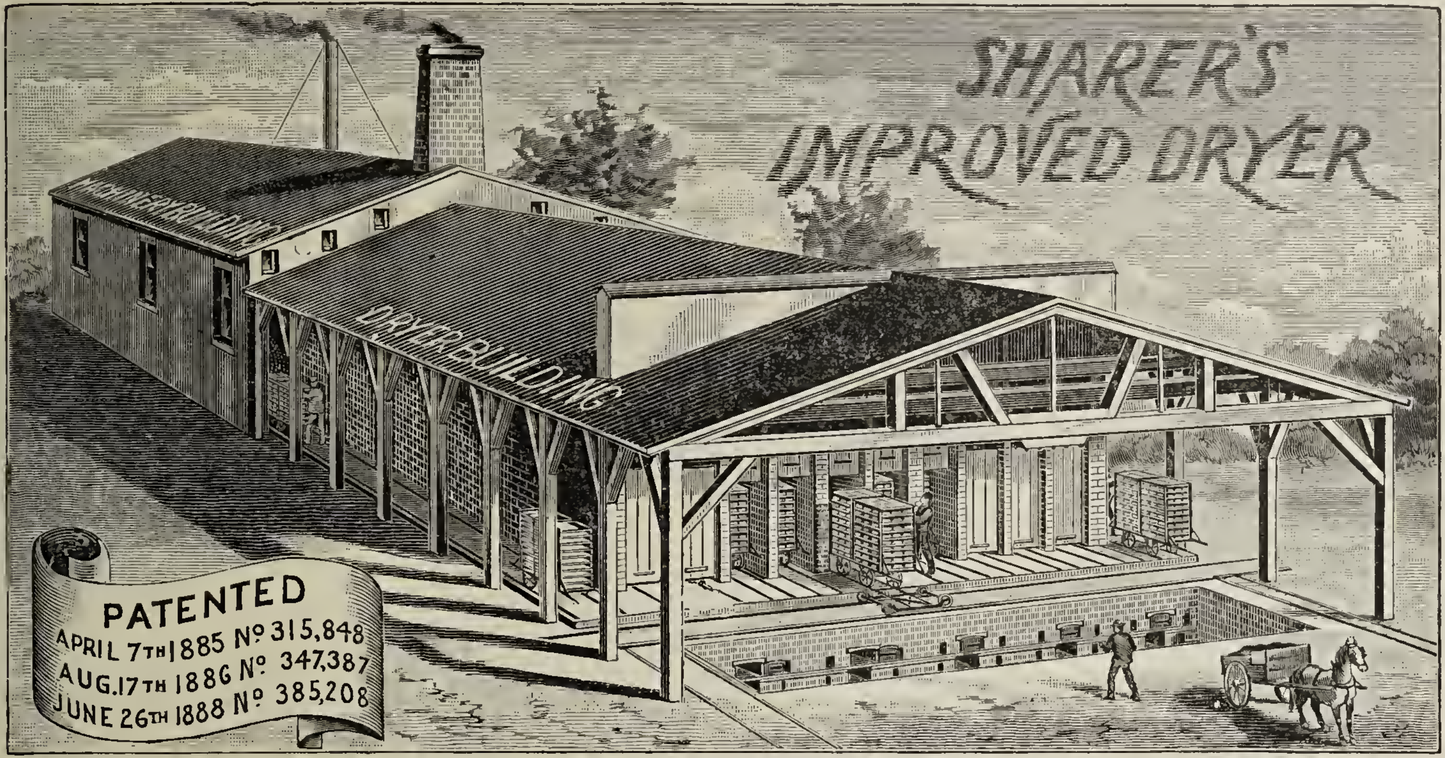
THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.


SHARER'S IMPROVED DRYER
MACHINERY BUILDING
DRYER BUILDING
PATENTED
APRIL 7TH 1885 No 315,848
AUG. 17TH 1886 No 347,387
JUNE 26TH 1888 No 385,208

COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address **GEO. W. SHARER,** 2224 Tioga St., **Philadelphia, Pa.**

NOTICE TO BRICK MANUFACTURERS.

The RADFORD CONTINUOUS BURNING SYSTEM

IS by far, ahead of all other systems of burning all kinds of building material, and it does not cost more than one-third of other Continuous Kilns to build it. Radford does not make as much noise as other Kiln men, but he gets there all the same.

Before deciding to building Continuous Kilns send for particulars to

Wm. Radford,

1512 Seller Street,
FRANKFORD, PHILADELPHIA.

Testimonials.

Ft. DODGE CLAY WORKS.

L. A. Thorson, *Secretary.*

Fort Dodge, Iowa, October 17, 1894.

Wm. Radford, Atlanta, Ga.

Dear Sir:—We have now used your Monarh Continuous Kiln for nearly two years and are pleased to state that it works perfectly satisfactory. We have burned building brick, paving brick, and also drain tile successfully, and very, very cheaply. Will further state that so far there has not been one dollar's worth of repairs done or needed on the kiln.

Wishing you much success, we are respectfully yours,
Ft. DODGE CLAY WORKS, L. A. Thorson, Sec.

Wm. A. Hancock, *Pres.* T. P. Perkins, *Vice-Pres.* H. L. Grant, *Sec.*

Office of SOUTH RIVER BRICK CO.,

Manufacturers and Dealers in SOUTH RIFER PRESS BRICK.

Works located at Norton, Ga., E. T. Va. & Ga. R. R.
Office, 3 Constitution Building; Telephone 506.

Atlanta, Ga., October 31, 1894.

This is to certify that Wm. Radford built us a 10 Chamber Kiln this past summer. The kiln is built of common brick inside and out. We have burned around about 14 times. Khe kiln is in as perfect condition now as when finished, so far as we can see. With proper attention of the burners the kiln will burn 95 to 98 per cent. hard brick. The kiln is giving good satisfaction and it does all that is claimed for it. The saving of coal is $1.25 per 1,000. We don't believe it has any equal; it can't be too highly recommended.

SOUTH RIVER BRICK CO.
W. A Hancock.

(This kiln cost $3,405, all complete.)

McCAY & COMPANY,

Manufacturers of ALL KINDS OF BUILDING BRICK.
Yards: Oxford Pike.

Frankford, Phila., July 31, 1895.

This is to certify that Wm. Radford has altered our —— Continuous Kiln, taught us to set and properly burn it, and we can highly recommend him to any fellow brickmaker who desires to construct a Continuous Kiln. Mr. Radford has demonstrated that he thoroughly understands the construction and burning of Continuous Kilns, and no one will err who engages him for that purpose.

Very truly, McCAY & CO.

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

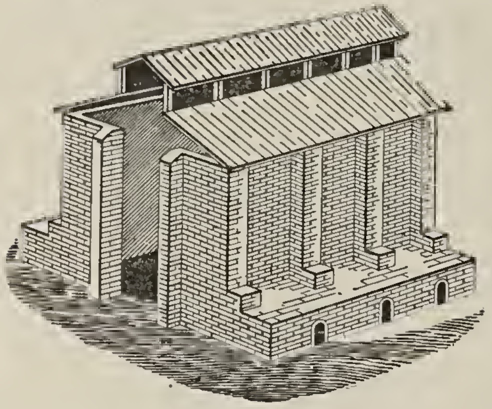
All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., ***Minneapolis, Minn.***

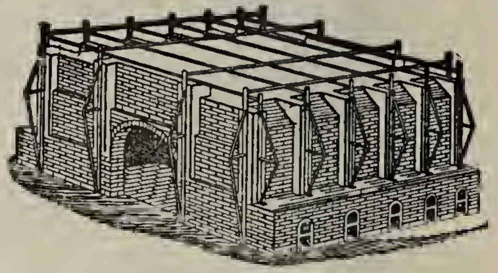


Up-Draft Kiln.

LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Down-Draft Kiln.

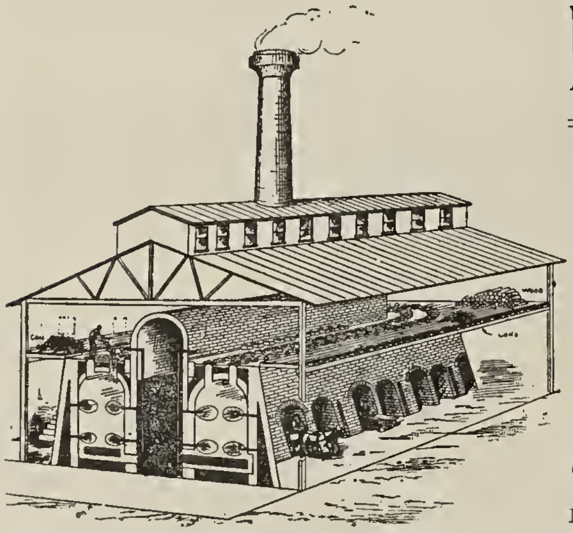
Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,913 Indiana Ave., ***Kansas City, Mo.***

Firestone's Continuous Kiln and Dryer.



THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.
No soft or Salmon brick.
No yards or sheds needed.
It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

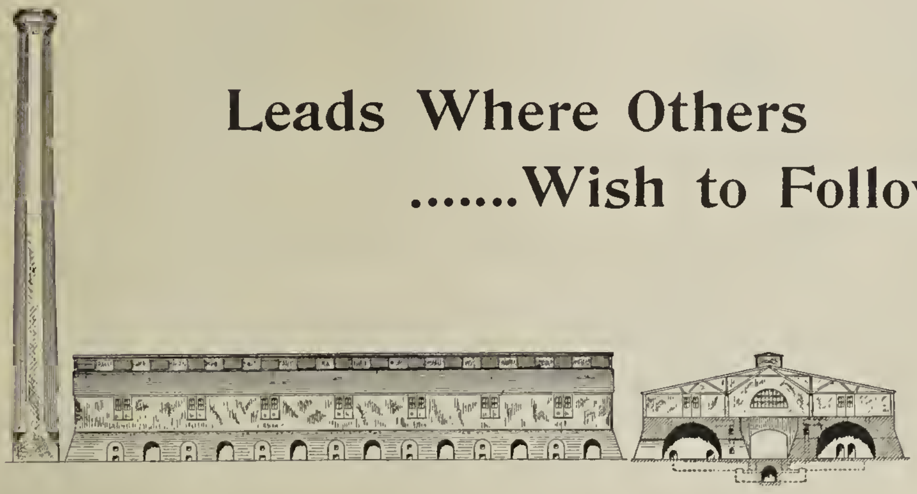
Vitrified Paving Brick

Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Wheeler. Mailed free on receipt of price, $1.00.

T. A. RANDALL & CO., **Publishers,**

INDIANAPOLIS, INDIANA.

Haigh's New System of Continuous Kiln,



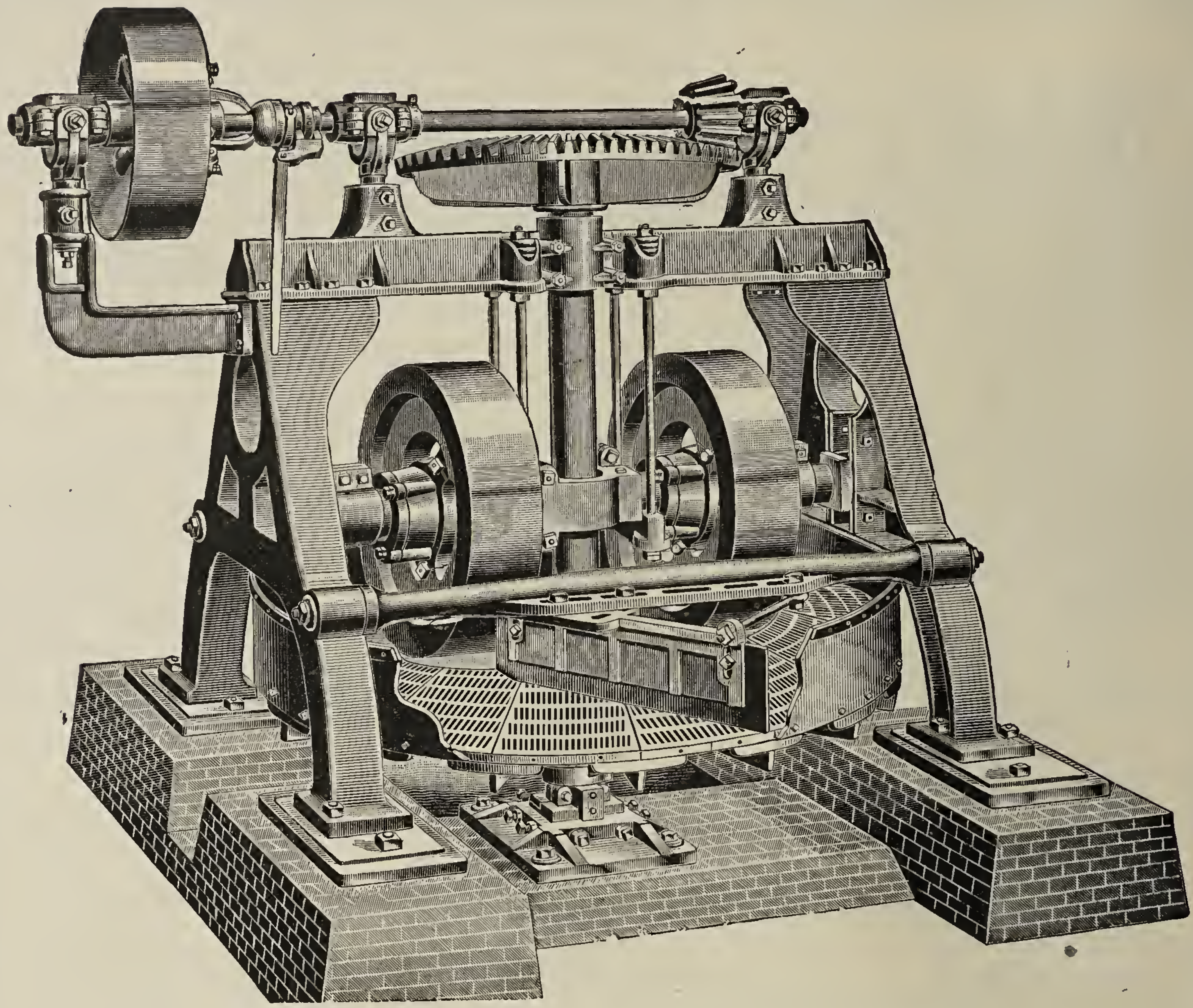
Leads Where Others
.......Wish to Follow.

Several other kilns are being changed to this system of side firing. Everyone that has been to see and note results, are enthusiastic over its simplicity and the character of product obtained.

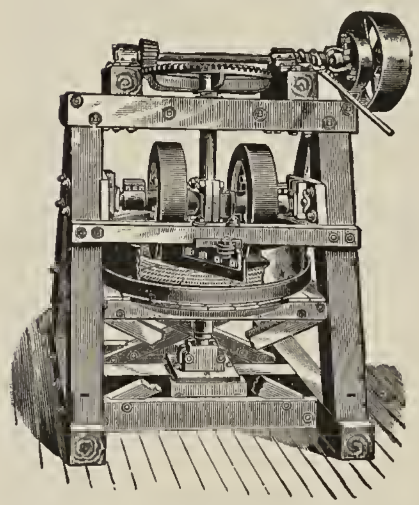
Let me ask you one question: Why pay $2.00 per M for fuel when less than 40 cents will do the same work? Its worth considering in these days of close competition.

Cost of Construction, Labor in Burning and Repairs, are all in proportion, lower. For further information, address

H. HAIGH,
Galesburg, Ill.

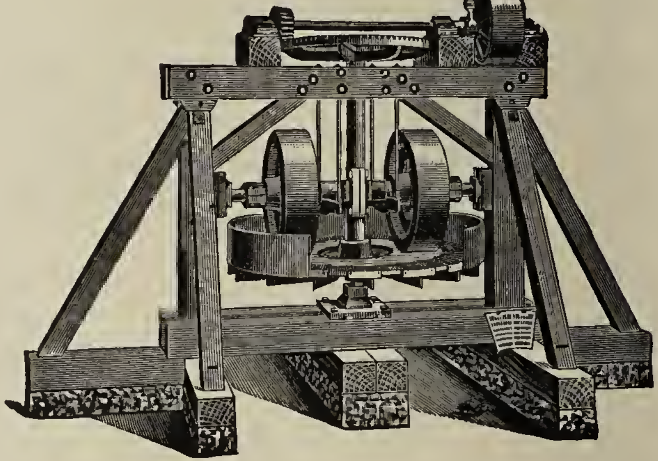


OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



......SEND FOR NEW ILLUSTRATED CATALOGUE......

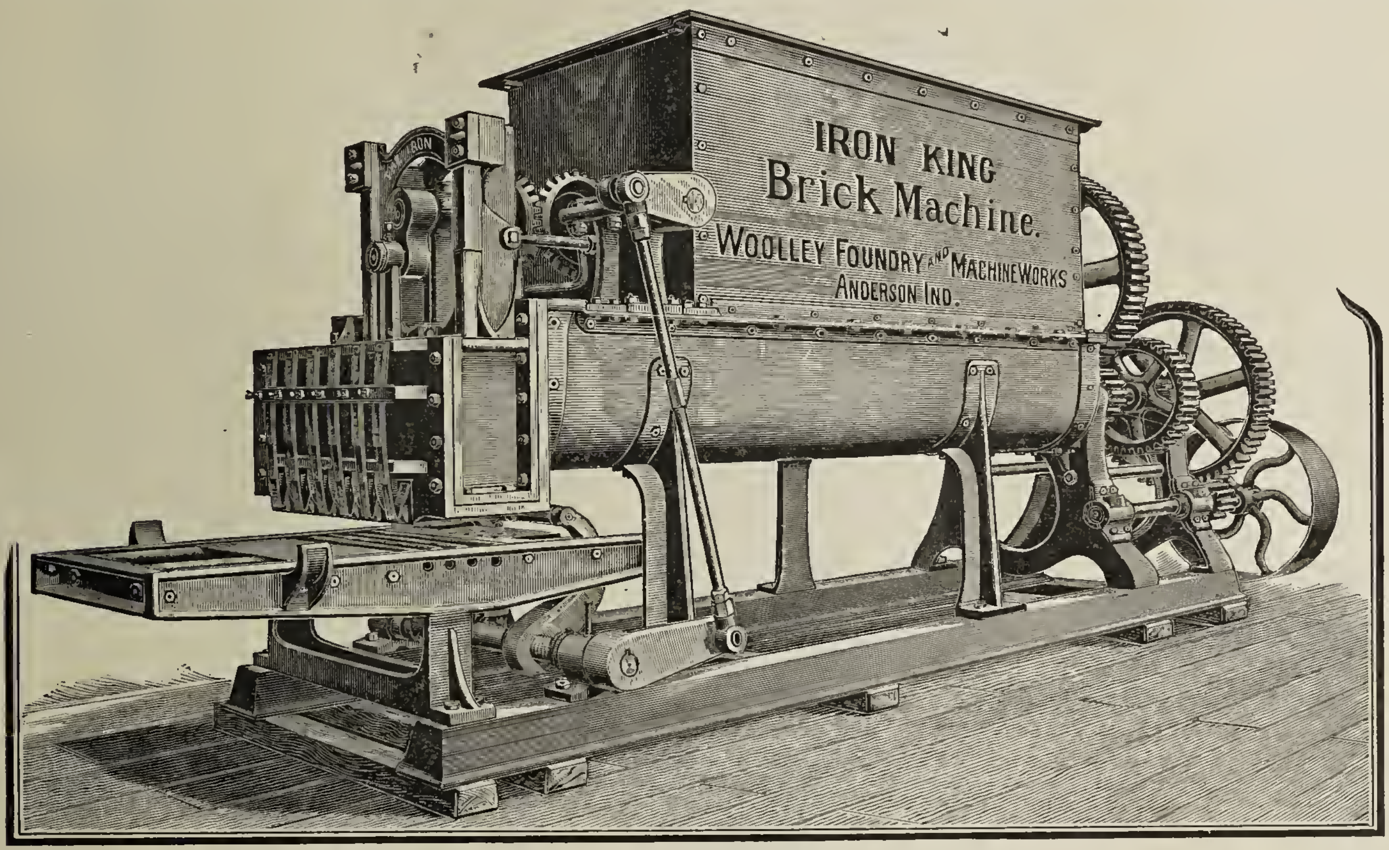
FROST ENGINE CO., Galesburg, Ill.,
U. S. A.

Great Strength

Is a necessary factor in all Brickmaking Machinery, but that is not all that is required. To be effective a Brick Machine must have mechanical features that enable it to perform its work regularly though under varying conditions. In other words

The Successful Brick Machine

Is constructed on scientific principles. That is the kind of a machine we offer. **The IRON KING** is what its name implies—a monarch of strength. It is no experiment but has demonstrated great capacity and endurance in real every day brickyard use. It makes good brick without any hitches or break downs, and molds them so stiff they bear handling.


IRON KING
Brick Machine.
WOOLLEY FOUNDRY AND MACHINE WORKS
ANDERSON IND.

The Iron King....

Does this not merely by "main strength and awkwardness" but by virtue of peculiar methods of construction by which the clay is thoroughly tempered or pugged and then subjected to greater pressure than in any other machine using a sanded mould.

Brickmakers who want the best soft clay machine, and remember the best is the cheapest, are requested to investigate the merits of **The IRON KING**. It has many.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

WE'VE QUIT

......USING WOOD

In the construction of our

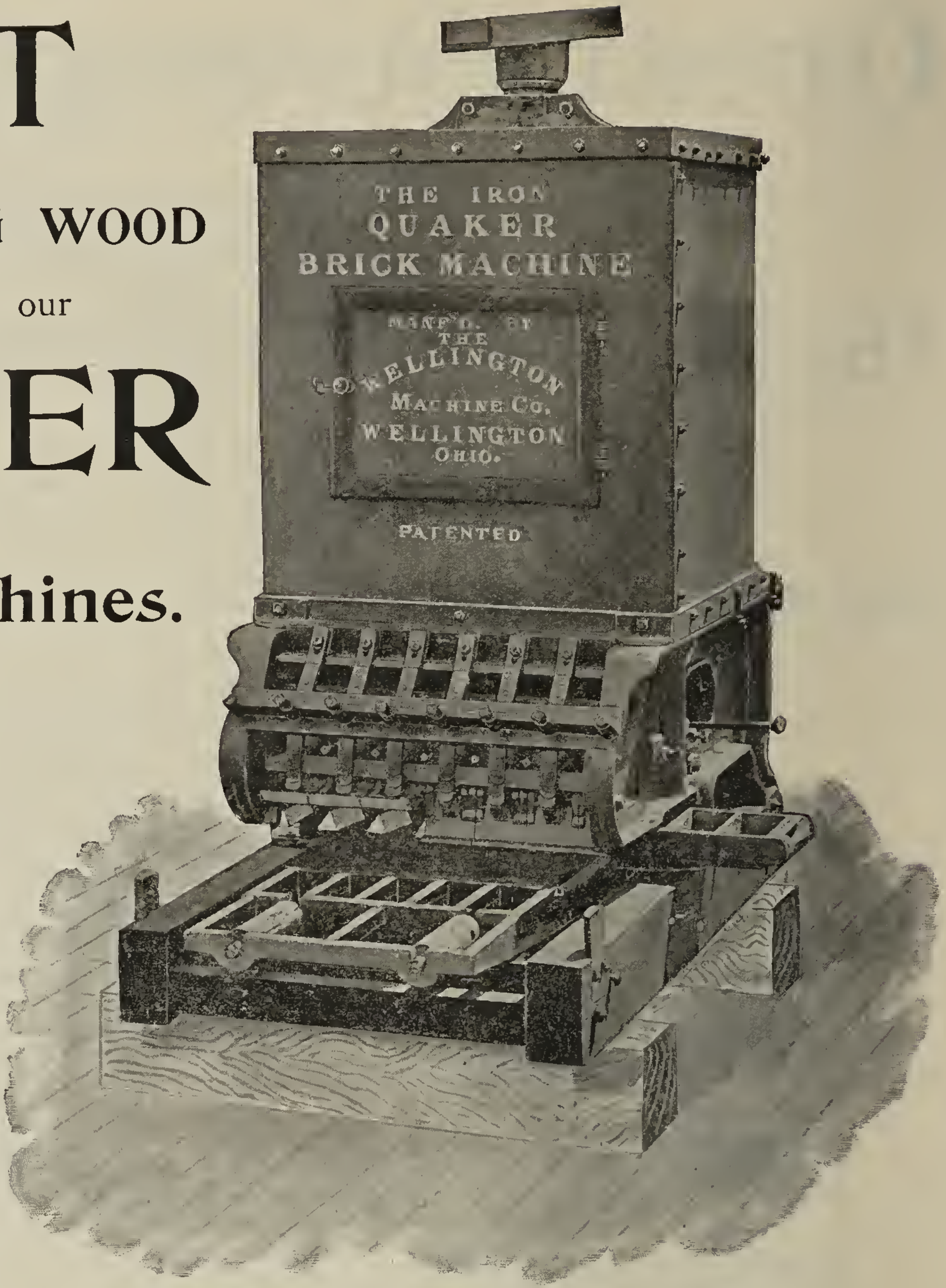
QUAKER

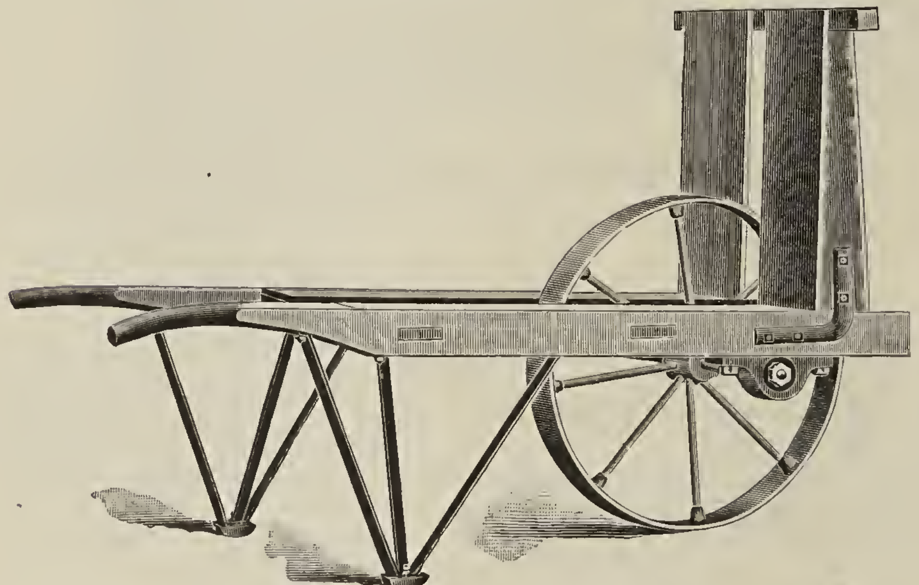
Brick Machines.

Two Styles:
Horse-Power.
Steam-Power.

Horse-Power can be changed to Steam-Power whenever desired.

PRICES NO HIGHER THAN BEFORE.





Ball-Bearing Brick Barrow

A user writes: "Send four more. There's a fight every morning among the hands, as to who shall have it, and then he wheels 15 per cent. more brick than any of the rest."

WE ALWAYS DEVOTED

Especial attention to supplies, etc., and have the largest line, and we think the best goods.

The Wellington Machine Co.,

DROP
A CARD
IN THE SLOT
AT YOUR P. O.
FOR CIRCULAR.

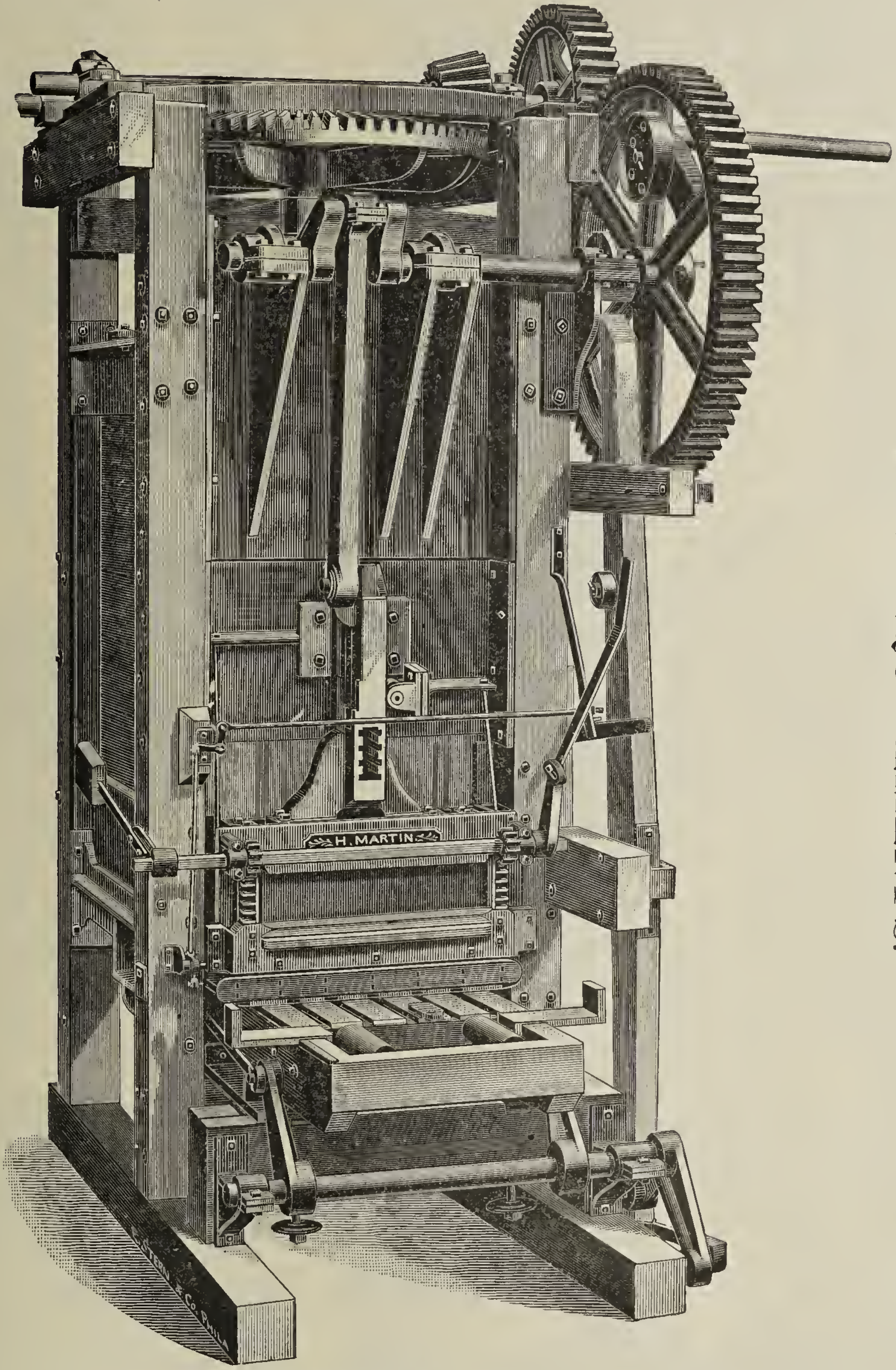
Also See Page 171.

Wellington,
Ohio.

Simplicity, Strength and Durability

Are the Characteristics of

STANDS SECOND TO NONE.



IT HAS BEEN TRIED AND FOUND TO SUPPLY ALL THE REQUIREMENTS.

MARTIN'S LETTER "A."

The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

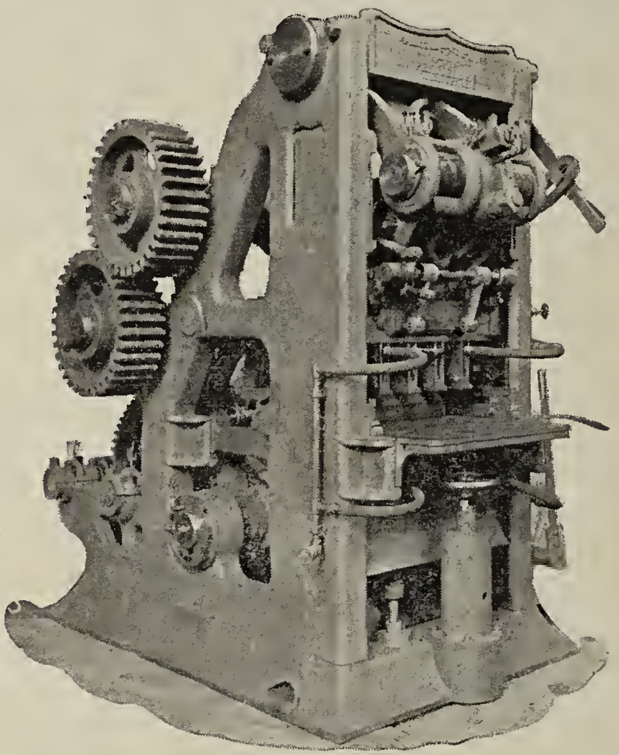
LANCASTER, PENN.

When You Know How it Works,

You can't **help** but see why the **PENFIELD DRY PRESS BRICK MACHINE** is the best.

It Takes A Fresh Start

Where others leave off, and gives the brick an extra pressure, making them denser, stronger and more perfect in every way.



Penfield 4-Mold Press, Model D3.

The Machine That Gives the Extra Pressure.

J. W. Penfield & Son,

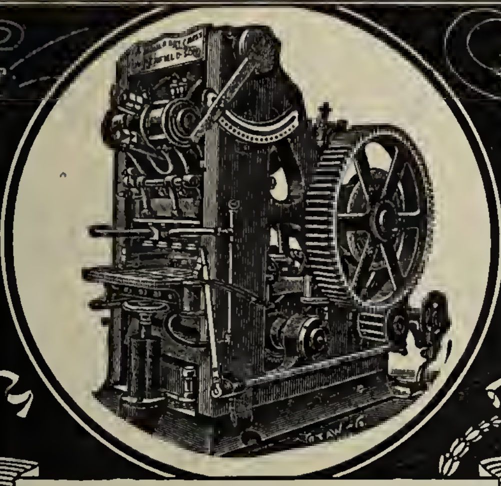
Willoughby, Ohio, U. S. A.

Consulting Engineers,

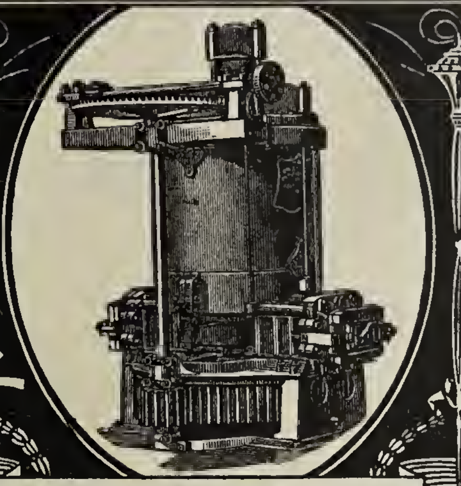
Manufacturers of Modern Clayworking Machinery.
Designers and Equippers of Complete Brickmaking Plants.

Send for Our 1896 Catalogue.

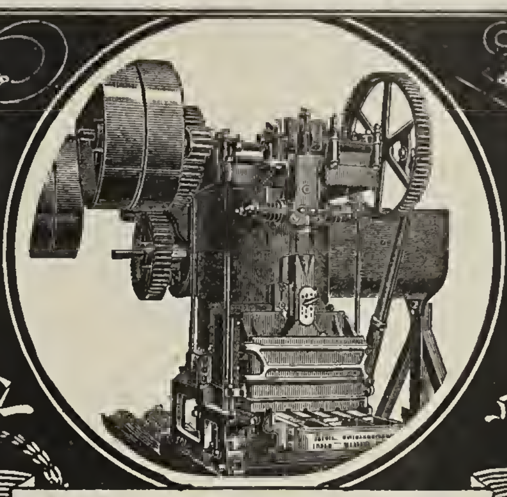
CLAY-WORKING MACHINERY



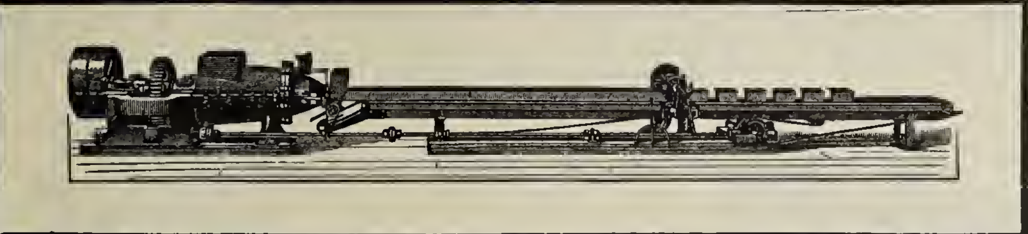
DRY PRESS BRICK MACHINES



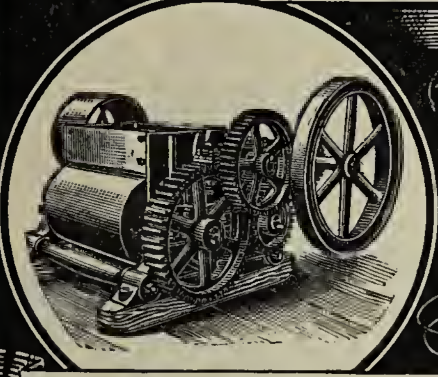
PLUNGER BRICK MACHINES



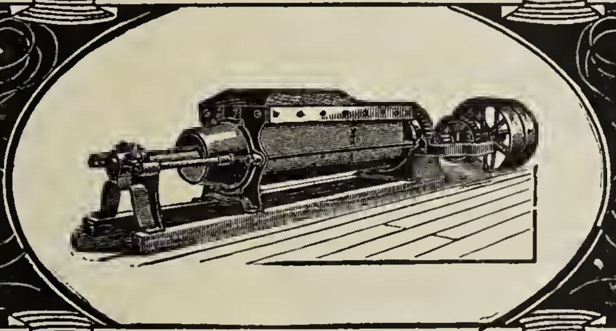
SAND-MOLDING BRICK MACHINES



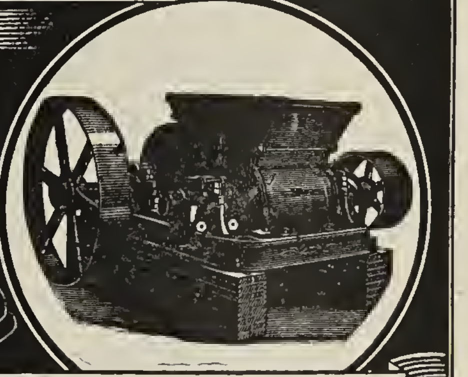
AUGER BRICK MACHINES



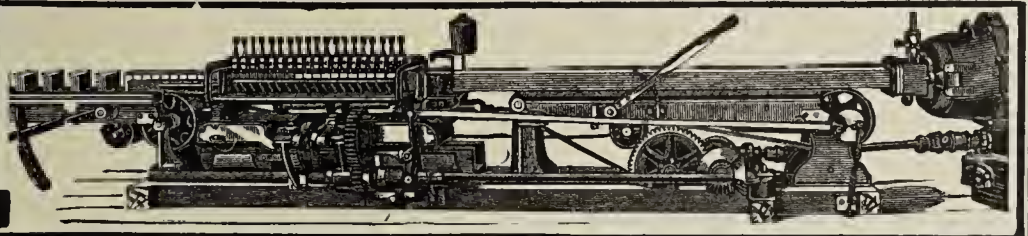
CLAY CRUSHERS



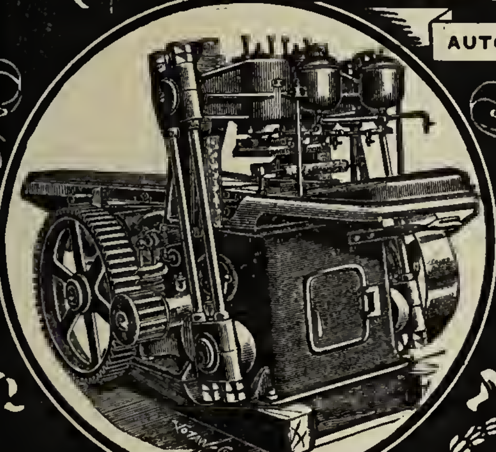
PUG MILLS



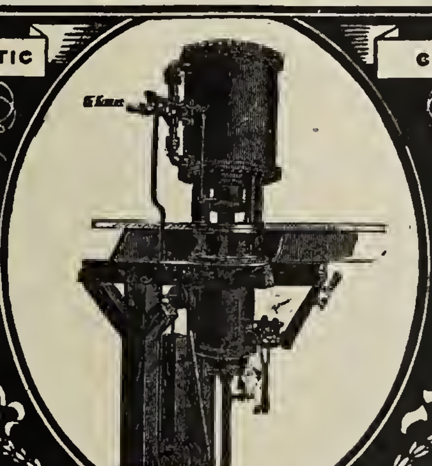
DISINTEGRATORS



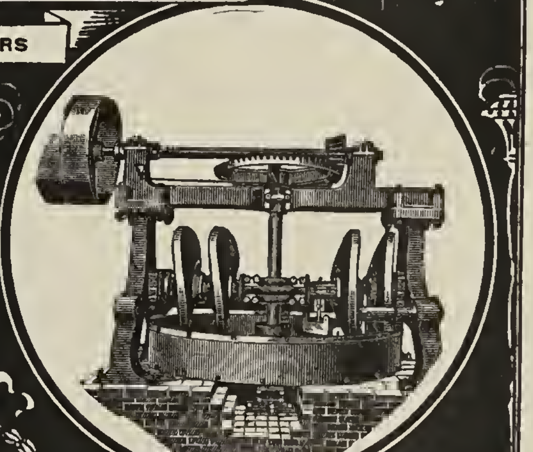
AUTOMATIC CUTTERS



BRICK REPRESSES



SEWER PIPE PRESSES

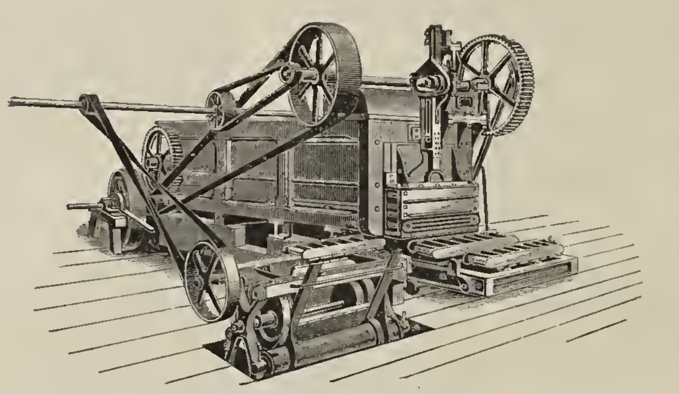


DRY PANS, WET PANS, ETC.

J.W. PENFIELD & SON, WILLOUGHBY, O. U.S.A.

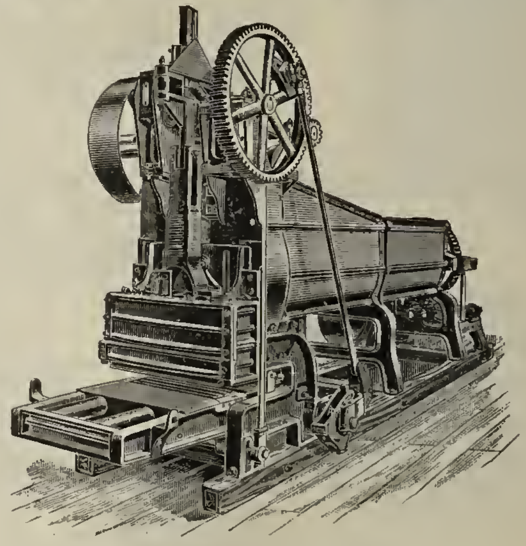
THE POTTS Horizontal Stock Brick ...Machines.

These machines have replaced a great many Vertical Machines and extra Pug Mills. They have never failed to do more and better work.



No. 1 WOOD FRAME PUG MILL, IRON FRONT and TABLE.
Over 250 in Actual Use.

The No. 1 Machine will make **more and better** brick than can be done by any machine on the market.



No 2 ALL IRON.
15 Sold the Past Season.

The No. 2 Machine has the reputation of being the best built on the market, it is without a doubt the **largest, heaviest and strongest** machine ever offered the trade.

Any person contemplating making sand mould brick will do well to investigate the merits of the above machines.

Remember that it is not always the cheapest, which is the best.

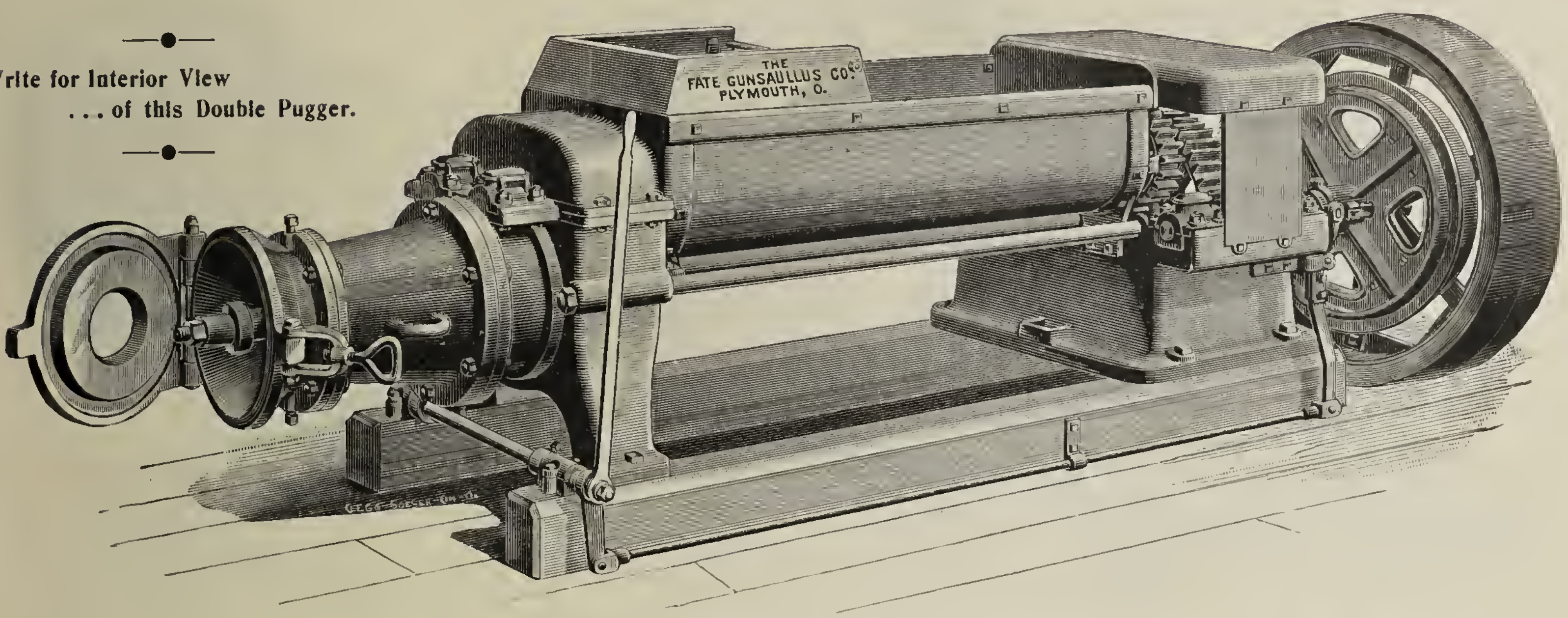
We manufacture a full line of Clayworking Machinery and Brickyard Supplies.

C. & A. POTTS & CO.,

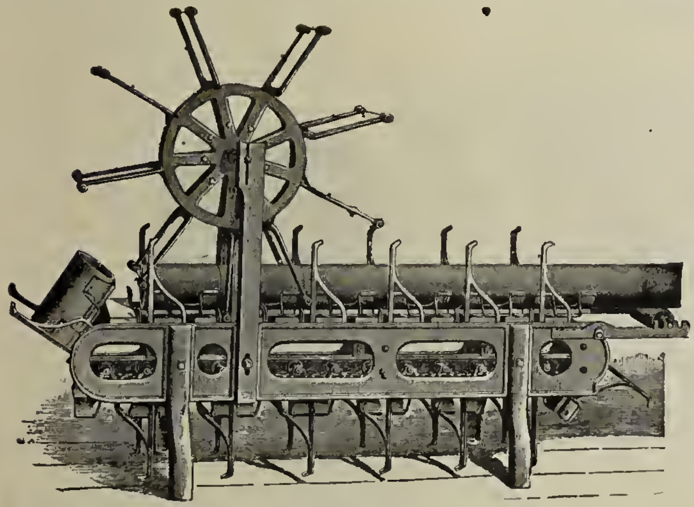
420-428 **West Washington St.,** (Old National Road,) INDIANAPOLIS, IND.

The "PLYMOUTH."

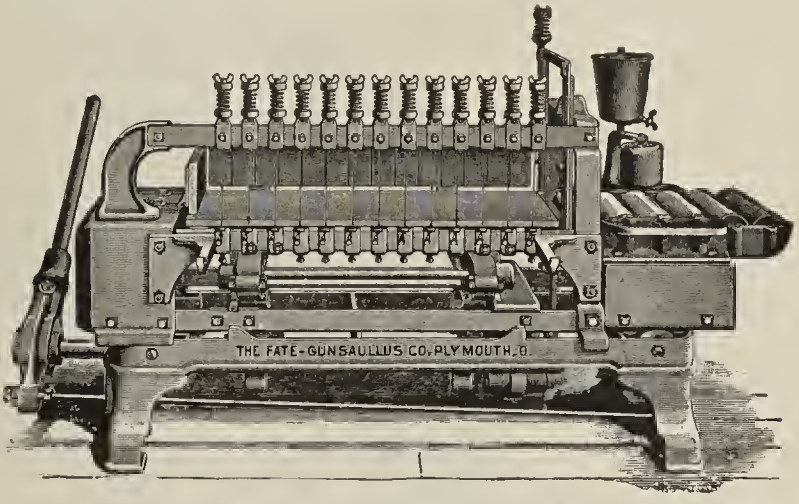
Write for Interior View
. . . of this Double Pugger.


THE FATE GUNSAULLUS CO. PLYMOUTH, O.

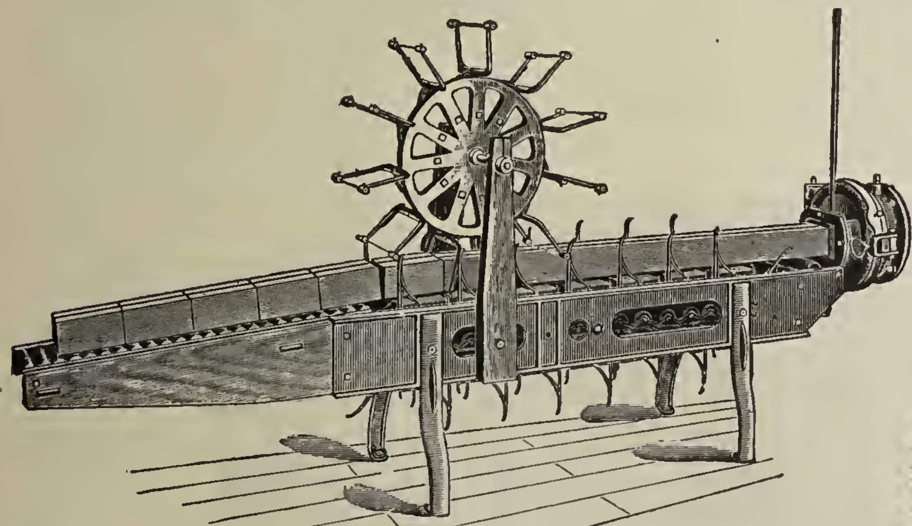
The "HUMMER" Combined Pug Mill, Brick and Tile Machine.



Automatic Table for Tile 2½ to 8-inch and Hollow Blocks.


THE FATE-GUNSAULLUS CO. PLYMOUTH, O.

Board Delivery Side-Cut Table.



Automatic End-Cut Brick Table.

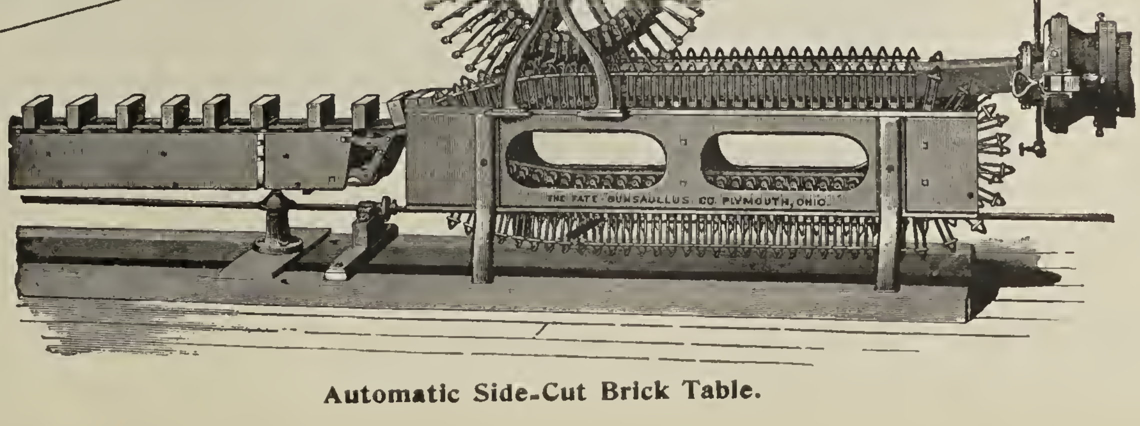
The Happy Family

All work together in
Harmony. . . .

Write for particulars to

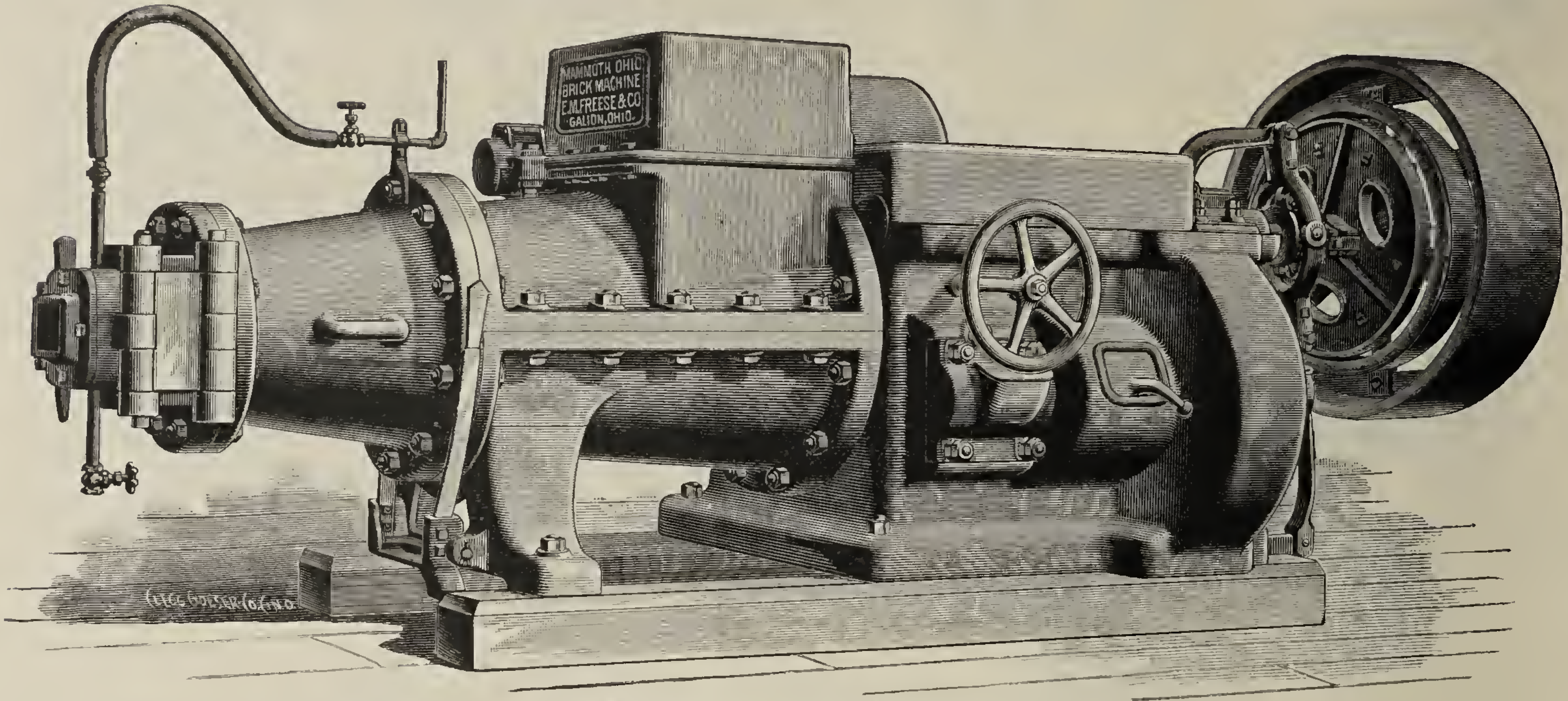
**The Fate-
Gunsaullus Co.,**

PLYMOUTH,
Richland Co., OHIO.

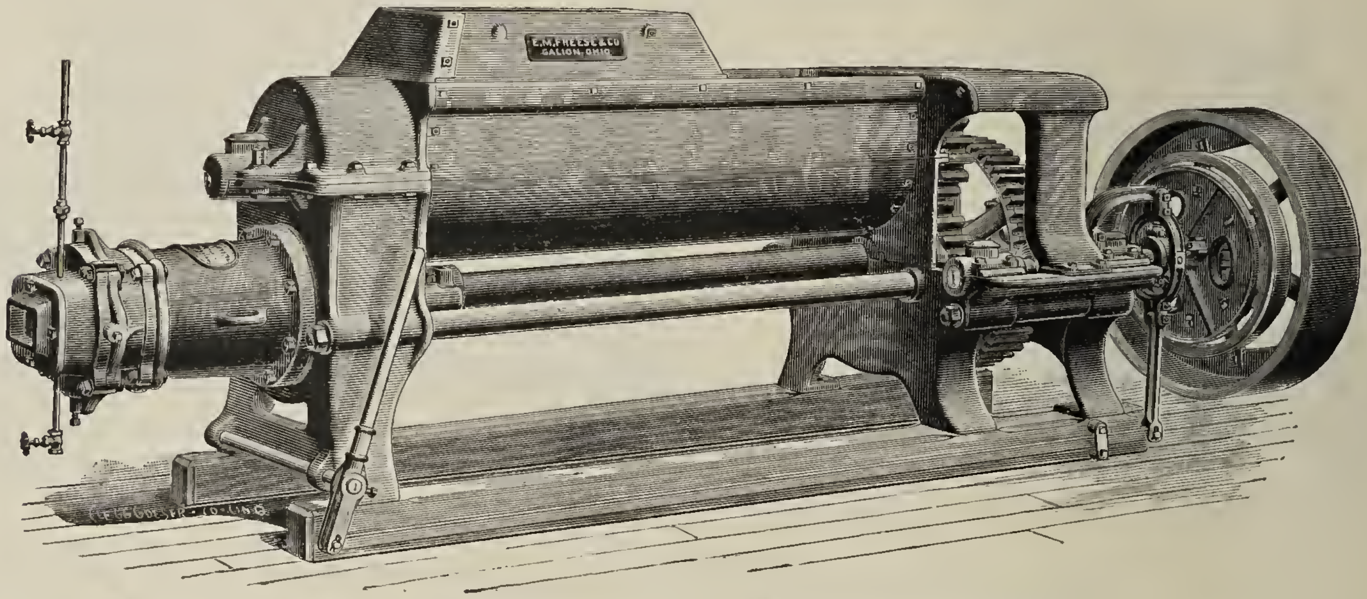

THE FATE GUNSAULLUS CO PLYMOUTH, OHIO.

Automatic Side-Cut Brick Table.

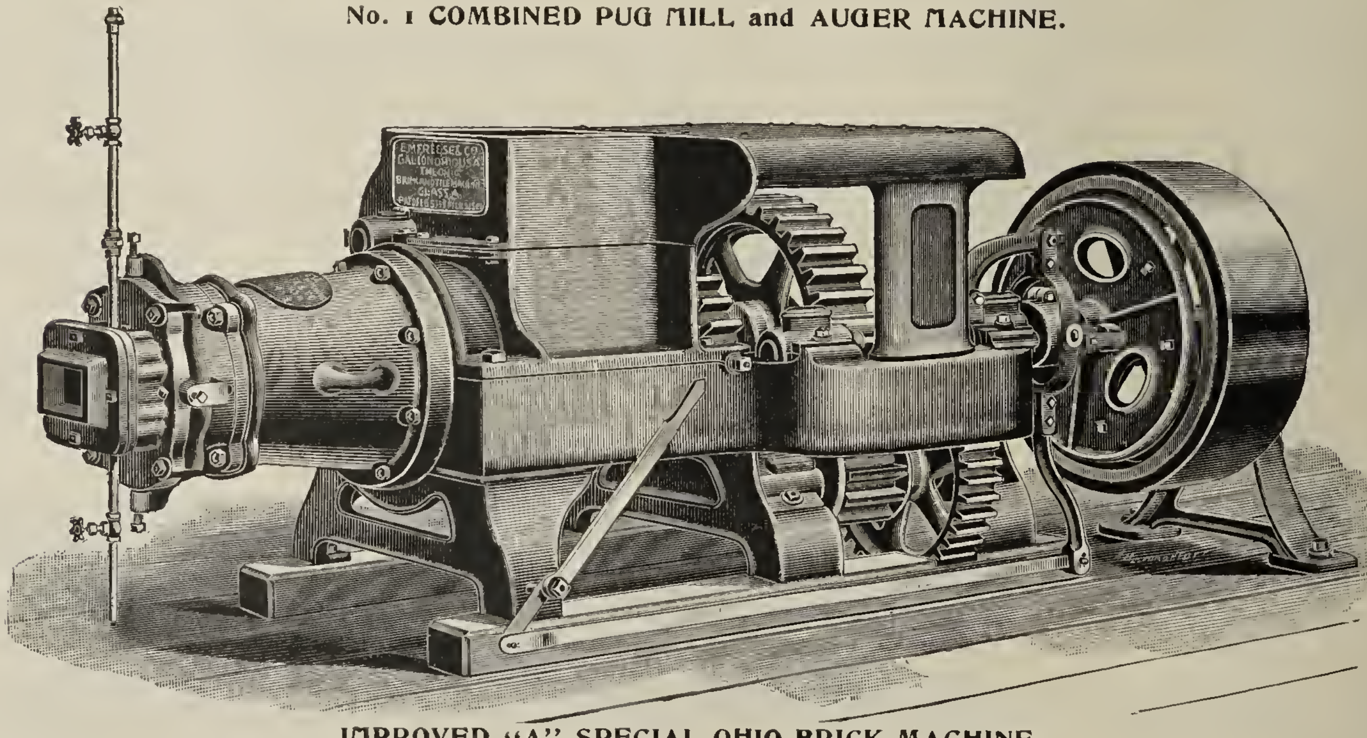
E. M. FREESE & CO., GALION, OHIO.


MAMMOTH OHIO
BRICK MACHINE
E.M. FREESE & CO.
GALION, OHIO.

MAMMOTH BRICK MACHINE.



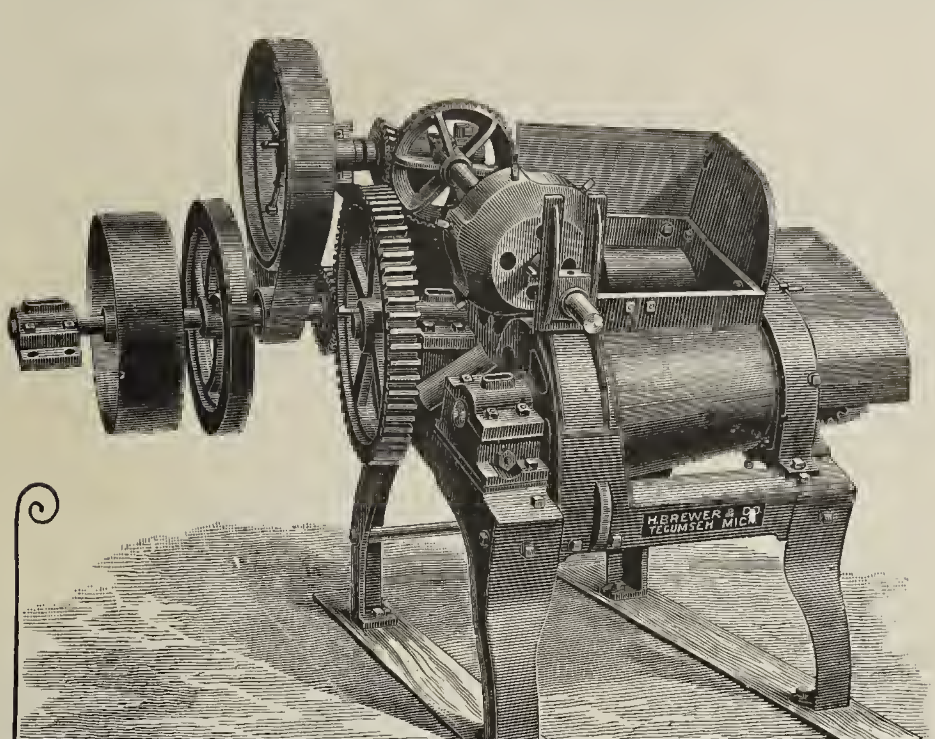
No. 1 COMBINED PUG MILL and AUGER MACHINE.



IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.

AUTOMATIC BRICK CUTTER with SANDER ATTACHED.

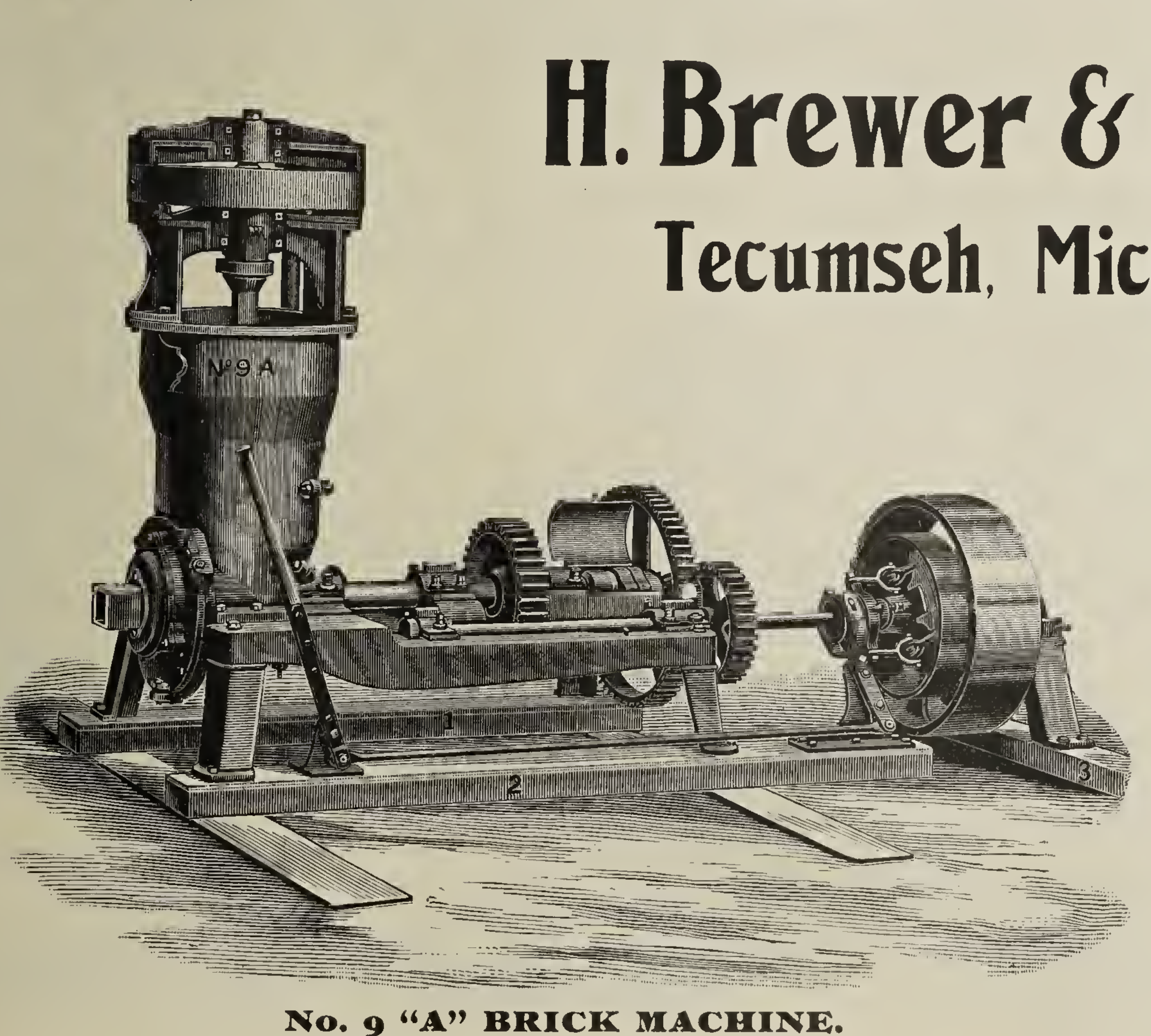


STONE EXTRACTING CLAY CRUSHER.

Manufactured by

H. Brewer & Co.,

Tecumseh, Mich;

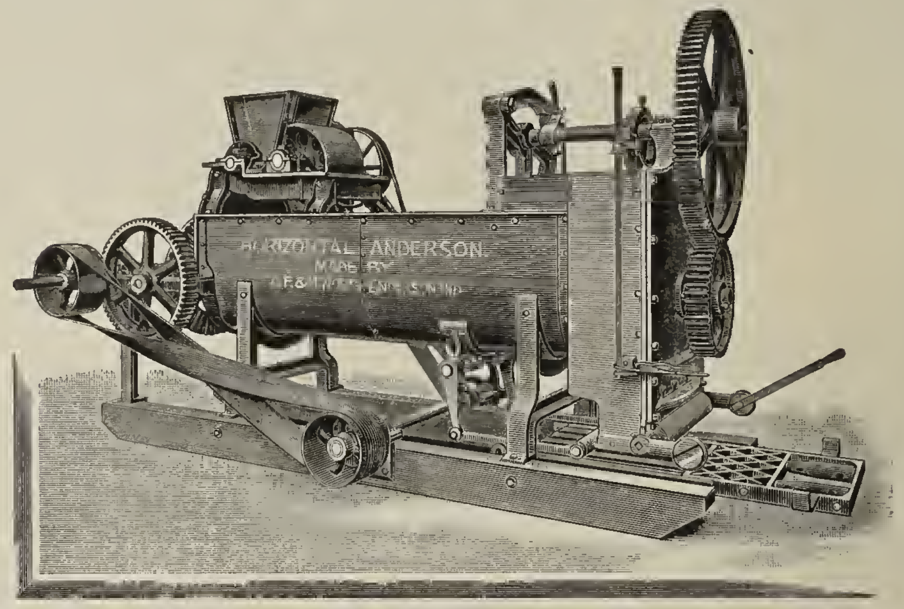


No. 9 "A" BRICK MACHINE.

A New Departure in Brick Machinery
THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY;** simple in construction and durable.

This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.


HORIZONTAL ANDERSON.

W. H. HOOVER,

General Building Brick.

LAPORTE, IND., September 25th, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.,

Dear Sirs:—As foreman of the Hoover & Flory brick yard, I wish to add my testimony in regard to the merits of your "Horizontal Brick Machine." I have been in the brick business for fifty years and have examined a great many machines, and feel confident that yours is unexcelled for simplicity, durability and perfect product.

Would cheerfully recommend it to all purchasers and extend an invitation to all to call and see ours in operation.

Yours truly, ROBERT PHILLIPS.

OFFICE OF

J. A. DALY,

Contractor and Builder,

And Manufacturer of Brick.

NEVADA, MO., April 24th, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.

Gentlemen:—I have been from home, hence the delay in answering your letter. I must say the old brick machine you sold me "is out of sight," it has never skipped a cog or lost a day.

Yours respectfully,
J. A. DALY.

SHELBYVILLE, IND., September 1st, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.,

Gentlemen:—We are getting along fine and think we have the best machine there is.

Respectfully,
JONES & VANNOY.

W. H. HOOVER,

General Building Brick.

LAPORTE, IND., September 25th, 1895.

ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.,

Dear Sirs:—The Brick Machine we purchased of you last July gives perfect satisfaction in every point. It has been in operation since the 26th day of July and we have turned out from 28,000 to 35,000 brick per day, and could have turned out more if we could have handled them. Before purchasing your machine we looked at a great number of other Brick Machines but decided on yours, and are not sorry that we did so. We would advise any one contemplating the purchase of a first-class Brick Machine to give the "Anderson Horizontal" a thorough investigation. We have had no trouble in regards to repairs or break downs since we started.

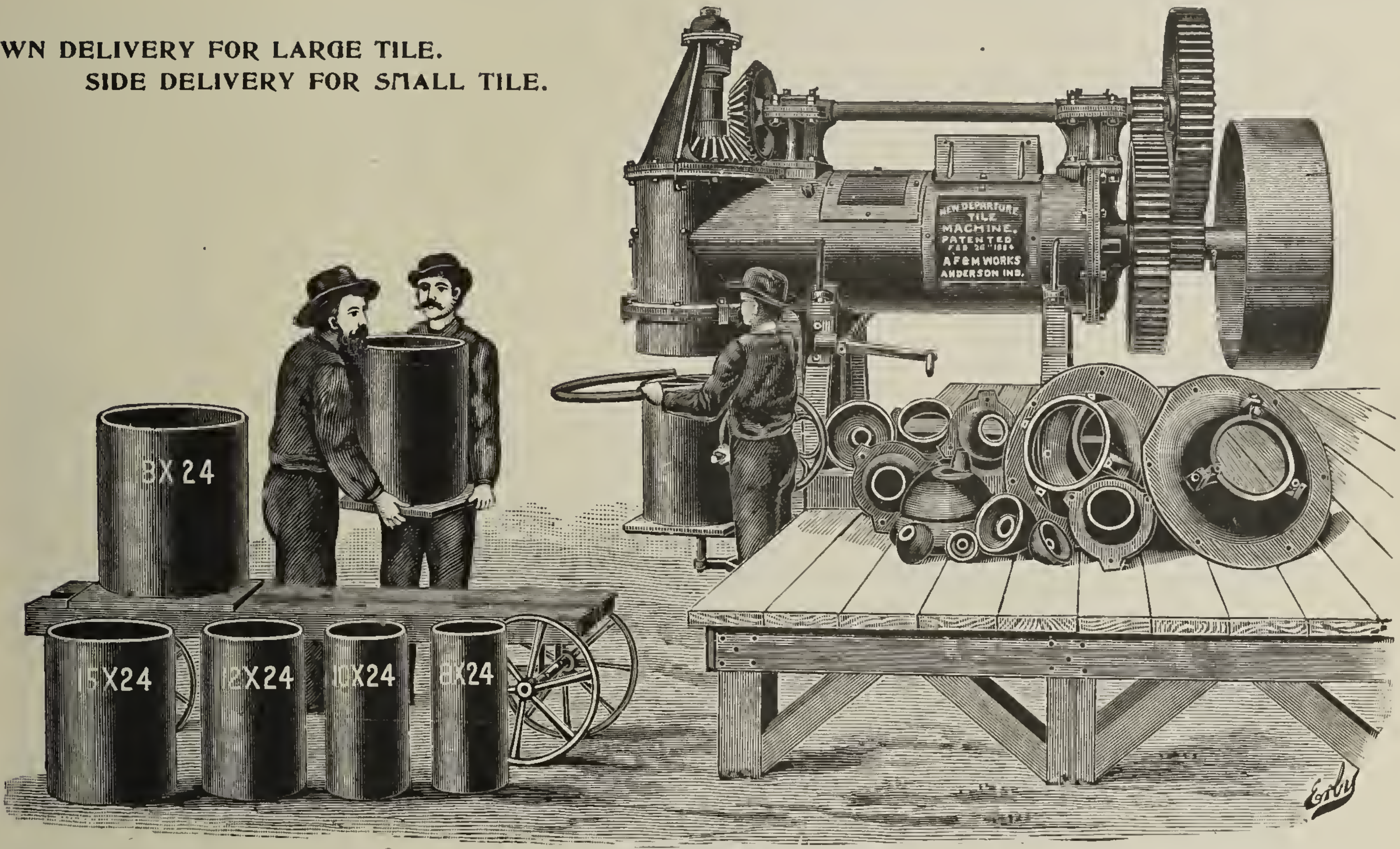
Yours truly,
HOOVER & FLORY.

For full information relative to the Horizontal Anderson Brick Machine, write to

The Anderson Foundry and Machine Works, = = Anderson, Ind.

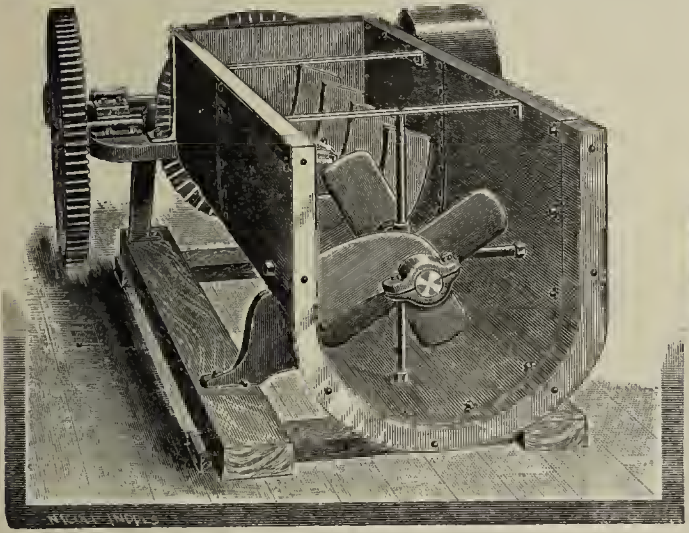
New Departure
Tile Machines,

DOWN DELIVERY FOR LARGE TILE.
SIDE DELIVERY FOR SMALL TILE.

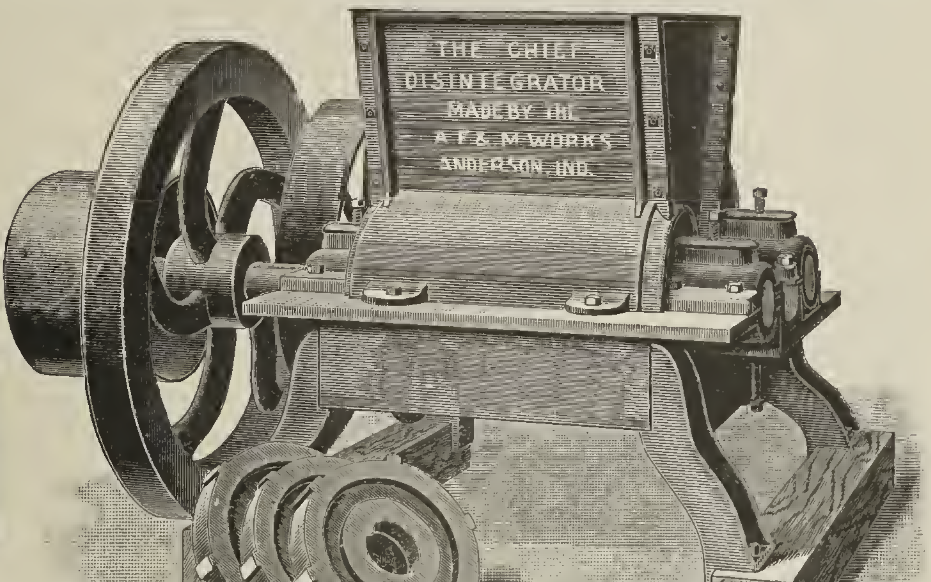

NEW DEPARTURE TILE MACHINE. PATENTED FEB 20 1894 A F & M WORKS ANDERSON IND.
8X24
15X24
12X24
10X24
8X24

THE GREATEST ON EARTH.

We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.



End View of Pug Mill.


THE CHIEF DISINTEGRATOR MADE BY THE A F & M WORKS ANDERSON, IND.

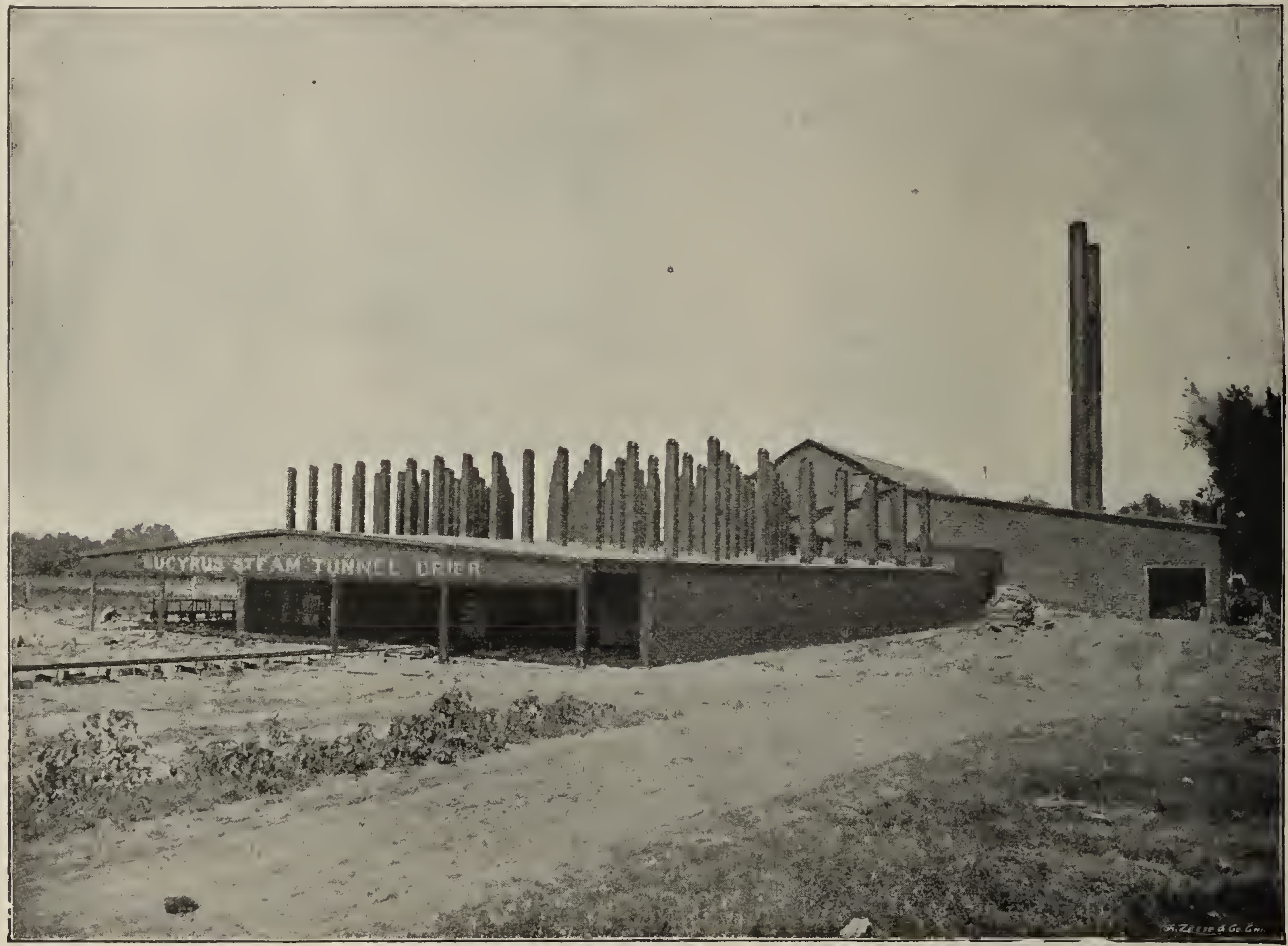
The Chief Disintegrator.

Write for full description. Address

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.

The BUCYRUS STEAM TUNNEL DRIER,

For Drying Soft Mud, Stiff Mud and Dry Press Brick, also Hollow Building Blocks and Fire Proofing.



Some Users of the BUCYRUS STEAM TUNNEL DRYER:

The Galesburg Brick & Terra Cotta Co., Galesburg, Ill.
The T. B. Townsend Brick & Contracting Co., Zanesville, Ohio.
The South Zanesville Sewer Pipe & Brick Co., Zanesville, Ohio.
The Canton Brick Co., Canton, Ohio.
The Anderson & Barr Clay Co., Streator, Ill.
B. H. Reed & Bro., Hightstown, N. J.
John Keim, Philadelphia, Pa.
Coplay Cement Co., Coplay, Pa.
Switzer Pressed Brick Co., Blossburg, Mont.
The R. H. Savage Brick Co., Reading, Pa.
The Norwood Park Co., Cincinnati, Ohio.
The Streator Tile Works, Streator, Ill.
The Vallisca Brick & Tile Co., Vallisca, Iowa.
The Raritan Hollow and Porous Brick Co., Perth Amboy, New Jersey.
The Galesburg Vitrified Brick Co., Galesburg, Ill.
The Roseville Brick & Terra Cotta Co., Roseville, Ohio.
F. A. Griffin & Co., Griffin, Ill.
Kelsey & Mather, Richmond, Ind.
The H. B. Camp Co., Shreve, Ohio.
The Wooster Shale Brick & Clay Co., Wooster, Ohio.
Cooper Brick Co., Akron, Ohio.
The Scioto Fire Brick Co., Sciotoville, Ohio.
The Perkiomen Brick Co., Perkiomen, Pa.
Geo. O. Robinson, Bellaire, Ohio.
Canton & Osnaburg Brick & Tile Co., Canton, Ohio.
Allen Jackson & Co., Akron, Ohio.
W. G. Paul & Co., Massillon, Ohio.
Tube City Brick Co., McKeesport, Pa.
The Beatty Fire Clay Co., Canton, Ohio.
Keller Brick Co., Cuyahoga Falls, Ohio.
The Akron Brick & Tile Co., Akron, Ohio.
M. S. Marquis, Newcastle, Pa.
Bucyrus Brick & Terra Cotta Co , Bucyrus, Ohio.
Holloway Paving Brick Co., Canton, Ohio.
Adams Brick & Terra Cotta Co., Buffalo, N. Y.
Cloverport Manufacturing Co., Cloverport, Ky.

We solicit Correspondence from all Clayworkers. Send for our Catalogue.

THE FREY-SHECKLER CO., - Bucyrus, Ohio, U. S. A.

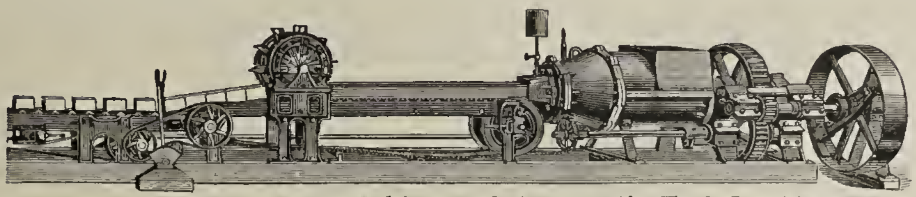
BUILDERS.

BRICK MACHINERY FOR 1896.

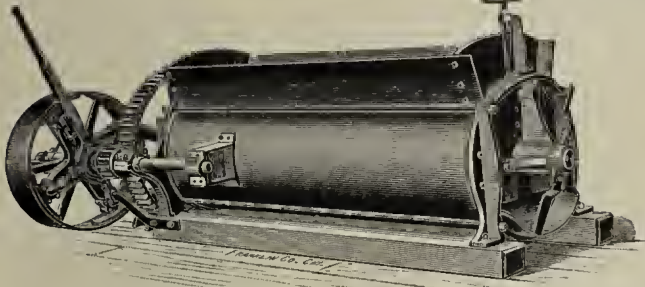
Write for Catalogue.

Before Buying

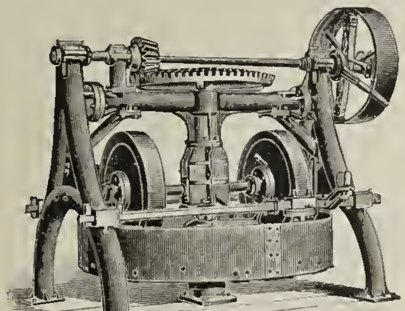
Write for our Prices.



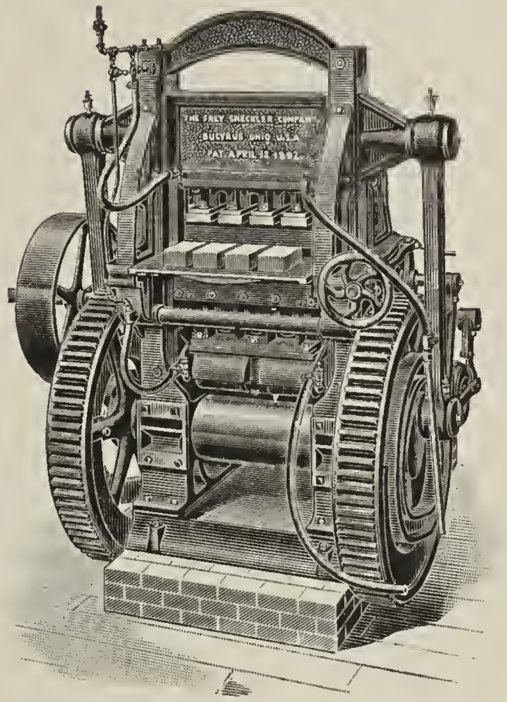
No. 1 Giant Machine and Automatic End Cut Table.



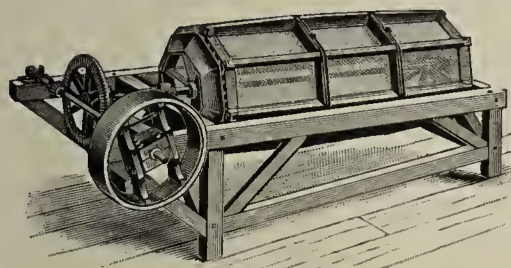
Pug Mills and Granulators.



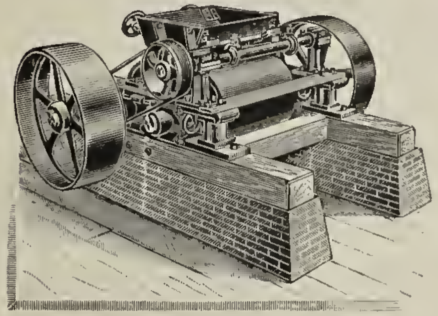
Dry and Wet Pans.



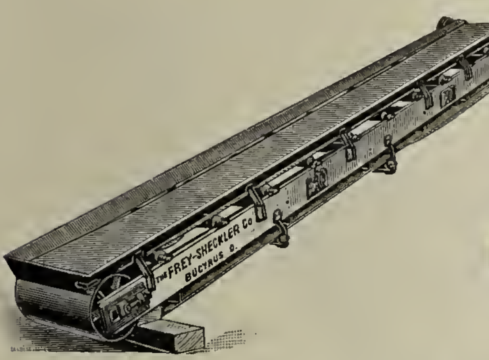
4-Mould Semi-Plastic Brick Press.



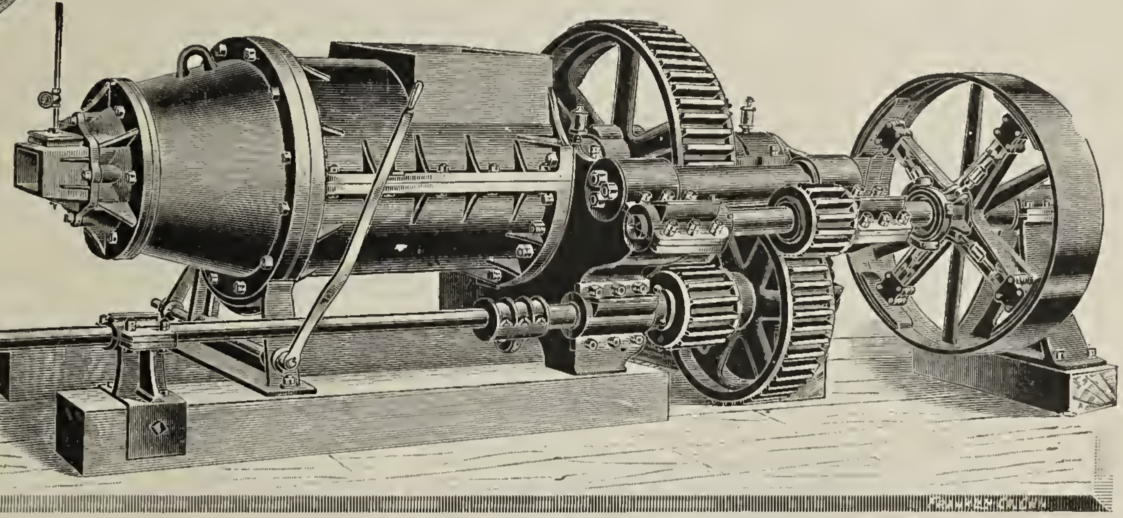
Clay Screens.



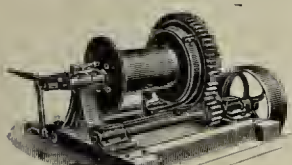
Crushers.


THE FREY-SHECKLER Co.
BUCYRUS O.

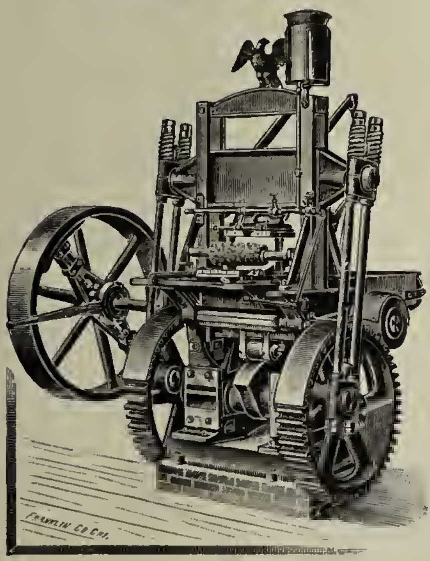
Clay Conveyors.



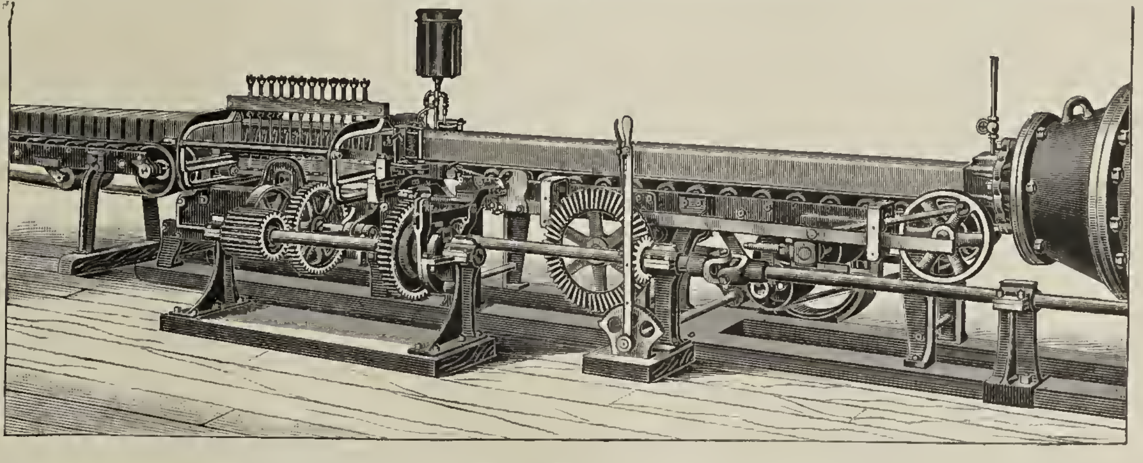
Special Bucyrus Giant Brick Machine.



Winding Drums.



Brick Re-Press.

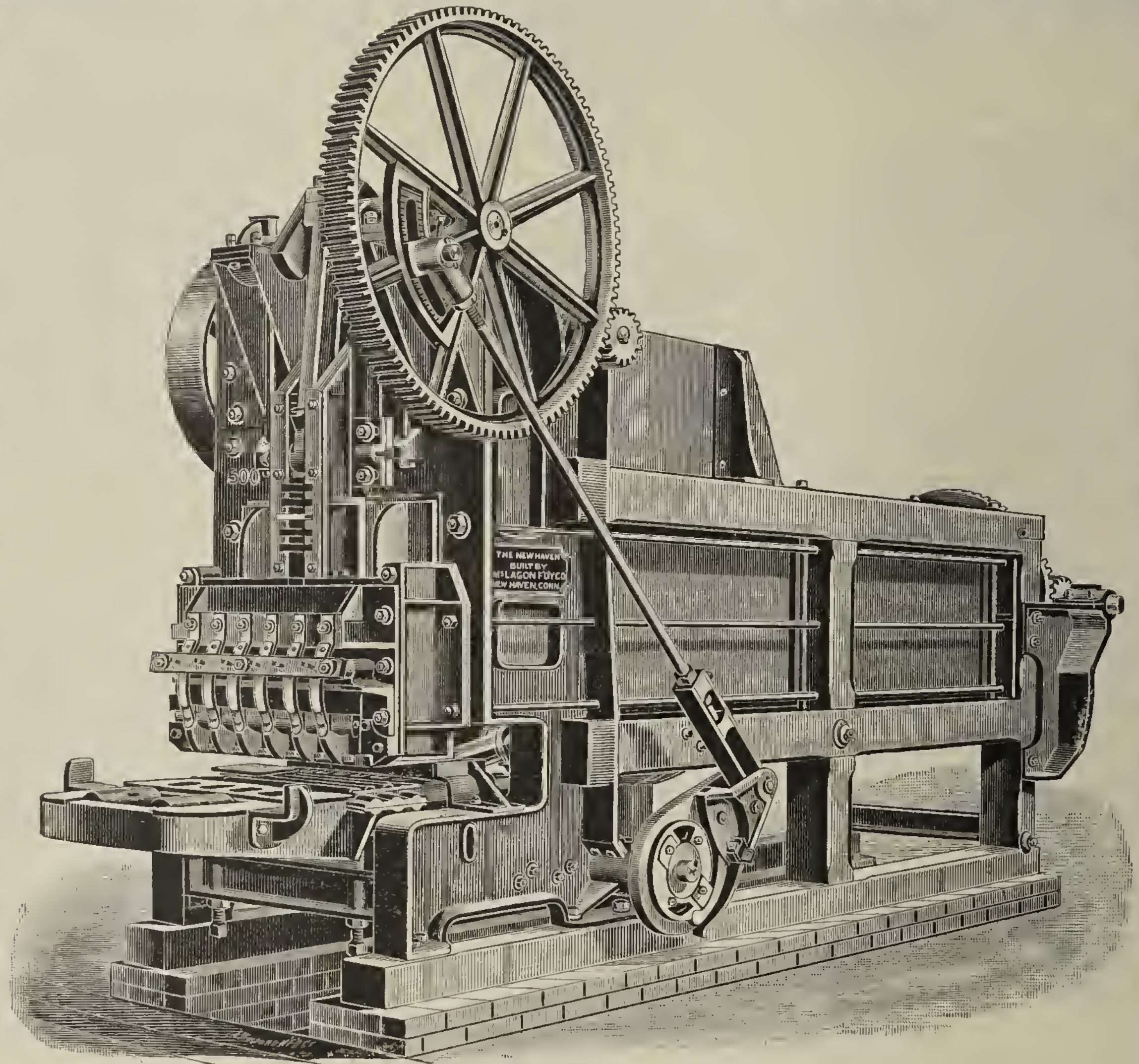


Bucyrus Automatic Table for Side Cut Brick.

The Frey-Sheckler Co., BUCYRUS, OHIO, U. S. A.

"New Haven" Brick Machines

PLEASE EVERY USER.



You may have a preference; still you are reasonable, and, no doubt, open to conviction.

The record is very convincing.

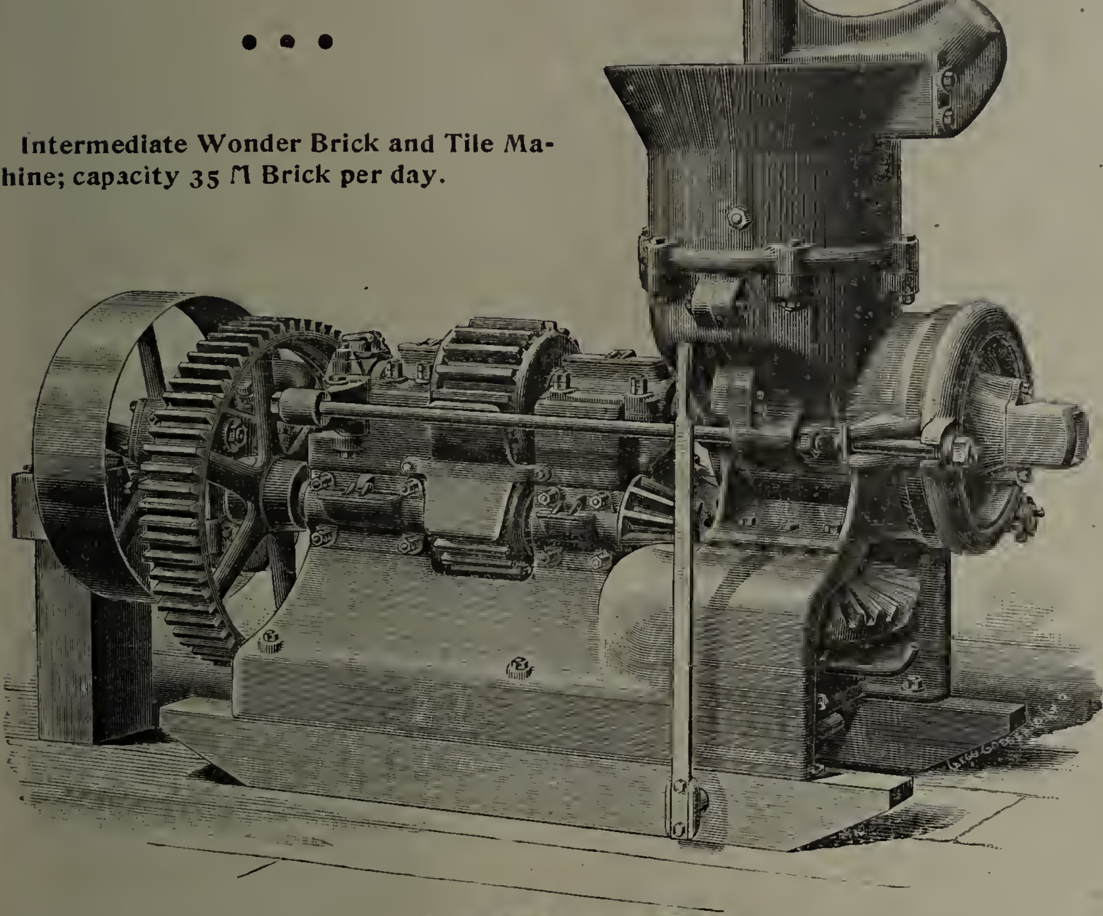
The Eastern Machinery Co.,
NEW HAVEN, CONN.

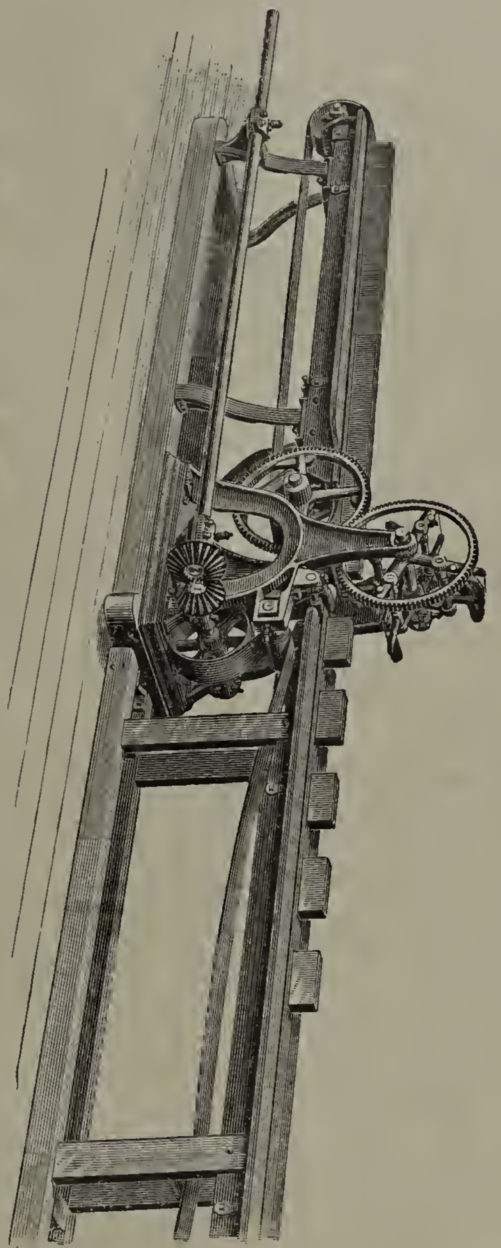
WONDER MACHINERY,

For Brick and Tile.

• • •

Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



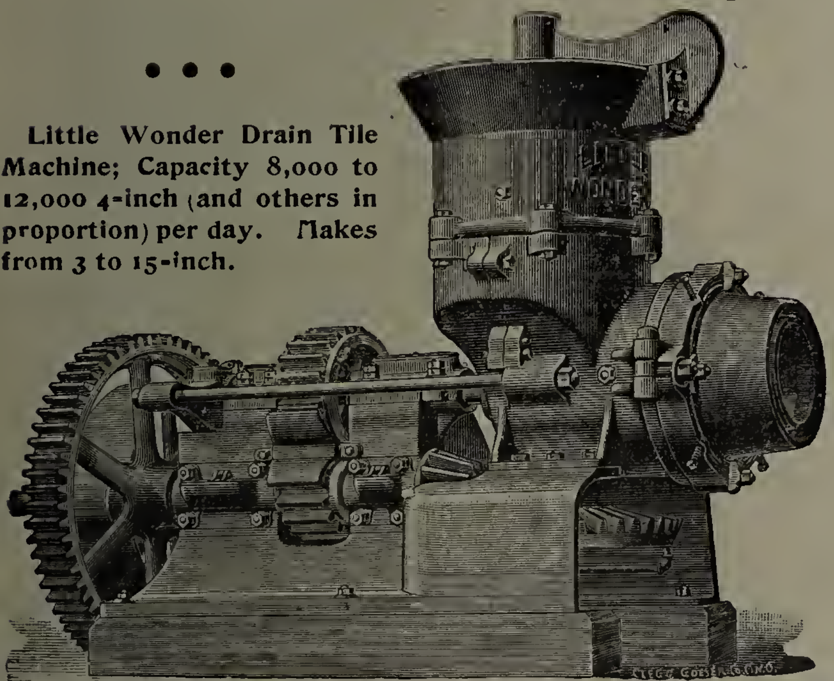


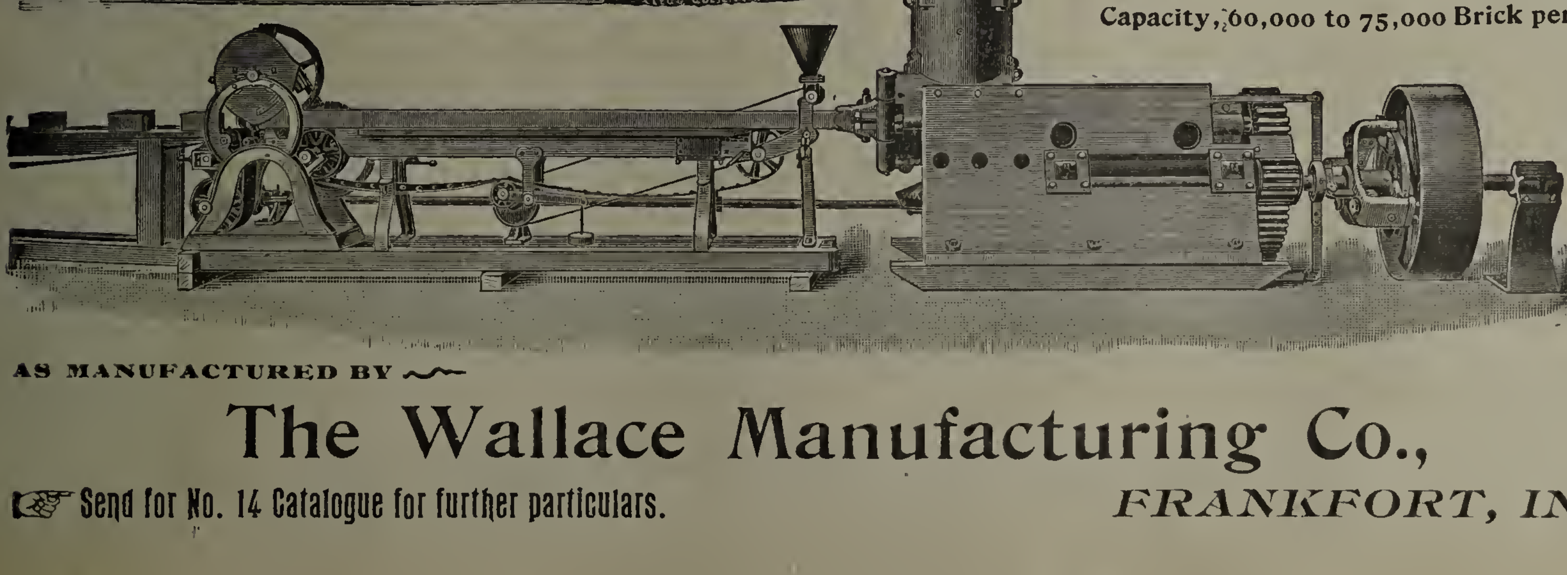
Cunningham's Single Stream Automatic End Cut Brick Cutter.

• • •

• • •

Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.





Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.

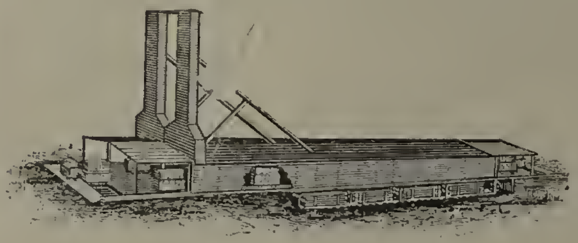
AS MANUFACTURED BY

The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

Iron Clad Dryer....IN THE LEAD



DRYING BUILDING BRICK.

CHICAGO, July 18, 1894.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—We have had one of your 12 track dryers in use for nearly three years, and two six track dryers for more than two years. Since you have improved these dryers by means of the receiving tank and pump system, we are drying 175 to 180 M brick per day, with a saving of 20 to 25 per cent of steam used under the old system. It is possible to dry up to 200 M bricks every 24 hours without injury to the ware, and we have done this on several occasions, when we were compelled to run over time.

Our experience with other dryers formerly used on our plant and the results obtained by other manufacturers in this neighborhood with hot air and fire dryers. compels us to say, that in our estimation, your dryers are more economical and show better results than any we have seen. We use 2 boilers 5x18 feet for these dryers, and at times have to reduce the quantity of steam used, to prevent getting the bricks too dry. Pressure carried 85 pounds.

Yours respectfully,
WECKLER-PRUSSING BRICK CO.,
Alexander Prussing, Sec'y.

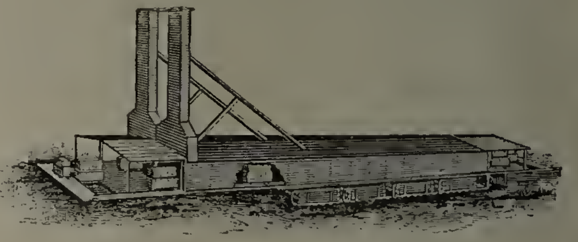
DRYING SOFT MUD BRICK.

MILWAUKEE, WIS., November 5, 1895.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—One season has passed with us in the manufacture of brick, where we used the dryer you built for us, and I must state that we have had more success than we expected, as our clay is very hard to dry, and we could do nothing drying our brick out doors, they all would check. Our repairs have not amounted to 5 cents, and think it recommends itself. If we had to build another dryer, it would be the Iron-Clad Dryer only.

Yours truly,
MILWAUKEE BRICK CO.,
R. Reinke, Vice-Pres



DRYING PRESSED BRICK.

MONTREAL, P. Q., September 13, 1895.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—Replying to your favor as to how the dryer erected by your Mr. Lederer is working, I have much pleasure in telling you that we have no fault to find. We dry our bricks easily in twenty-four hours, and so far, without a hitch of any kind.

Your system of returning condensation is undoubtedly the best the writer has ever seen, it needs very little attention and is a decided success in every way. We are drying dry-press, square, ornamental and plastic builders and pavers with equal success.

Wishing you a deserved success, we remain.

Very truly yours,
LA PRAIRIE PRESS BRICK & TERRA COTTA CO.

DRYING PAVING BRICK.

LOUISVILLE, KY., April 12, 1895.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—Replying to yours of the 11th inst., will say that the dryer you recently put in has worked splendidly, exceeding our expectations. It dries our brick perfectly in twenty-four hours and would dry a good many more than we make, which has been 30 M per day, re-pressed brick.

Our green brick measure 9¼ x 4⅝ x 2 9-16. Your dryer has far exceeded the old Penfield, in which it took four days and then did not dry. Will be pleased to hear further from you.

Yours truly,
KENTUCKY VITRIFIED PAVING BRICK CO.,
P. Bannon, Pres.

Write for prices and illustrated catalogue to

WOLFF DRYER CO.,

358 Dearborn St., Room 303, *CHICAGO, ILL.*

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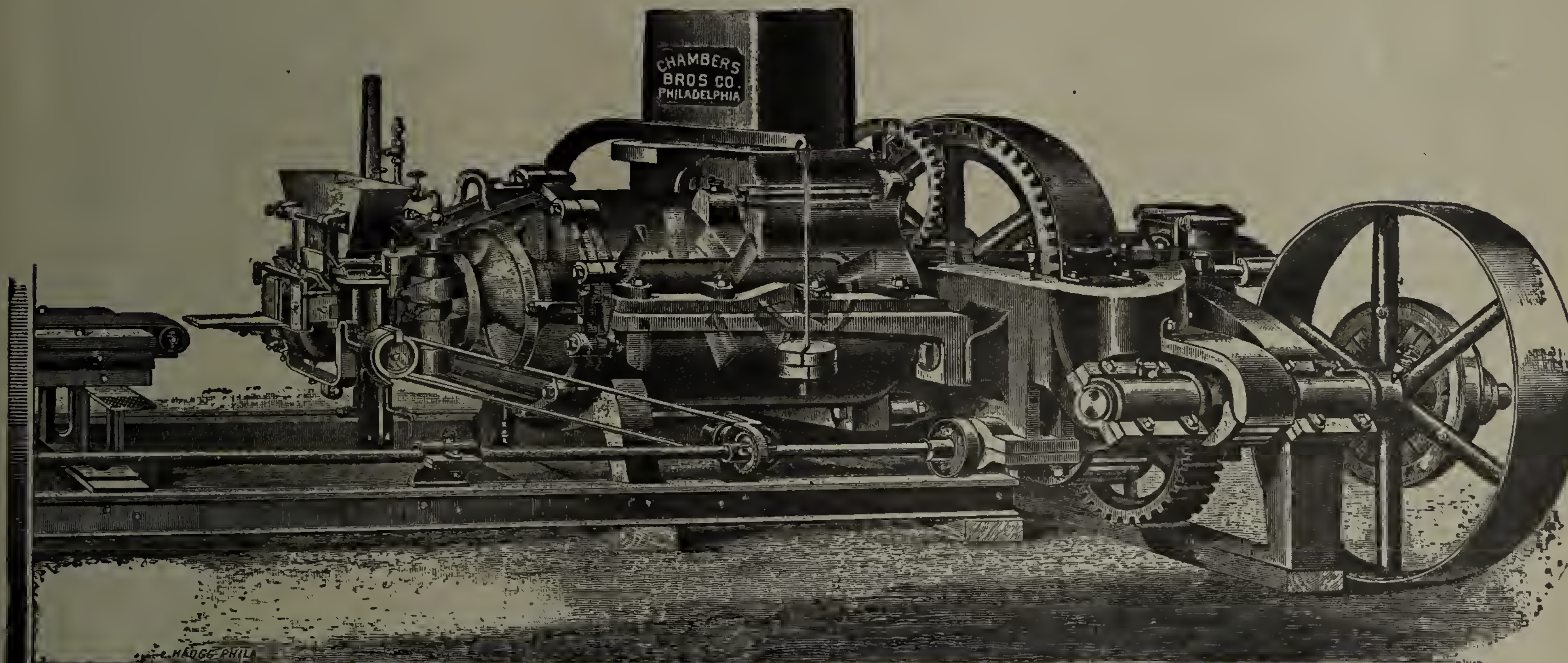
THE
CLAY WORKER
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA-COTTA SEWER PIPE POTTERY ETC.
T. A. RANDALL & CO., PUBLISHERS.
CHANDLER SC. INDPLS.

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

Vol. XXV, No. 3. INDIANAPOLIS, IND., MARCH, 1896. $2.00 a Year in Advance.

Brick Making Machinery.



Chambers Brothers Company,

FIFTY-SECOND STREET, BELOW LANCASTER AVE.,

J. E. EASTES, Chicago Agent,
174 South Clinton Street.

PHILADELPHIA, PA.

The Cummer Dryer is a

THE CUMMER DRYERS

Direct Heat Dryer.

. . . NO . . .

Boilers,
Pumps,
Steam Pipes,
Big Fuel Bills,
Experimenting.

. . . YES . . .

We Guarantee Results and will guarantee to dry your brick with a given amount of fuel. For instance, if your brick each carry one pound of moisture and you want to dry 20,000, we will guarantee to dry them with less than 3,000 pounds of **Slack Bituminous** coal.

CONVERTED

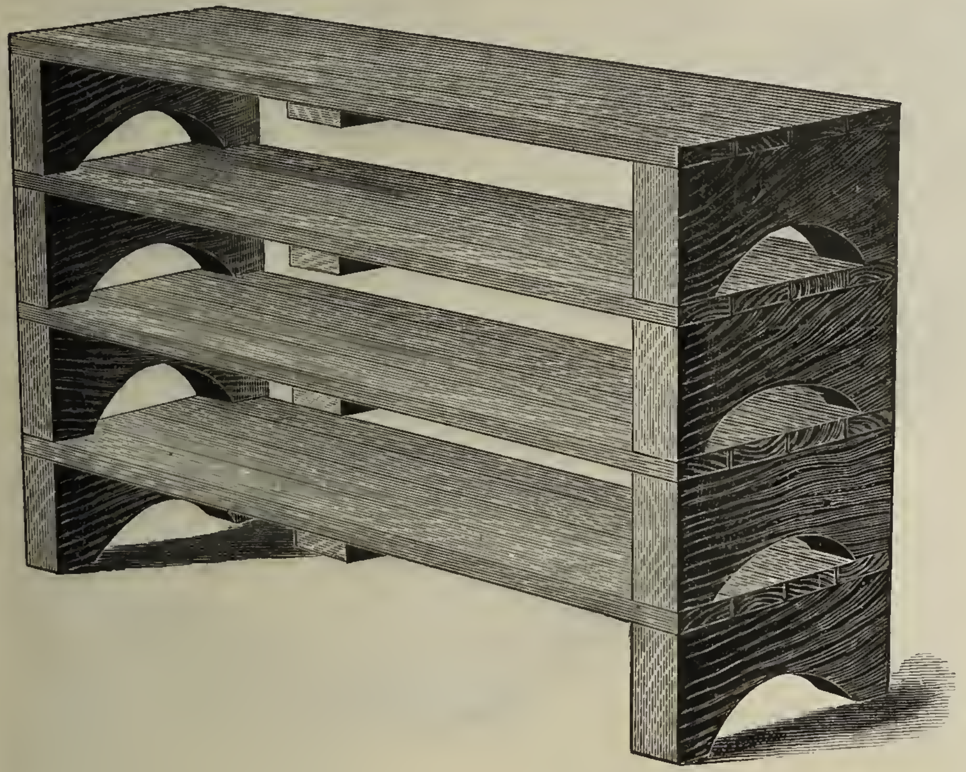
If you have a Dryer that is not satisfactory, it can be **Converted** into a "**CUMMER**" at slight expense.

The CUMMER REVOLVING CLAY DRYER has many users and is well known.
Clay can be dried cheaper in it than by any other method.

The F. D. Cummer & Son Co.,

CLEVELAND, OHIO.

THE
HARRINGTON AND KING PERFORATING CO.
CHICAGO, ILL.
THE H.&K.P. Co.
PERFORATED SHEET STEEL FOR CLAY SCREENS
SEWER PIPE
BRICK.
TERRA-COTTA
FOR CHUTE SCREENS.
FOR DRY PAN SCREENS.
FOR REVOLVING SCREENS.



IF YOU NEED..

Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

Rack Pallets,
Hacking Pallets,
Pallets for Dryers,
Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

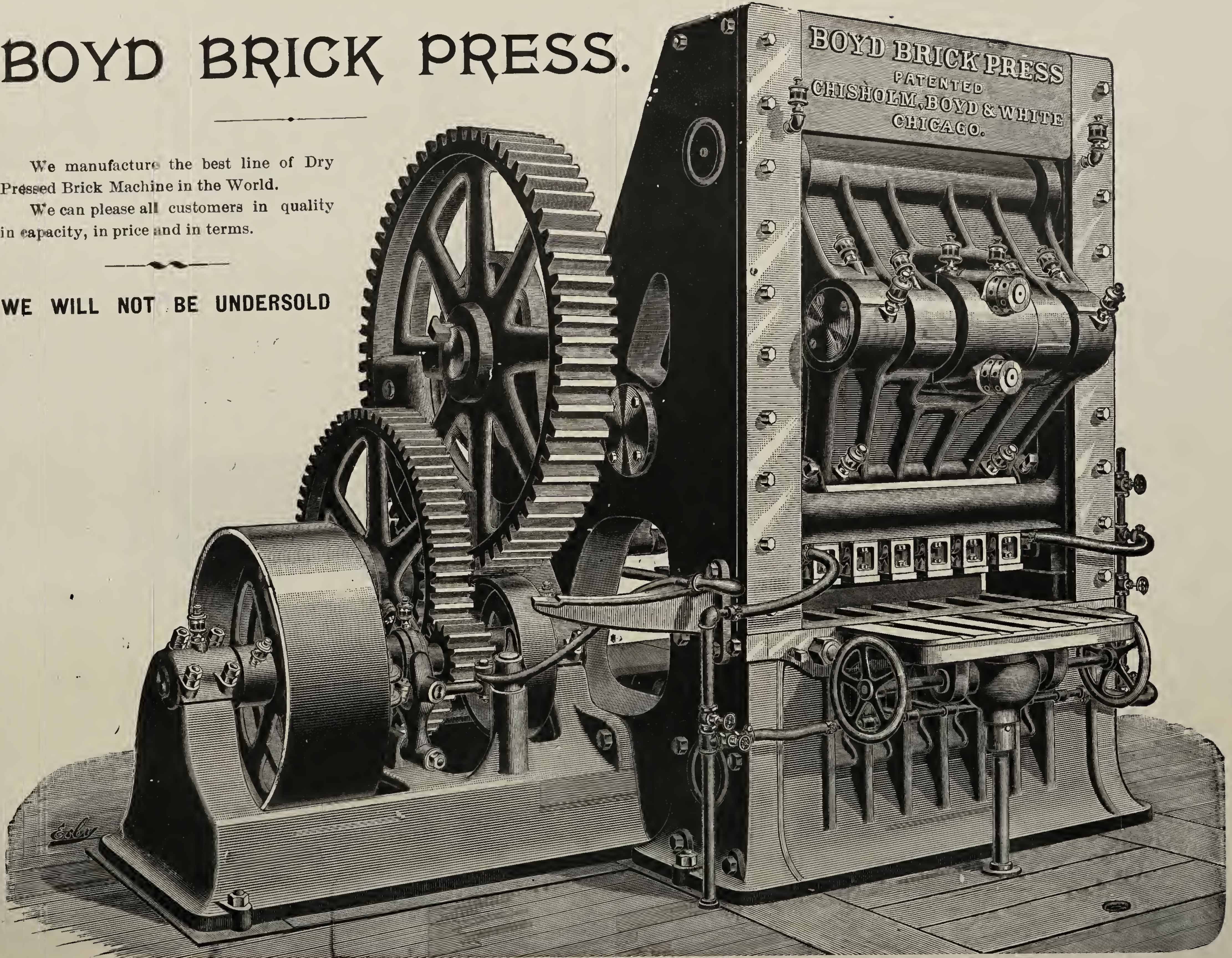
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

BOYD BRICK PRESS.

We manufacture the best line of Dry Pressed Brick Machine in the World.

We can please all customers in quality in capacity, in price and in terms.

WE WILL NOT BE UNDERSOLD



The CHISHOLM, BOYD & WHITE CO., 57th and Wallace Sts., **Chicago.**

A SURE THING.

We will construct and equip a Brick Plant of any capacity desired for any responsible party, furnishing Brick Presses, Power, Kilns, Clay-preparing Machinery, Shafting, Belts, etc., and erect the necessary Buildings. We will make and burn one or more kilns of brick, and turn the Plant over to him in proper working order under guarantee of satisfactory results as to quality of product and cost per 1,000; the loss to be ours in case of failure.

Why experiment when you have a sure thing?

THE CHISHOLM, BOYD & WHITE CO.,

57th and Wallace Streets. CHICAGO.

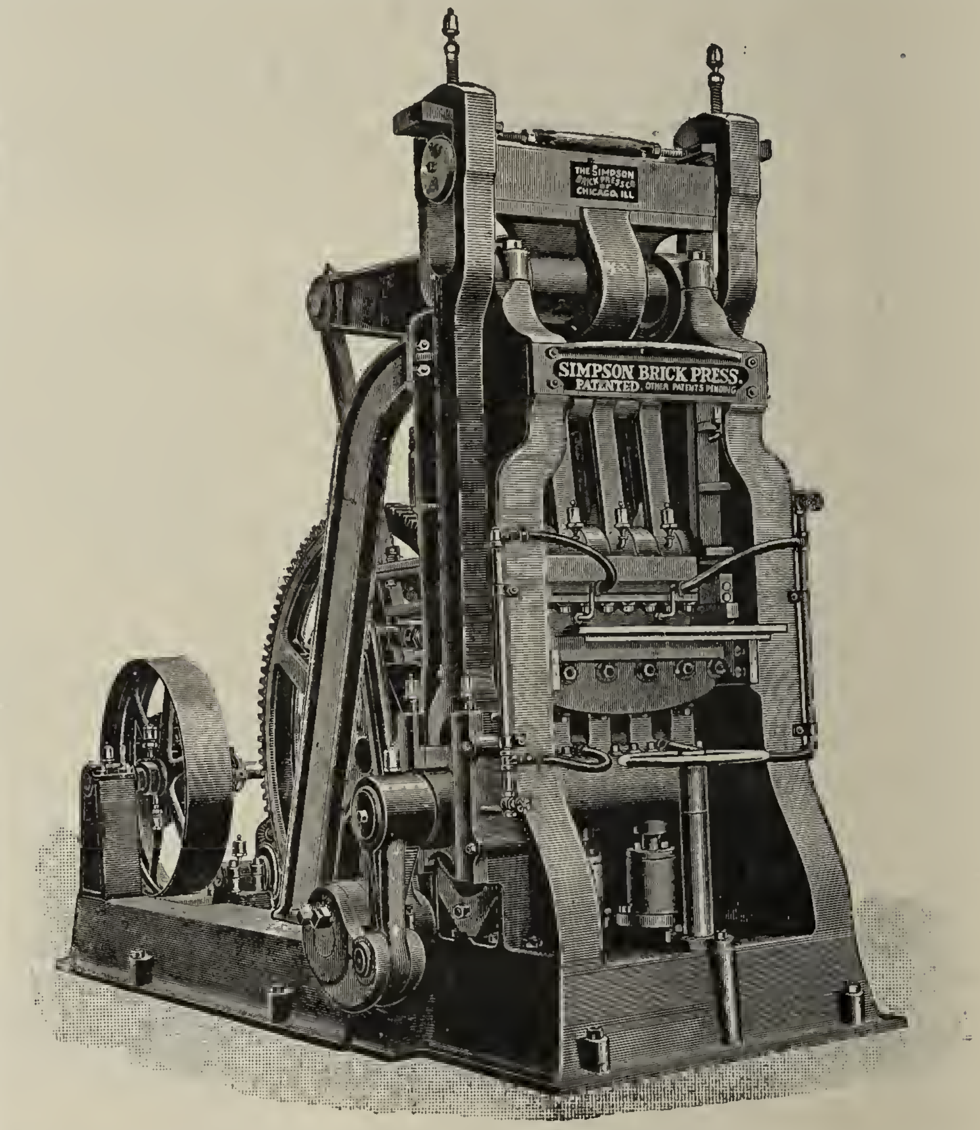
Clay-Working Machinery.

The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line of Brickyard Equipments. . .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Agents for Canada:
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BRANTFORD, ONTARIO.

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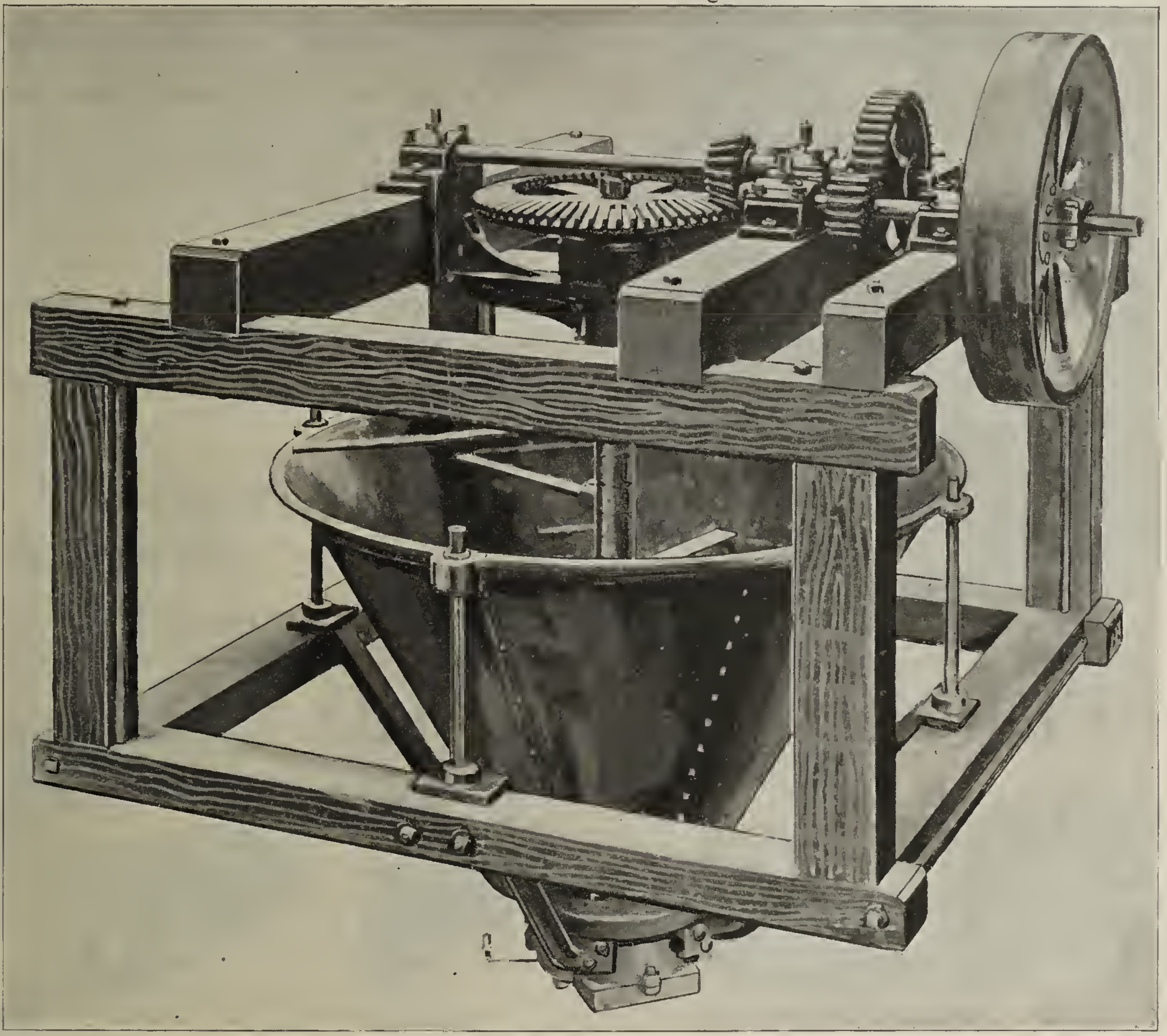
"Our Doubts are Traitors and Make us Lose the Good We Oft Might Win, by Fearing to Attempt."

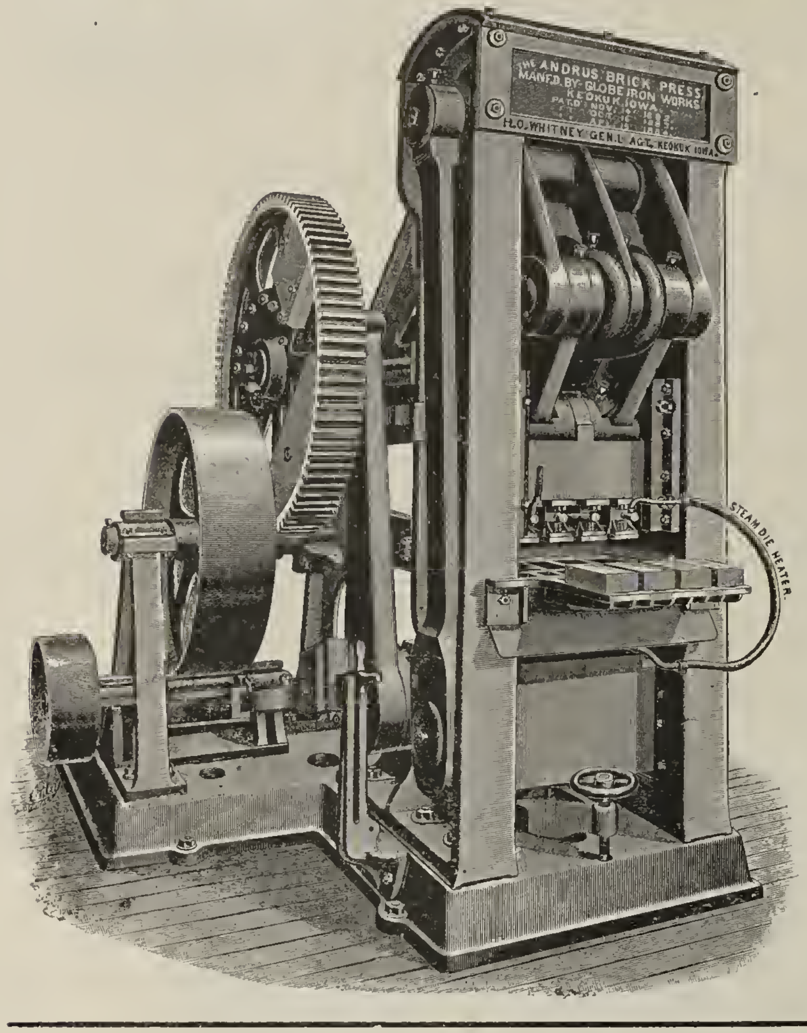


ONE reason why paving brick manufacturers do not make more first class brick is that they do not temper their clay uniformly well, the reason they do not temper their clay better is that they have not the facilities for doing it—they depend upon the constant attention and judgment of a man or boy to adjust the proper amount of water to a clay supply which is constantly varying; they do not know that the machine illustrated above will temper their clay automatically much better than any man can possibly do it. All we ask is an opportunity to prove that our machine will do this and more. We do not expect a man to pay for any machine of ours until he is satisfied that it will do all we claim, and do it better than any other machine made for the purpose.

W. D. Richardson & Co.,

809 Cuyahoga Building, —CLEVELAND, OHIO.

THE ANDRUS DOUBLE PRESSURE BRICK PRESS.


THE ANDRUS BRICK PRESS
MANF'D BY GLOBE IRON WORKS
KEOKUK IOWA
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STEAM DIE HEATER

We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

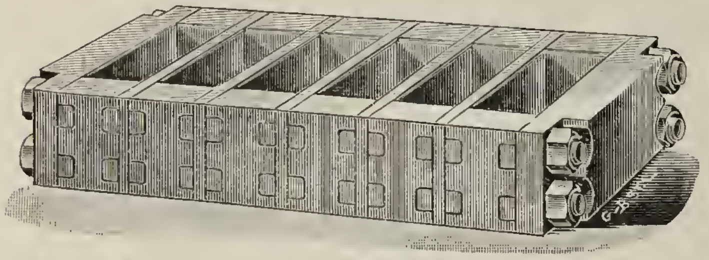
They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

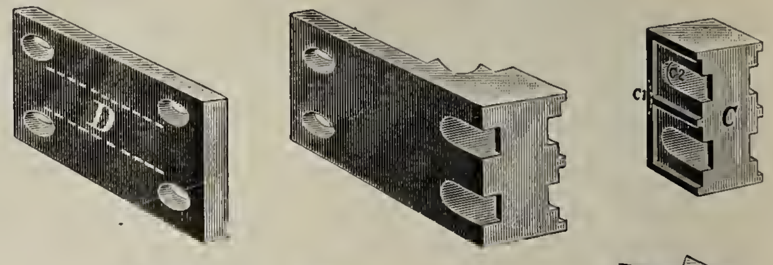
We guarantee them against breakage for **Five Years.** . . . .

Send for descriptive Catalogue, address

H. O. Whitney,
General Agent,
KEOKUK, IOWA.

The FERNHOLTZ MOLD BOX.





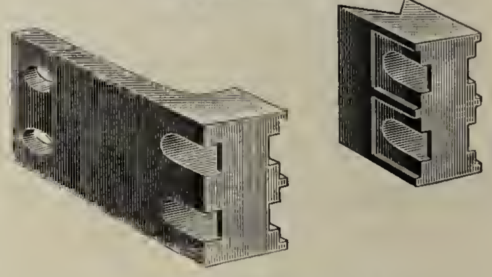


Figure 1. Patented April 10th, 1894. No. 518,185.

The most practical, durable and economical Mold Box that has ever been invented. It insures square corners and edges on the Brick and positively does not spring. Every Brick is perfect, if the clay is in proper condition. It is made entirely of specially prepared chilled iron.

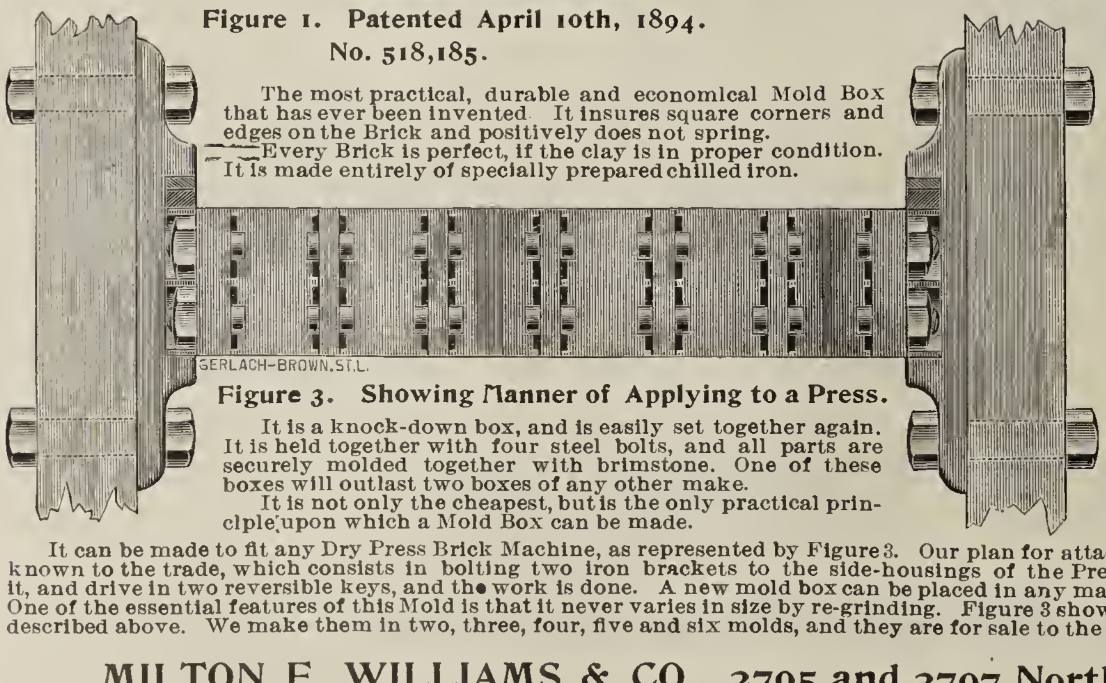

GERLACH-BROWN.ST.L.

Figure 3. Showing Manner of Applying to a Press.

It is a knock-down box, and is easily set together again. It is held together with four steel bolts, and all parts are securely molded together with brimstone. One of these boxes will outlast two boxes of any other make.

It is not only the cheapest, but is the only practical principle upon which a Mold Box can be made.

Figure 2. Showing Combination of Any Desired Kind.

It will outlast the hardest Mushert steel and when worn can be knocked down by building a small fire under it and melting the brimstone, at which time it can be reground, if necessary, and set up again, and is as good as new.

One of these boxes is good for 40,000,000 of brick. It can also be made a combination mold, as represented in Figure 2.

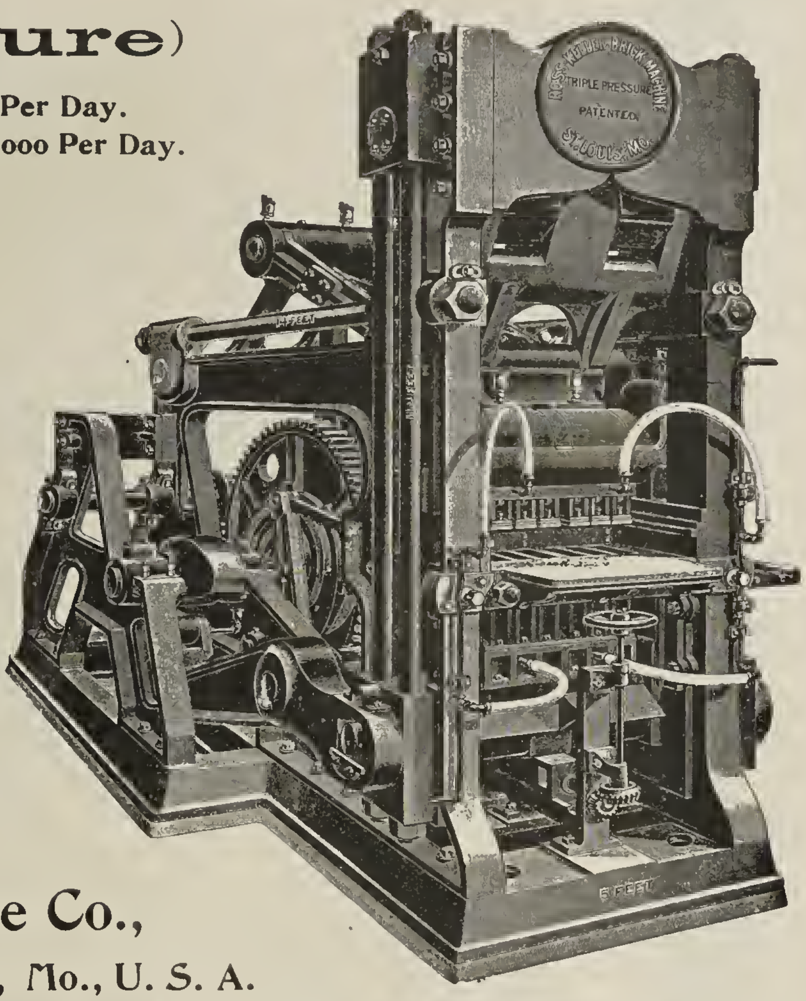
It can be made to fit any Dry Press Brick Machine, as represented by Figure 3. Our plan for attaching to a machine is also the simplest method known to the trade, which consists in bolting two iron brackets to the side-housings of the Press. Slip the mold box on to the lugs, adjust it, and drive in two reversible keys, and the work is done. A new mold box can be placed in any machine, after the brackets are set, in 30 minutes. One of the essential features of this Mold is that it never varies in size by re-grinding. Figure 3 shows the manner of attaching to a Press, as described above. We make them in two, three, four, five and six molds, and they are for sale to the public. For further information, write to

MILTON F. WILLIAMS & CO., 2705 and 2707 North Broadway, St. Louis, Mo.

The Ross-Keller Brick Machine.

(Triple Pressure)

Weight of 4-Mold Press 50,000 Pounds, Capacity 24,000 Per Day.
Weight of 6-Mold Press 75,000 Pounds, Capacity 36,000 Per Day.

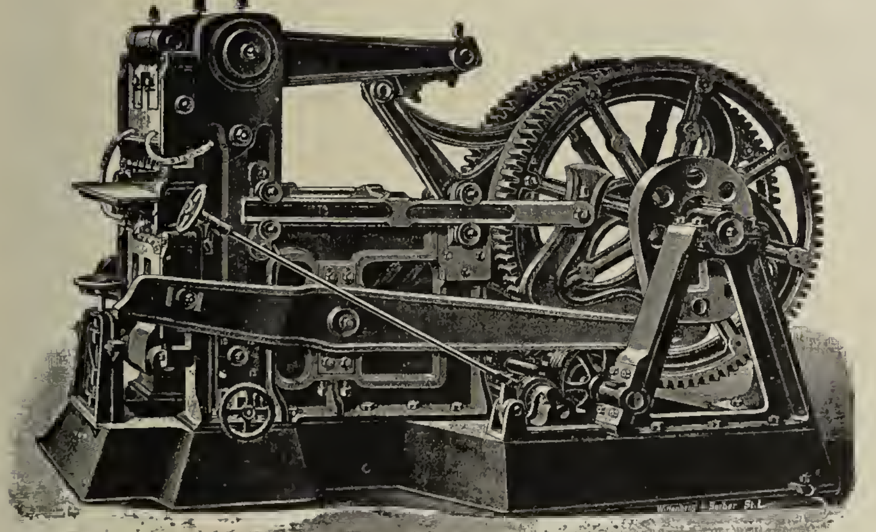


THIS PRESS is made in two sizes, four and six mold, and has **three separate and distinct pressures.** It is noiseless in its movements, and is the most simple and powerful machine ever built in the United States. It works dry or semi-dry clay, and is especially adapted for working **shale** and other similar materials. It presses the brick equally on both sides, and removes all granulation from faces of same. It will make any shape brick desired, also Edge and Roman brick. It has wide bearings bushed with bronze, and all pins and shafts are made of five, six and seven-inch forged steel.

Correspondence Solicited.
☞For Circulars, prices and other particulars, address

Ross=Keller Brick Machine Co.,
Room 108 Rialto Building, St. Louis, Mo., U. S. A.

The Progress Brick Press



FOR PLAIN AND ORNAMENTAL BRICK. . . .

The Progress Brick Mould, Brick Grinding and Mitering Machines, Dry Clay Gatherers, and a full line of Dry Press Brick Manufacturers equipments.

DESCRIPTIVE CATALOGUE ON APPLICATION. . . . .

Progress Press Brick and Machine Co.,
King's Highway and Oak Hill R. R. *ST. LOUIS, MO.*

Any Draft So Its Up-Draft.

◆

WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost. .

Manufacturers of Building Brick can get nothing better. . . . .

For all information desired address

R. B. MORRISON & CO.,

P. O. Box 335,

Rome, Ga., U. S. A.

PROPRIETORS

Morrison's Latest Improved Kilns.

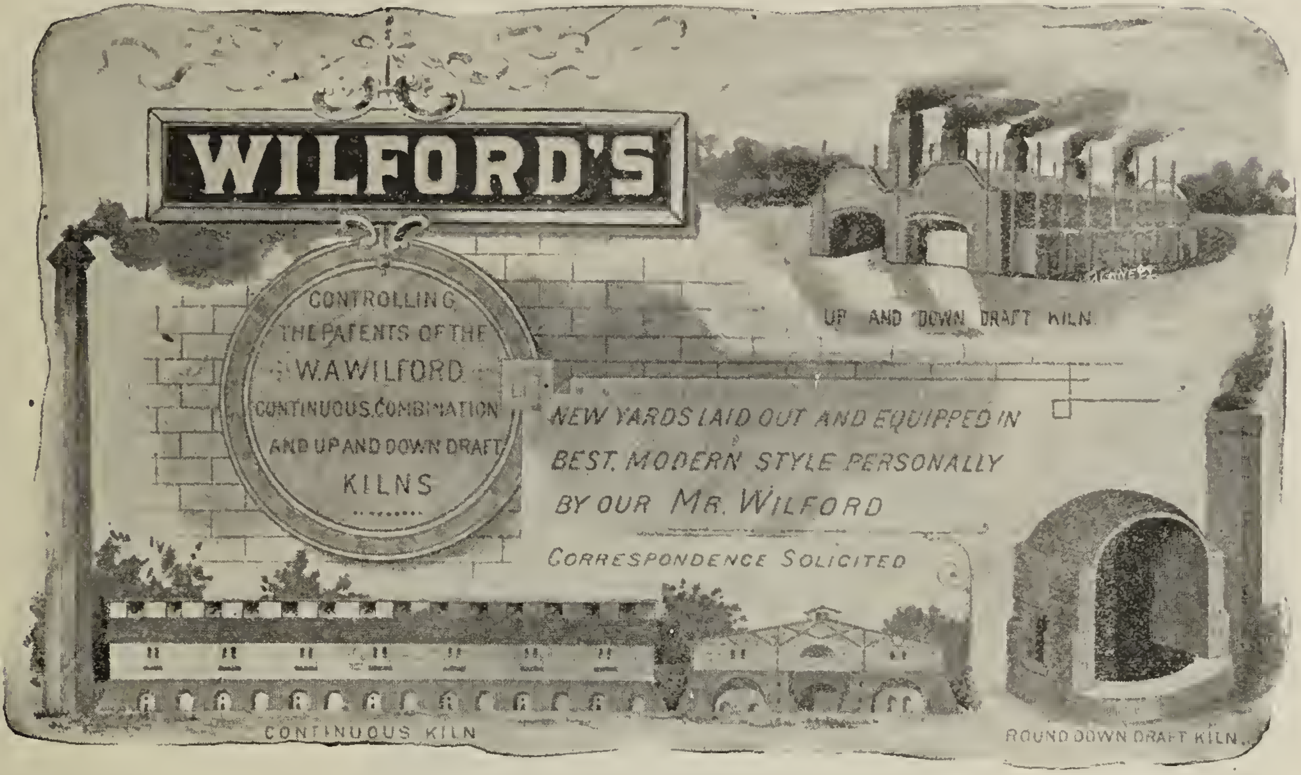
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W. A. WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST. MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

HON. A. DESJARDINS, PRESIDENT. JOS. BARSALON, VICE-PRES. HUBERT DESJARDIN, MAN. DIRECTOR. N. T. GAGNON, SECRETARY.

MONTREAL TERRA COTTA LUMBER CO.
LIMITED.
Maisonneuve, P. Q.
Office, 86 *St. Peter Street, Montreal.*

MONTREAL, July 12th, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—In answer to yours of the 1st inst., we are thoroughly satisfied with the kiln you built for us. We find we have better burnt material than we ever had before. Your system of kilns we consider as near perfect as one can expect. Our ware is all burnt alike from top to bottom. We have burnt it many times round, and the more we use it the better we like it. Shall be glad to answer any enquiry from anyone interested in your kilns, as you deserve success. Your very truly,

N. T GAGNON, *Secretary.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety)

Wishing you the success in the future you have obtained in the past, we are Yours truly,

TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are, Yours truly,

TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying. Your well wishers.

J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and* 2 *Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,

BRUSH BROS.

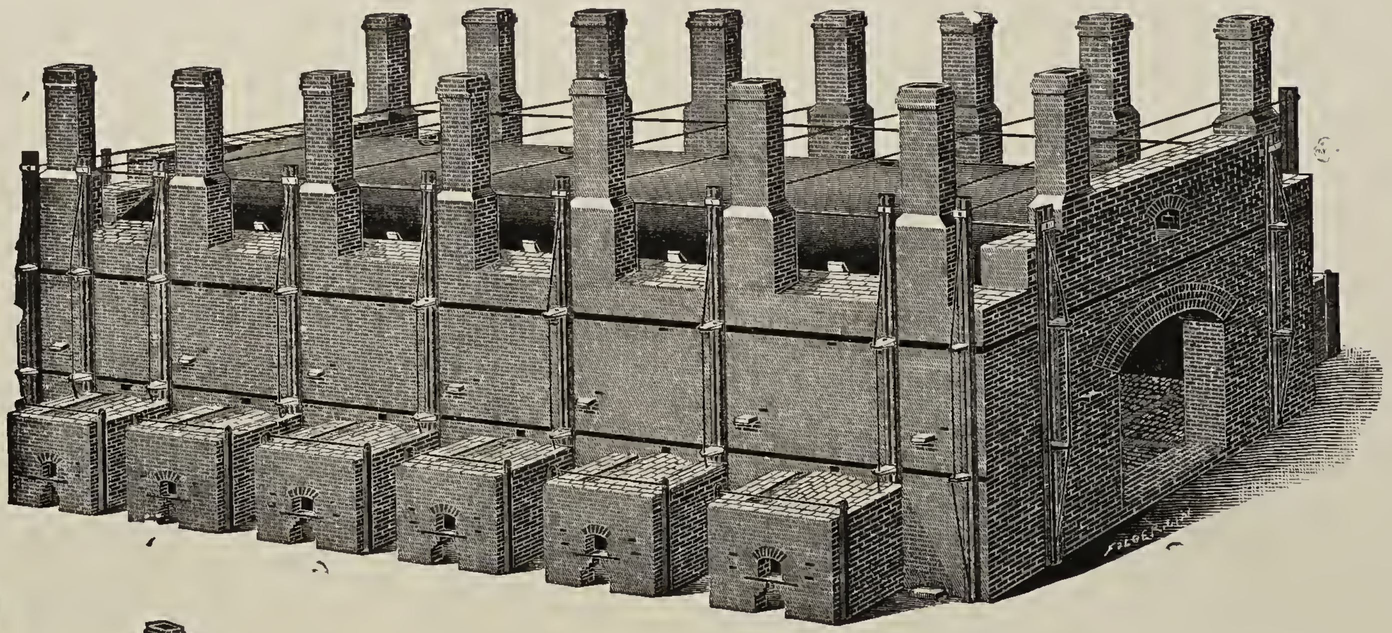
Let us give you full Particulars.

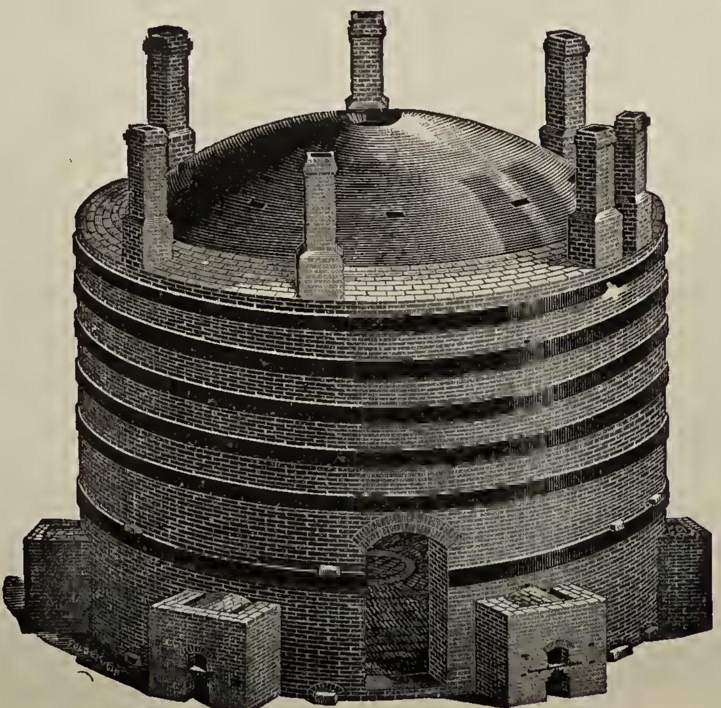
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ELMIRA, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy** in **cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

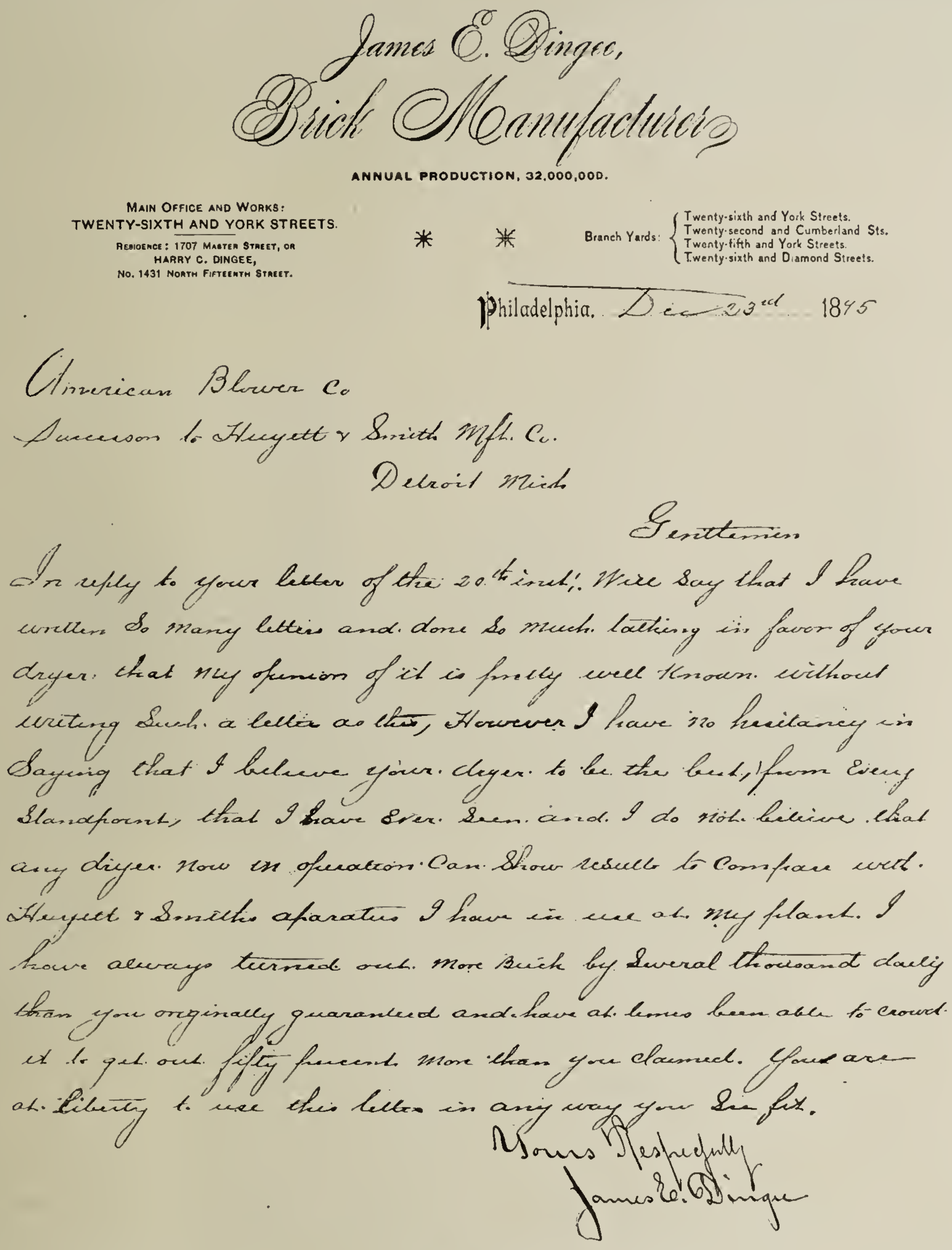
64 Johnston Buildings, **Cincinnati, Ohio.**

OUR . . . Improved Hot Blast Brick Dryer

Raed this Letter.

"THE BEST FROM EVERY STANDPOINT."

NO DRYER now in Operation CAN SHOW RESULTS to Compare with THIS ONE.



James E. Dingee,
Brick Manufacturer

ANNUAL PRODUCTION, 32,000,000.

MAIN OFFICE AND WORKS:
TWENTY-SIXTH AND YORK STREETS.
RESIDENCE: 1707 MASTER STREET, OR
HARRY C. DINGEE,
NO. 1431 NORTH FIFTEENTH STREET.

Branch Yards:
Twenty-sixth and York Streets.
Twenty-second and Cumberland Sts.
Twenty-fifth and York Streets.
Twenty-sixth and Diamond Streets.

Philadelphia, Dec 23rd 1895

American Blower Co
Successor to Huyett & Smith Mfg. Co.
Detroit Mich

Gentlemen

In reply to your letter of the 20th inst. Will Say that I have written So many letters and done So much talking in favor of your dryer that my opinion of it is pretty well known without writing Such a letter as this, However I have no hesitancy in Saying that I believe your dryer to be the best, from Every Standpoint, that I have Ever Seen and I do not believe that any dryer now in operation Can Show results to Compare with Huyett & Smiths aparatus I have in use at my plant. I have always turned out More Brick by Several thousand daily than you originally guaranteed and have at times been able to crowd it to get out fifty percent More than you claimed. You are at Liberty to use this letter in any way you See fit.

Yours Respectfully
James E. Dingee

50 per cent. More Brick Dried Daily than Guaranteed. A Record Hard to Beat.

Brick Cars,
Transfer Cars,
Tee Rail.

AMERICAN BLOWER COMPANY

SUCCESSOR TO THE HUYETT & SMITH MFG CO.

Send for . . . .
Catalogue,
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Prices.

Main Office and Works, DETROIT, MICH.

CHICAGO, 31 South Canal St. NEW YORK, 26 Cortlandt St. LONDON, ENG., 70 Gracechurch St.

The Standard Improved Brick Drier

Is capable of such **close regulation,** that any combination of drying influences necessary to suit the particular product or peculiar nature of the clay to be dried, are easily obtainable.

Adaptability to the various clay products now produced is one of its **strong points.** In corroboration of this statement we give below the experience of the Excelsior Brick Works, Brazil, Ind., with a Four Track Drier on **Pavers, Fire Brick, Hollow Blocks, Flue Linings and Drain Tile.**

Office of THE EXCELSIOR CLAY WORKS.

Brazil, Ind., November 4, 1895.

THE STANDARD DRY KILN CO., Indianapolis, Ind.

Gentlemen:—We have had one of your Four Track, 116 foot, Natural Draft Driers in use about four months. During that time we have dried shale pavers, 9¾ x 4½ x 2¾ inches, fire brick, hollow building blocks, flue linings and drain tile and have never lost one piece of ware in the Drier.

The shale brick we dry 30,000 every twenty-four hours, and have dried hollow blocks 8½ x 8½ x 16 and one inch thick in six (6) hours from machine into burning kiln. Mr. Frey, of the Bonnot Co., was an eye witness to this and expressed his surprise at such rapid and perfect drying.

We are more than pleased with your Drier.

Yours truly,
THE EXCELSIOR CLAY WORKS,
John S. Smith, Gen. Mgr.

We have others too, just as strong, proving its adaptability to soft mud brick made from tender clays.

Your name please and we'll send you our latest catalogue which will surely interest you, if you have the Drier subject under consideration.

Remember that on the **true basis** of comparison—quantity and quality of output and grade of equipment furnished—our prices are as low as the lowest.

The STANDARD DRY KILN CO.,
186 South Meridian St., INDIANAPOLIS, IND.

THE CLAY-WORKER

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

Vol. XXV. INDIANAPOLIS, IND., MARCH, 1896. No. 3.

Written for the CLAY-WORKER.

IN DEUTSCHELAND.

German Brick and How They are Made—Observations of a Clayworker Scribe in and About Berlin.

THE WORLD'S COLUMBIAN EXPOSITION has succeeded in stimulating the international exchange of ideas in all departments of the industries, especially so in the clay industry. Experts from every foreign country investigated the progress of the art, and, as we can state with pardonable pride, took home with them many valuable ideas. Among other nations the Germans were not slow to observe all that was of interest and new to them in the industry, and their technical journals, the Thonindustrie Zeitung and the Toepfer und Ziegler Zeitung, issued during the exposition year detailed reports compiled by their special correspondents. The report by Mr. Duemmler, representing the latter journal, is to-day the best compilation on the subject of the American clay industry. Our German fellow-clayworkers were thus enabled to benefit from our industry, and it is evident that we can learn a good deal from theirs. Looking at it in this light, the Clay-Worker, always of a practical turn, resolved to send its scribe across the Atlantic.

One fine morning we secured passage on board of one of the fleet ocean ferries bound for Europe. The weather being fine, the cuisine excellent, the place of residence both novel and pleasant, we could not help but enjoy the trip. But there is an end to everything, the more so to a pleasant ocean voyage, and so the ninth day after our departure found us landed upon the flat shores of a German seaport, Bremerhaven, about an hour's ride from the old city of Bremen.

Monument to Prof. Seger, Berlin.

Although this part of Germany can boast of but little scenic beauty, yet it is full of interest to the American clayworker, inasmuch as clay products are such an important factor here. We find brick the universal building material, while roofing tiles are used hardly less, and brick sidewalks are numerous. Though they may cover their buildings with unaesthetic cement and plaster facades—unaesthetic from the view of a clayworker—yet the substance of all is brick.

Bremen is a stately old city, with predominating commercial interests, having wonderfully clean streets and houses, quite in contrast to some of our soot-begrimed, busy cities at home. The country houses and the less modern houses of the North German cities show an odd but not unpleasant combination of brick and wood, the brick filling up the oblong spaces between the beams and triangles between braces and beams, thus rendering the appearance of such a house quite picturesque.

In the vicinity of Bremen, in fact, in the whole district between Bremen and Hamburg, hand molding reigns supreme, and only occasionally one notices machine-made brick, made with auger machines.

—Methods of Making Brick.—

Soft mud machines are entirely unknown. It is very likely that they are waiting for some pushing American to introduce them here. In the making of hand-made brick much attention is paid to the preparation of the clay. The material, generally a plastic surface clay, is, wherever possible, dug in the fall and allowed to freeze through the winter, thus rendering it extremely pliable and easy to work. From these accumulated piles the clay is wheeled into soak pits, thoroughly soaked, and then run through upright pug mills, often twice. The motive power to run this machine, which in itself is often of a very primitive character, is furnished by the time-honored old horse. The clay, issuing from the pug mill, is then wheeled to the molders. The molding is done in two brick molds, the brick being dumped onto boards and put on racks to dry. More attention is paid to stock brick, a boy being engaged to smooth them with a steel blade. The drying is done in ordinary sheds by nature's own process, thus, of course, limiting the working season to about five months. The burning is generally done in continuous kilns of the Hoffmann type.

Postoffice at Strade. Type of German Government Building.

We visited a number of yards answering to the above general description in the district between Bremen and Hamburg, and near the towns of Blankenese, Brunshausen and Stade. The clay throughout this region burns a bright red, and we noticed that on the yards we visited the output was of a very uniform color. We have been told that they average 95 per cent. of saleable brick.

En route we observed that the government has adopted a standard design of brick buildings for postoffices, railway stations, etc., which combine simplicity with beauty, often using glazed brick and tiles with pleasing effect.

From the north we directed our course towards Berlin, the metropolis of Germany. Although the weather was raw and chilly, our stay in Berlin was rendered most agreeable through the kindness of Mr. E. Cramer, the proprietor of the Thonindustrie Zeitung, the Clay-Worker's German contemporary, who with genuine Berlinian hospitality gave us many evidences of his courtesy. With the Thonindustrie Zeitung is connected a complete chemical laboratory for doing all the work required in the clay and cement industries, and it enjoys the reputation of being one of the best institutions for such purposes in existence. The founder of the laboratory, Prof. Dr. H. Seger, who died in October, 1893, devoted his whole lifetime to researches in ceramics, and obtained for himself a world-wide reputation. We might mention his scientific and at the same time practical researches in glazes and glaze bodies, the invention of the Seger pyrometrical cones, and the invention of the Seger porcelain, a porcelain-like body greatly liked by china manufacturers. His whole life was characterized by unselfish devotion to science and its practical application to the clayworker's art. Prof. Seger's monument, of black granite, is adorned with his portrait, a medallion of porcelain.

The German Brick and Pottery Gazette also has its editorial rooms in Berlin. This journal has the honor of being the pioneer publication in the field of German ceramics. With it is connected the oldest special chemical laboratory for ceramics, having been established by the eminent Mr. Frederick Hoffmann, the inventor of the continuous kiln. Prof. Dr. Seger was appointed by Mr. Hoffmann as the first director of this laboratory, and held this position until he founded the laboratory connected with the Thonindustrie Zeitung. At the quarters of the Gazette we found a staff of chemists busily at work. At the same place Mr. Hoffmann has his well-known technical bureau, where the plans for hundreds of kilns and brick works were designed. Here we had the pleasure of meeting Mr. Duemmler, the accomplished and affable editor of the Gazette, author of "The Clay Industry of the United States." Mr. Duemmler assisted us greatly by pointing out the best routes to well-known plants, and by favoring us with letters of introduction.

Mr. Fred Cramer, brother to Mr. E. Cramer, with obliging courtesy, undertook to guide us through Berlin's labyrinth of streets and houses. Berlin may truly be called a beautiful city, and is noted for its grand architecture, its pleasant parks, its clean streets and its civil inhabitants. But as brickyards were our centers of interest, we were obliged to tear ourselves away from the city and direct our steps towards the suburbs and neighboring towns, as the brickyards are situated quite a distance from Berlin, some of them fifty miles and more. The Berlin yards make only common brick, and hand molding is the rule. Front brick are shipped from the province of Silesia, where excellent clays abound; from the towns of Lauban, Siegersdorf, Liegnitz and others. The Berlin clay is very rich in lime, and burns a fine buff, but the brick soon lose their fine color and show a peculiar efflorescence of dark-greenish color. A number of buildings built of such brick, at first admired on account of their color, in the course of a few years became objects of disgust, the facades having turned into a conglomeration of dirty green and black spots. Thus it is that Berlin brick cannot be used as front brick.

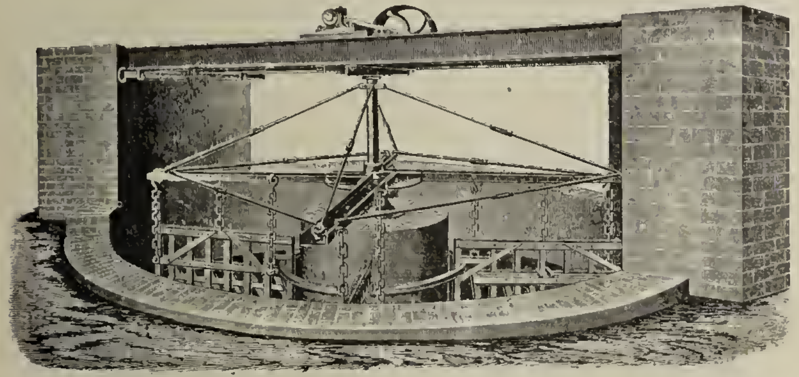
One of the characteristic yards of the Brandenburg district is the plant of the Birkenwerder Brick Co., at Birkenwerder, under the management of Mr. Carl Pernet, which was the destination of our first excursion. The plant, consisting of three yards, is situated on the river Havel, thus permitting of shipping by water. Mr. Pernet, one of the most cordial gentlemen it has been our good fortune to meet, took the lead and conducted us through the works.

—Washing Clay for Common Brick.—

The clay, a heavy, plastic material, is not fit to be worked alone, but fortunately there is a layer of six feet of fine sand on top of a twelve-foot vein of clay. The mixture in this proportion results in a very satisfactory material, with only the

Carl Pernet, General Manager Birkenwerder Brick Co., Birkenwerder.

drawback that it contains too much lime (10 to 12 per cent.) to be worked by the ordinary methods. Consequently, they are obliged to wash the clay. This was a serious problem—how to do it economically—until Mr. Pernet assumed the directorship; but he succeeded in solving it; that is, by washing the clay at so low a cost as to make it entirely practicable. The clay is drawn from the bank up an inclined track in dump cars by means of a continuous chain, to and from which the cars are alternately attached and released automatically. An electrical clockwork set up in the engine room keeps count of the cars dumped. The clay is emptied from the cars into the washer, a circular basin with cemented floor and walls, and is kept stirred up in water by a series of agitators driven by a vertical shaft. The coarser clay and sand, naturally sinking to the bottom, is prevented from sticking to the bottom by a number of harrows revolving with the agitators. The slip, escaping through a sieve on the side of the basin, is continuously pumped away by a powerful centrifugal pump. The washer has a capacity of washing about 105 cubic meters of clay per day, and requires 12 horse-power. One yard being 3,700 feet away from the main plant, the other about half the distance, the slip has to be pumped there in pipes, the one pump doing all the work. The slip is emptied into large basins, about 80x50 feet feet and larger, where the clay settles to the bottom. After standing about two days the water is drawn off and the clay left to stiffen until it has the proper consistency to be molded into brick. About six to eight weeks elapse before the clay is stiff enough to be worked.



A German Clay Washing Machine.

One important precaution has to be observed daily: to thoroughly wash the pipes before shutting down by pumping a large quantity of water through them. The clay is wheeled from the evaporating basins into vertical pug mills, and after issuing from the latter it is made into brick by hand in two-brick molds. The brick are dumped on boards holding two brick and put on racks to dry. The drying is done by the natural way in open sheds with tile roofs. Great care being taken in handling the brick all the way through, they were as fine a lot of hand-molded common brick as we ever saw. Mr. Pernet informed us that the capacity of the three yards is about 60,000 brick per day.

—How the Brick Are Burned.—

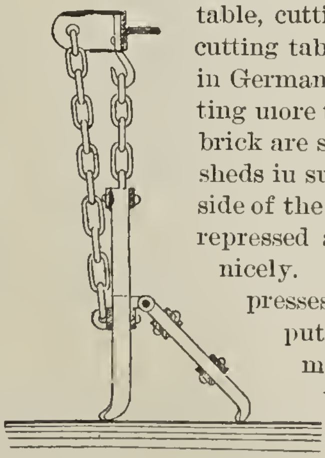
The burning on two yards is accomplished in up-draft kilns—the old "Dutch" kilns—while on one yard they have a new continuous kiln in addition. We observed that the brick are set skintling. One up-draft kiln we inspected was just about cool enough to empty, and it showed a remarkably uniform burn. Another one, about half emptied, also convinced us that at least at this yard they understand how to burn up-draft kilns perfectly. Compared with our up-draft kilns these kilns have enormously thick walls, about four feet thick at the bottom. Here we had an opportunity to compare the continuous kiln with the up-draft. As we were told, the latter consumes about 800 pounds of coal per M, while the continuous uses 350 to 400 pounds. In point of quality, however, we noticed that on this yard the brick burnt in the continuous kiln were not equal in appearance to those burnt in the up-draft kilns, being full of dark blotches, showing the more as the clay burns a fine buff color. The degree of uniform hardness was about the same in both kilns. The brick are loaded onto boats, carrying them to Berlin.

The surprising degree of neatness prevalent at the yards was a point which an American could not fail to observe; also the almost entire absence of waste. The power is furnished by compound condensing engines and transmitted by ropes. The broken or cracked green brick are wheeled to a so-called ball mill and ground up to be mixed with the slip.

Before leaving Mr. Pernet gave us an account of the difficulties he had to encounter constructing the pumping station and pipe lines. The pump had to be lowered below the level of the washer, the lines of pipe repeatedly torn up at places where they sagged, the pipes provided with air valves and special valves constructed at the branches.

—A Fire Brick Plant.—

At Freienwalde, a charming small town nearly two hours' ride from Berlin, the Henneberg Fire Brick Works were the destination of our next trip. This concern, besides making common fire brick, manufactures all kinds of refractory material for the iron and chemical industries, paving tiles and blocks of a superior, very hard stoneware body, and other articles too numerous to mention. The plant has excellent shipping facilities, being situated on a branch of the river Oder, and having a railroad switch. With the kind permission of Messrs. Henneberg & Co., the proprietors, we made a tour through the works. We were surprised to learn that nearly all the raw material is shipped from distant points, some varieties being gotten from Sweden, Scotland and other sources. The only material obtained at home is a very pure kind of quartz sand. The factory consists of two parallel main buildings, with common center wall. The one building contains the clay rooms and the machine rooms, the other the kilns. An additional building shelters the boilers and engine. One large, tall stack provides draft for the kiln and the boilers. The different materials, after being thoroughly dried, are ground in a ball mill having a capacity of grinding 10,000 pounds of dry clay per hour, and are then mixed in proportions to suit. This done, they are conveyed to a pug mill by means of an elevator. Issuing from the pug mill, the tempered clay is run through a pair of roller crushers, and at last through the auger machine. The brick machine does not materially differ from our machines of the same type, but one convenient feature might be mentioned. On the side of the die there is provided a hand-hole, the plate covering it being fastened exactly like the hand-hole of a boiler, with one spider. This arrangement enables the workman in charge of the machine to clean out the space behind the dies and quickly remove any obstructions, pieces of wood, etc., which are often so serious an annoyance. The column of clay is cut into brick by means of a hand cutting table, cutting two brick at a time. This kind of cutting table seems to be the one in general use in Germany—at least we did not notice any cutting more than three brick at a time. The wet brick are set on cars and conveyed to open drying sheds in summer, and drying rooms arranged inside of the buildings in winter. Every brick is repressed as soon as it is dry enough to repress nicely. The represses in use are portable hand presses. For the final drying the brick are put on racks, as usual. Henneberg & Co. make a specialty of manufacturing retorts for gas works, in lengths varying from 10 to 12 feet. Ware of this kind, of course, requires careful treatment, and the firm has a set of workmen trained by long experience to do this work with a minimum of waste.



Harrow at Rest.

The kiln in use is a "Mendheim" gas-fire kiln, a continuous kiln with twelve chambers of about 21 cubic yards contents each. The gas is produced in two generators, one only being used at a time while the other one is being cleaned. An underground flue conducts the gas to the end of the kiln, where it communicates with two flues running parallel with the kiln, one on each side. These longitudinal flues connect with each chamber by means of small flues, controlled by dampers. The gas flows from the flues into spaces beneath the kiln floor, mixes there with hot air heated by passing through the chambers which are cooling off, ignites and enters the chamber through apertures in the floor. The working of the kiln itself is identical with that of any other continuous kiln. The kiln, as we were told by the superintendent, works perfectly satisfactory in every respect. The consumption of fuel is about equal to that of an ordinary continuous kiln, but the results are much in favor of the gas fire system. The Seger pyrometrical cones are successfully used here for the determination of the temperature. By the way, we noticed that the peep-holes were closed up with sheets of mica, a very commendable practice.

View of Hennebery Fire Brick Works, Freienewalde.

(To be continued.)

Written for the CLAY-WORKER.

SETTING AND BURNING DOWN-DRAFT KILNS, AND CONSTRUCTION OF BOTTOMS.

BY R. B. MORRISON.

THE SAME GENERAL PRINCIPLES of draft and setting in up-draft kilns are applicable to down-draft kilns. In up-draft kilns the heat is distributed through the kiln from a number of tunnels that run parallel to each other, separated by 24 to 36 inches of brick. In the down-draft the heat is generated in a number of fire boxes at the bottom, passes upward through passages known as bag walls. Heat from all these fire boxes is received into one common vault, constituting the space between top of the brick in kiln and the crown of the kiln. From this vault it is distributed through the bricks by downward draft, so there are no distributing tunnels or vaults among the bricks. Bricks are set similar to those in an up-draft kiln, with extra space next walls to counteract cold walls. I lay one open course of platting on these kilns. The tops of these kilns are not left flat, but conform to shape of the crown of kiln, usually set three feet higher in center of kiln than next to walls.

The question of the best way to put in the permanent bottom is one upon which there is much difference of opinion. The best bottom is the one that will distribute heat uniformly from top to bottom, and from one side to the other. The plan I have adopted is simple, and, as it gives excellent results in practice, will describe its construction. This is a round kiln, 26 feet diameter inside, bricks set 26 courses high next walls and 34 courses high in center; stack 35 feet in height, one stack for two kilns. If you wish to burn both at same time, it is necessary to have a division or niche wall in the stack.

A tunnel 20 inches wide by 30 inches high leads from stack to center of kiln. This we will call the smoke tunnel. This intersects another tunnel of same width running at right angles to it and compassing the whole width of the kiln. This we will call the receiving tunnel. The two are on the same level at the bottom. The smoke tunnel is arched over with a four-inch arch; the receiving tunnel walls are carried up level with top of crown of smoke tunnel. The whole bottom is leveled up to this point.

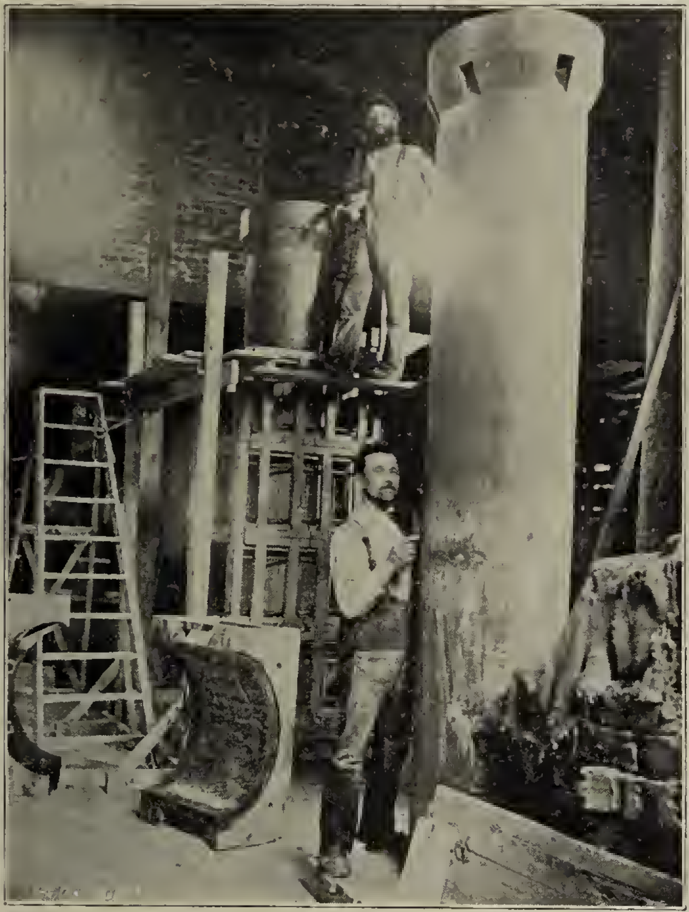
Then the flues begin. First, a circular flue is built next to the wall. In building the wall, at the proper height there is left on inside of wall a 2-inch ledge; this supports one end of cover brick, and the 4-inch arch wall supports the other end. After one single circle flue is built, begin flue next to smokestack and run parallel and over the center of the smoke tunnel to opposite side of kiln. Run the other flues parallel with this. These flues are 7 courses high and span the receiving tunnel; 4 projecting courses and 3 solid courses span it.

The width of these flues is governed by length of cover brick. If 9-inch, brick flues are 5 inches wide; if 12-inch, brick flues are 8 inches wide. For cover bricks I prefer bricks 4 inches on top side, 2 inches from each end, then scalloped, leaving them 3 inches wide where they span the flue. This leaves 1 inch space for draft between each brick. The flue walls are built solid; the fire coming into each flue must travel to the receiving flue. The circle flue is divided into two semicircle flues, each half having two connections with receiving flue. This gives the bricks next walls their full share of heat.

I have tested this system of bottom, which I will call the Chattanooga bottom. The bricks are burned uniformly from one wall to the other, and while the top bricks are not overburned, the bottom course is a good front brick. I cannot conceive how any other plan of bottom can give better results. There are eight fire boxes, six bands each of ¼x6-inch iron. The two top bands are just above and below the skewback of crown during the first burn. When bands are drawn very

Repressing Brick, Hennebery Fire Brick Works, Freienwalde.

tight we turn the nut back one or two revolutions to relieve the strong tension. I think all the bands should be carefully watched on first and second burn and tension relieved when too great. After second burn the permanent bands above the doorway are not changed; have never had one to break.



Making Gas Retorts. Henneberg Fire Brick Works, Freienwalde.

When heating a down-draft, if it does not heat uniformly across the kiln, partially closing the damper will in a few hours drive the heat to all parts of the kiln when the kiln is settling. When the object is to burn the kiln well to the bottom, experience has convinced me that strong draft is necessary, and I raise the damper and pull the heat through rapidly at the last. If the heat diminishes, then lower damper until heat is restored; then raise it again. I cannot see how heat can be drawn to the bottom and maintained there without lively draft.

Care must be taken to keep the fire boxes in good order, clear of cinders and well supplied with fuel. It is impossible to hold heat in a down-draft kiln if there are cinders in the fire box. It will begin to lose heat at once, and no amount of firing will make up for an unclean fire box.

This is true of any furnace in which coal is burned. More fuel and time is wasted by firing or throwing fuel on a bed of ashes and cinders than in any other way. The furnace will flame, and great clouds of smoke will arise from the kiln or stack, and very little heat is generated. The fuel is only partly consumed; the furnace is cooling while unburned fuel remains on the fire; then it is stirred or more coal thrown on. I have found heat in the kiln reduced, furnaces full of fuel, but doing no good. Have the furnaces cleaned, also ashes and clinkers removed; then begin to fire; in a short time the kiln is hot again, coal burns up clean, and still the furnace retains its heat. A skillful fireman who attends faithfully to his work, keeps the grates clean, puts in the right amount of fuel in the right way and at the proper time, is a very valuable man to his employer. He saves him many hours of time and tons of fuel, and gives better results in the end.

The good fireman should receive considerate treatment and good wages. There is not a more important workman about the plant than a good fireman. With this kind of a fireman the ash-roller takes away only ashes and cinders; with an ignorant or careless fireman the ash-roller carries one-fourth to one-half unburned fuel with his ashes. It is impossible, however, for a fireman, however careful and skillful, to save his fuel unless he has good grate surface upon which to put his fuel. If there are large spaces between grates where coal can fall through, he cannot prevent waste. It is extravagant to use a grate after it is burned out, warped and twisted until it can't lie still and only comes in contact with its companion perhaps at one or two points and is sprung up two inches in its middle. Don't attempt to economize by using such grates. Order a new set at once. You will soon save their cost.

Again, it is not economical to use coal that has a large percentage of slate, clay or sulphur in it. There is no heat in these things; they are only a hindrance to combustion. You pay freight on something that is worse than useless, and consume extra time and labor. It pays to use good fuel.

OBITUARY.

J. H. Benjamin, of Rogers, Benjamin & Co., Royersford Stove Lining and Fire Brick Works.

Every member of the National Association of Fire Brick Manufacturers will regret and appreciate the loss we have sustained by the unexpected death of our genial co-worker and friend, J. H. Benjamin, of Royersford, Pa.

His exceedingly pleasant personality, combined with his extended practical experience as a fire brick maker, made him a prominent member of the Association. He belonged particularly to the stove lining section of the Association, and was very active in everything which could in any way advance the best interests of the trade.

At the last Convention, held Dec. 18, 1895, his absence was distinctly noticed. The query, "Where is Benjamin?" was frequently heard, and the sad reply came from his intimate friend, Benjamin Fox, of Reading, Pa.: "I fear poor Benjamin will never meet with us again. He is at death's door, suffering from acute Bright's disease." None of us could realize the fact. It seemed not possible that one who had been one of the most jovial and apparently most robust members of that jolly clam bake at Dighton only a few weeks before could be so suddenly stricken with a fatal disease. Yet it was so to be, and on Jan. 20, 1896, at Spring City, Chester county, Pa., our well-loved friend passed away, leaving us to mourn the loss of a generous fellow-worker and a cheerful friend. He was only fifty-four years old, having been born in Chester county Pa., Oct. 4, 1841.

J. H Benjamin.

The Clay-Worker extends greetings of sorrow to all his friends in the craft, and most especially to those most near and dear to him who was thus suddenly cut down in the prime of his manhood. JAMES TAYLOR.

THE IOWA BRICK AND TILE ASSOCIATION.

THE thirteenth annual meeting of the Iowa Brick, Tile and Drainage Association convened in the club room of the Hotel Kirkwood, Des Moines, Wednesday, Feb. 5, 1896, at 10 o'clock a. m., the President, Robert Goodwin, presiding. This session was given up to enrollment of and reports from members on the

PAST YEAR'S BUSINESS.

C. J. Holman: Trade has been dull and prices unsatisfactory.

Hawarden Brick and Tile Co.: We have had a fair trade, but prices have been low.

Wolff Dryer Co., Chicago, Ill.: We have had a fair trade, with a favorable outlook for this year.

H. M. Pentecost, Panora: I make brick and tile, and have had a good trade.

Iowa Paving Brick Co., Des Moines, Ia.: Have had a good trade; outlook fair.

Cedar Falls Brick and Tile Co.: Fair trade; prices low, and we hope for a better trade this season.

George Eckert, Madrid: Trade fair; have been running one year, and have sold the most of my tile.

Carl Neis: I have made money enough to attend this Convention.

W. D. Richardson, Cleveland, O.: I come from a State ranking first in the value of her clays and clay products. I find that our clayworkers, like those of this and other States, are complaining of excessive competition. There is sufficient demand for our products to return good profits if prices were reasonable. That they are not so is quite evident, and for this condition we ourselves alone are to blame. The volume of business the past year has been fairly satisfactory, and I think the prospects are good for the coming year.

W. W. Lewis, Williamsburg, Ia.: We make brick and tile. Our trade has been fair on brick, but poor on tile.

J. M. Starbuck: I make brick and tile, and they are about all sold, and the future is more promising.

C. E. Shaw: Business has been fairly good, but I could have done more.

D. J. Spencer, Afton, Ia.: Trade slow. I make brick and tile. My trade on brick has been good and on tile poor.

S. McHose: Trade has been dull, but we hope for a better trade this season.

Charles McHose, West Boone: I am down here looking up a location for a tile and brick works.

E. M. Freese & Co.: The past year was fair in a business view, and the prospect for this year is very good.

L. Aulman, Des Moines: I am a machine man. Our trade has been quite satisfactory.

W. B. Lower: Trade has been fair, but I have a good stock on hand.

J. W. Penfield & Son: We manufacture clay machinery, brick, tile and fireproofing. Sales of machinery have been slow, but tile, brick and fireproofing sales have been good. We are now building the largest continuous kiln in the world.

Frey-Sheckler Co.: Trade was fair last year, and it already shows improvement for this year.

PRESIDENT ROBERT GOODWIN.

C. L. Smith: We make brick and tile, and have had a slow trade. We are hopeful for the future, if we get the rain promised, on the just and unjust, that we shall have a better trade.

Robert Goodwin: We find the trade dull in tile; the brick trade has been fairly good, but prices have not been satisfactory.

T. E. Haines, Altoona: My experience has been very similar to the rest. I make tile and brick. I put out tile on the yards year before last. They are there yet, but the demand will come again, and I expect to get my prices. That is the way to protect our business.

Fort Dodge Clay Works: Made money enough to attend the Convention, and expect to attend every Convention.

Lehigh Brick and Tile Co.: I am new in the business, having taken an active interest in our factory a few months ago. I am here to learn all I can. If possible, I would like to know of some plan by which we can obtain better prices. That, it seems to me, is the chief thing now.

W. E. Sidney, Buffalo, Ia.: I made 2,500,000 brick; have about one million brick and from four to six hundred thousand tile on hand. We have been swapping dollars for the past year, but I don't want to make brick for glory.

President Goodwin: We are here for pleasure and profit, and both can be best realized by cultivating closer relations. Let us get together, shake hands, and get better acquainted. We will now adjourn till after dinner.

THE SECOND SESSION

Was called to order by President Goodwin at 2 o'clock, when, after a few newcomers had been enrolled, all listened attentively to

THE PRESIDENT'S ANNUAL ADDRESS.

Gentlemen of the Convention:

I esteem it an honor to welcome you to this our Seventh Annual Convention. It gives me much pleasure to see so many here to-day. Sixteen years ago an organization was formed which was called the "Iowa Tile and Drainage Association." It became necessary for the manufacturers to meet together to discuss those difficulties which come up in the handling of clay. Many entertaining papers on "Tile Drainage," which demonstrated to the farmer the benefit received from tile, were read before these meetings. Accordingly many farmers tiled their land. Others, who wished to do so, could not for want of outlet, except through their neighbors, who not wishing to tile prevented others from tiling. These farmers soon urged through the tilemaker the necessity of better "Drainage Laws." The tilemakers took up this great question of drainage and made several efforts, without success, to secure a good suitable law. We believe the failure was due to the fact that it was thought that it was especially for the benefit of tilemakers, rather than the farmer. Such was not the case; both were equally interested; the farmer could not tile his land without an outlet, hence the tilemaker was unable to sell his product.

I would recommend that the farmers take up this drainage question. I believe that they could soon secure a good and just law, which would be equally beneficial to all.

Later a change was made in the organization, which was brought about by the tilemakers turning their attention to the brick as well as to the tile business, so that it was called the "Iowa Brick, Tile and Drainage Association."

To-day we meet again. Many interesting

papers will come before this Convention. The discussions which follow, if we are to judge from the past, will be very interesting. Let us discuss these questions in a manner that we may derive the greatest benefit. Let us all take part, as we are seeking knowledge. We have been especially desirous to give the public a good article; we have been trying to attain it; we have labored for the past sixteen years, and when we look back at the system of brick making in the old days, we have reason to feel proud that we have not labored in vain.

How have we made this advancement? By meeting together and discussing our troubles with one another so that the experience of one aided the other. This was the only way we could receive the desired information. I am especially grateful to see so many machine men here to-day. For I think we should work together. They have a wide experience and are able to help in many ways. Always are they ready to furnish the desired improvements that we may need, and sometimes those that we do not need.

We should feel grateful for the interest that the editors of the several clay journals have taken in our work, some of them coming here at a great expense that they might report the proceedings of these meetings.

By these meetings we have built up this great industry so that it is second to none except the iron industry in the United States.

The advancement, owing to the depressed condition of trade, has not been so great in the last two years. Many brick and tile companies have been compelled to sell their product at a small profit, and in some cases no profit at all.

Vast sums of money have been expended in building up this industry. We should carefully guard and protect it; we should keep up the high standard of our goods and sell at a fair profit.

Much could be gained by local organizations, not for the purpose of advancing prices, but to protect one another against "dead beat" contractors, so that honest contractors could be employed.

Nothing is gained by cutting prices and taking contracts your neighbor expected to get, and which would naturally go to him. He will simply retaliate by returning the compliment by making a more severe cut.

Keep the value of your goods before the public; show the value of brick buildings; compare it with frame buildings; state the difference in insurance.

By all means advertise your business. St. Louis is a city of brick, and no finer or more beautiful homes can be found in any country. Brick is surpassing all other material for paving; it is cheaper and makes a very durable pavement. Nothing has been found that will equal a well-burned brick for such purposes. No better brick can be found than are being made in our own State of Iowa.

Two years of dry weather has greatly effected the tile business. Very few sales have been made during this time. Wet weather and prosperity will come again. Not many years ago land could be bought for $6 or $7 per acre. To-day it is worth $40 or $50. So valuable is our land that we cannot afford to have it lay idle.

The great harvest will again create a demand for tile. The puff of the engine, the groan of the cars in moving the great crop will bring prosperity. Let us hope that the financial cloud which has hovered over us will soon break and be blown away.

"Value of State Conventions," a paper by J. Dixon Doyle, Chicago, was read by W. D. Richardson, as follows:

THE VALUE OF STATE CONVENTIONS.

—J. Dixon Doyle.—

If there is any one subject that lies nearest my heart it is the importance and intrinsic value of State Conventions. I have so long been an advocate of their importance and the great benefit which necessarily accrues to the individual clay manufacturer, that perhaps some of my friends may assume that the holding of State Conventions with me is nothing more or less than a second nature. Well, Mr. President, and gentlemen of the Convention, I must plead guilty to the soft impeachment. I am a most pronounced State Convention man and believe that these methods are productive of so much good to us clayworkers that they cannot come too often. It is, therefore, with the greatest pleasure that I accepted the invitation of your Secretary to address you on this subject. I hope that the few deductions that I shall present will meet with your approval and that the future Conventions of the Iowa Brick, Tile and Drainage Association will be even more largely attended than the present one.

One of the very best things that prove beneficial to every organization, no matter what, is the frequent interchange of ideas. It serves as an incentive and the success of one and the failure of another is always attended, more or less, with beneficent results to all concerned. This is particularly applicable to the clayworking industry, and especially to the States where a permanent organization is maintained. These yearly Conventions are productive of much good, and aside from the social feature, in itself a most attractive part of the programme, the meetings of brick and tile manufacturers from all parts of the State are always sure to redound to the interest of the trade at large.

About a fortnight ago the Illinois Clayworkers' Association held their Eighteenth Annual Convention at Streator, and we Illinois people are awfully proud of it. It was the best Convention in every respect our State ever held; the attendance was larger, the papers read were ably prepared and the discussions which followed were of the most interesting and instructive nature. It brought out a lot of young clayworkers hitherto unheard of in Conventions and young men who were there to learn. I have always maintained that as a rule State Conventions are really of more benefit to the smaller manufacturers than is our National. At the latter the papers read and the discussions are invariably participated in by men who have been before the trade for years, and as a consequence the smaller fry and the new members are relegated to the rear or else take no part in the proceedings. At the State Conventions things are conducted differently and, I think, much better, for the benefit of the clay manufacturers. Every worker in clay is not a Demosthenes, and consequently men who are perfectly competent to discuss any matter pertaining to their profession in casual conversation are suddenly possessed with an acute attack of "stage fright" if they are asked a question in a National Convention. It is right here that our State Conventions prove most beneficial. Men who would not dare express an opinion at the National are heard to advantage in the various State Conventions. The objects of these State Conventions are two-fold; the interchange of ideas, review the past and plan for the future. Can any one doubt its great benefit? Look around you in this Convention hall. Representative clayworkers and the manufacturers of clayworking machinery of the latest and most improved type are all here imbued with one great object, and that—to find out what his neighbor is doing. If perchance, there is a failure in a kiln, defective machinery or any of the many and vexatious accidents which are bound to occur sooner or later in the best managed plants, your neighbor is there to find out all about it. He may have a similar accident occur at his yard and he wants to know how to remedy it. The discussion which follows is always productive of good results, and thus fortified with experience the brick manufacturer learns, perhaps for the first time, how to overcome such difficulties should they arise, and he is thoroughly satisfied as to one of the great "Values of State Conventions."

J. DIXON DOYLE, Chicago.

The clay industry has advanced more rapidly in the last twenty years than any other in the mineral world. It is not so very long ago that to be a manufacturer of brick and tile was considered nothing more or less than a common worker in mud and he was considered nobody. Conventions and Associations were unknown and as a consequence the trade languished. But a change came. A new era was at hand. Progressive men with progressive ideas came to the front. Old fogy ideas and old fashioned ways of making, drying and burning brick were soon relegated to the rear. What is the result? Your splendid plants in the great State of Iowa is the best answer to my question. The clay industry has assumed the second place in the mineral world, and with the rapidly increasing development it is soon destined to supersede iron as the leader. Improved machinery and improved brick yard appliances have worked a revolution in the brickmaking industry. Where thousands were manufactured years ago, millions are now the rule, and this is constantly increasing. And every year these State Conventions help the brick manufacturer. When a great representative body of men, such as are here to-day, get together and give their experience, failures, triumphs and otherwise, it certainly proves beneficial, and every Convention is an improvement in this line over the last held. What better demonstration than this can be presented of the great "Value of State Conventions."

My distinguished friend and clayworker, E. M. Pike, says: "At these very pleasant gatherings we can reset the stakes adown life's pathway and form a sort of boundary line between the past and uncertain future. As we imperceptibly move down the years it is well to tarry a little and view the past and speculate as to the future, but the future piles upon us so rapidly that it becomes present, so we must seemingly deal with both as they fly by us into the past."

And so it is with us. We are here to-day to learn—to profit by the experience of others and listen to the suggestions of able men regarding new ideas and innovations. While we have advanced very rapidly in our calling there is yet much to learn. In fact, I cannot recall any branch of trade where so much time, attention and close application is absolutely necessary as in the clay industry. Perhaps the clay formerly used may give out; a new bank has to be secured, and even then trouble may come as to its adaptability by the machinery. All of these are matters which have to be carefully studied out. I was present at a recent State Convention where one of the younger members was noticed as being nervous. It was evident that he wanted to say something, but was afraid to trust himself on the floor of the Convention before so many of the older members. He was induced to get up, however, and so soon as the first feeling of embarrassment wore off, made quite a sensible little speech. He had experienced considerable difficulty with his kiln bands, and desired some explanation. This was given him by some of the older heads, and in the discussion of the same much valuable information was obtained. After the adjournment of the session he informed me that he had learned more in that morning about how to run his plant practically than in the whole three years he had been in the business. This is but one instance of many I could cite wherein so much good has been accomplished and proved beyond a shadow of a doubt the great "Value of State Conventions."

I cannot impress upon you, gentlemen, too strongly the value of these annual gatherings. They are productive of so much good that to foster them is nothing more or less than your bounden duty. This is your seventeenth annual meeting, and those of the "old guard," the charter members, who are here to-day, can see the rapid and progressive strides the clay industry of Iowa has taken during that period. The clay products of this State are not confined within its borders. They are known abroad and in every city used have always come up to the top mark. This is a condition that certainly must be agreeable to the Iowa manufacturers—and incidentally, I hope, to their profit.

With all these favorable conditions it is the duty of every brick manufacturer in the State to become a member of this organization. We are all slipping down the hill of Time, and some of these days our boys, or those who follow, will have to take our place. Impress upon them the necessity of this Association. That its object is to promote good feeling and a spirit of mutual helpfulness among those engaged in the clay industry of this State. That it promulgates information relating to the newest and best theories regarding our profession. That all improvements in machinery and other appliances used in the clay industry are discussed at these gatherings—in fact, everything pertaining to the trade. When you do this, your mission is fulfilled. As the eye grows dim and the step feeble with advancing years and the younger generation steps into our place, we can then realize that our work has been well done. We can then point with pride to the "Value of State Conventions." Gentlemen, I thank you for your attention.

President Goodwin: I understand that the committee appointed at our last year's meeting to draft new Constitution and By-Laws for us are ready to report. We will hear from them.

Mr. C. J. Holman, chairman of the committee, then read the following, which, after considerable discussion, some of the members suggesting that the name of the Association should be the Iowa Clayworkers' Association, and others unimportant changes, the Constitution was reread and adopted unanimously.

CONSTITUTION
—of the—
IOWA BRICK AND TILE ASSOCIATION.

ARTICLE I.

—Name.—

This Association shall be known as the Iowa Brick and Tile Association.

ARTICLE II.

—Object.—

The object of this Association shall be to promote the interest of those engaged in the manufacture of brick, tile and other clay wares, by the free discussion of all questions pertaining thereto, and to establish a more intimate and friendly relation between clayworkers throughout the State.

ARTICLE III.

—Membership.—

Section 1. Any person directly interested in the manipulation of clay products or the means of their improvement or use may become a member by signing the Constitution and paying the admission fee of $2.

Section 2. The admission fee and annual dues of each member shall be $2 for the first year, and $1 a year thereafter, payable in advance.

Section 3.—Members not paying their dues within thirty days, after due notice of delinquency by the Secretary being given, shall be dropped from the rolls.

ARTICLE IV.

—Meetings.—

The meetings of the Association shall be held annually at such times and place as may be determined by the Executive Committee. Public notice of the same to be given two months before the time of meeting.

ARTICLE V.

—Officers.—

Section 1. The officers of this Association shall consist of a President, Vice President, Secretary and Treasurer, who shall be elected by ballot at each annual meeting.

Section 2. It shall be the duty of the President to preside at all meetings of this Association, who shall be governed in his rulings by such parliamentary rules as usually govern similar bodies.

Section 3. It shall be the duty of the Vice President to perform the duties of President in the latter's absence.

Section 4. It shall be the duty of the Secretary to keep a record of each meeting; and he shall also receive moneys and pay this over to Treasurer, keep an account of same, and make a full report of each annual meeting; conduct all necessary correspondence, and such other business as the Association may direct.

Section 5. It shall be the duty of the Treasurer to receive from the Secretary all moneys belonging to the Association, and receipt for them; to keep an account of and pay out same upon order of the President, when countersigned by the Secretary, and make a full report at each annual meeting.

ARTICLE VI.

—Executive Committee.—

Section 1. The officers of this Association shall constitute an Executive Committee, whose duty it shall be to make all necessary arrangements for all meetings, and perform such other duties as may be assigned to them.

ARTICLE VII.

Section 1. This Constitution may be altered or amended by a two-thirds vote of the members present at any annual meeting.

Section 2. At any meeting of the Executive Committee three members shall constitute a quorum.

Mr. J. B. McHose moved that all who were enrolled at this meeting be considered charter members, and it was so ordered.

Secretary C. L. Smith.

PAVING BRICK—ITS HISTORY AND ITS FUTURE OUTLOOK.

—By Carl Neis.—

Mr. President and Fellow-Craftsmen:

The first part of its history can be told in a few words. About one hundred and forty years ago there were some paving brick made and put down in Holland; then for a time the progress seemed to stop, and a basalt stone from Germany, between the rivers Rhine and Main, was shipped down the river to Holland and used for paving; it was also shipped to England and even to America. If no freight could be procured going westward, vessels would take the stone as ballast and sell it in American ports. At those times hundreds of men were working in the quarries. This is a stone, in my judgment, superior to granite.

In the latter part of the forties this began to slack up, and before I left the old country, which was in 1857, I know positively that not over fifteen men worked in these quarries. The reason of the decline of the business was that Holland was using brick and all the cities in Germany were done paving; so all which were needed was mainly for repairs. This is the history of paving brick in Europe.

On this continent there is in some way a misunderstanding about the place where paving brick were first manufactured and used. From what I can learn, it seems Charlestown, West Virginia, has the honor of the first what we might call brick paving. This I will not discuss any further, for it will not be interesting nor profitable to this Association. I will say, about twelve years ago brick paving was in reality begun, and a few good jobs were done up to about seven years ago.

About that time the great paving brick epidemic, like influenza or la grippe, swept over this continent. Everybody contracted it; they all saw millions in it; in fact, it was like the last African gold fever. The millions were really not in it at that time, but they are in it now. There was no trouble of getting them in, and a noteworthy part of this history is that the more invested in a plant—the more money that had to be put in—it seemed the cheaper they could make the brick, and it looked for a while that if a company could be organized that had about fifty million to invest in a paving brick plant they might be able to make them for nothing, load them on cars, and pay a hundred miles of freight, providing the city officers would give them a fair show!

This, gentlemen, is the history up to date, and let me say right here, so that all will receive their due: the machine men, the kiln rights men and the clay literary men are entitled to great credit in the making of this history.

The future prospect is not such an easy one to predict, and if there is a fellow-brickmaker present who thinks it easy, I will stop and give way to him. Since I see no one here willing to take up the job, I will proceed and tell you how it appears at our observatory; but I warn you to make allowances for my prediction. You all know even the predictions of the Signal Service Office sometimes are wrong in predicting only twenty-four hours ahead. The future is an immense long time! The weather predictions are calculated mainly by the weight of the atmosphere and the directions of the wind. If the atmosphere is heavily loaded with moisture, and the wind not strong, so there is what is called a calm, a heavy downpour of rain is sure to follow; but if the wind rises we may look for fair weather.

I find the paving brick business so heavily overloaded that nothing short of a hurricane can clear the horizon, and in a hurricane, you all know, considerable wreckage is found after it is over. Only the captain who has reefed his sail is safe. It makes no difference the size of the craft or the number of seamen; if the waves strike the broadside, the larger the concern the greater the loss. I find that all run with full sails, expecting to reach another zone, knowing full well that a heavy downfall or a hurricane is bound to come. How many will outrun it and reach a safe harbor? All steer for the same port, over the same course; the larger ones try to crowd their neighbors out onto the dangerous rocks—and the passage is only sufficient for one; both will founder as soon as the first squall strikes them.

The smaller crafts have ten chances to one in their favor; they can run full sail to the very last minute, since they can lower their entire sails in a moment, heave to and ride out the storm—damaged some, but still in sailing order. They have learned a lesson, and will henceforth so arrange their crafts that some other articles besides paving brick may be loaded, and in a pinch more than one harbor may be reached in safety.

The sum of this is, millions of paving brick are made and thousands of dollars will be lost by a lot of good, energetic and I would like to say brainy men; but I am compelled to be truthful, and must say foolish fellows!

In conclusion, let me say I did not choose this subject; it was assigned to me. I am an enthusiast on paving brick, but I have not reached that stage of enthusiasm to make them for glory and pay the freight on them.

The paving brick has come to stay; that is a settled fact, and, as in most other articles manufactured, it has been overdone in the start. But after the manufacture of paving brick will have adjusted itself to the demand, then, I think, there will be a living in it for some of us, like in other manufactures, only with this difference: that many dollars will always stay in it, for they are in "paving brick," and these are everlasting!

To give you an idea of the immensity of production, let me tell you: Galesburg alone has a capacity of one hundred millions of pavers per year, and it is safe to say that the capacity of the State of Illinois is five times that amount—a total of five hundred millions per year. This will pave about six million yards, figuring an average of eighty brick to a yard. Suppose that so much paving would be kept up only five years, it will amount to thirty million yards. Estimating the cost per yard at $1.30, it will amount to thirty-nine millions of dollars just for the

State of Illinois! Besides this large production, Indiana and Ohio are sending brick to Illinois in large quantities; furthermore, the asphalt and granite people are still alive, and intend to keep alive, they say. Is it possible that the cities can afford such enormous expense for street improvements?

Gentlemen, I will stop now to give you a chance to consider these figures, and give you all an opportunity to show this meeting how wrong I am in my statements, and that this is nothing but a wail of a pessimist!

J. B. McHose moved that all papers read be handed to the Secretary, and that he be instructed to arrange for such copies of the same as shall be needed by the press. Carried.

DISCUSSION.

Mr. Wolff: I think the paving brick industry is in its infancy. Our smaller towns will use more pavers in the future than in the past. The demand for paving brick is sure to increase from year to year for a long time to come.

Mr. Holman: This subject of overproduction is an important one, which it is hoped will adjust itself when the rains come again. We should do all that we can to increase the use of paving brick in the smaller cities and towns. Railway companies use paving brick for freight yards and their approaches and similar work, and we may aid in relieving the overproduction by introducing and encouraging the use of paving brick for these and similar purposes. There is much paving ahead to be done in this country.

W. D. Richardson: The origin of some plants is due to parties owning clay lands. These parties want to sell their lands at high prices, and in order to do this they interest other parties and encourage the erection of clay works. Small towns that want to do some paving try to keep their money at home and establish home industries, and encourage the erection of paving brick works. They do not consider that their home market will not consume the output of the plant. The result is that when the home paving for the time is completed, the plant is found to be without a home market and must seek elsewhere. Then they learn that they are badly located for transportation and facilities for reaching outside custom.

Carl Neis gave figures that showed vividly the overproduction in Illinois. He stated that the capacity of the present plants was greater than the demand would be even should Chicago adopt brick for paving and said: There are too many paving brick plants now. We have held for living prices and permitted buyers to go by to other places. We have put our good money into the plant, and cannot afford to operate at losing prices. We had better let the plant rot. We had better make three millions for a fair price than six millions to be sold at losing prices. The little plants are, as a rule, in better shape than the large ones. We had better go into some other business, and thus prevent overproduction, than to try to operate plants while prices are unprofitable. Millions of dollars have been sunk in the Mississippi valley within the last few years in the erection and operating of extensive brick plants. Machine and dryer men have encouraged the erection of new plants, but the paving brick manufacturers know that it has already been carried beyond the limits justified by the demand of the markets.

Max Wolff: Lumbermen and manufacturers of other goods go all over the country for their market, and so must the paving brick men. There are more States in the Union that cannot make paving brick than there are that can make them, and their paving brick must be drawn from those that can produce them. This will give work for all the plants.

BRICK PAVEMENTS THE BEST.

—By M. H. Underwood.—

Gentlemen of the Convention:

In every progressive city, and to the individual taxpayers thereof, this proposition is one of vital importance. Whatever may be the opinion of those present, it is a proposition the truthfulness of which is disputed by many, and against which the strongest arguments of the asphalt monopolist are being hurled. It has been well said, "Truth crushed to earth will rise again." I care not, therefore, how much may be said or written against this proposition—it can never be overthrown, and time will only make its truthfulness the more apparent.

PRES. M. H. UNDERWOOD DesMoines.

The age in which we live is one of progression and thought. Evolution and change is one of nature's laws, and man, a child of nature, is of necessity governed by this same law. Nature knows no inactivity, and humanity for idleness has no place. All is push and action, therefore, and in no one thing is this more manifest than in the means of locomotion. Steam is being supplanted by electricity; the scrub horse has given place to the thoroughbred, but to-day he and the standard-bred driver stand idly in the stall, for the horseless carriage and the bicycle have furnished a more rapid and a less expensive means of travel.

In view of these facts there has arisen from all over our land a demand for better country roads and for smoother city pavements. What, then, shall the material be?

The old wooden block pavements, like many of our clayworking machines, have had their day. Dry weather shrunk the blocks, and travel, while in this condition, worked them loose, causing a very rough and uneven surface. Wet weather soon rotted the blocks, and as a result all over the land they are condemned on sanitary grounds, and the general conclusion is, that class of pavements is dear at any price, and cannot at all meet the modern demands.

Iron has been tried in various forms, and in combination with stone and gravel, but in no instance has it given satisfaction as to cost or durability.

Granite and stone have been thoroughly tested, but, while they have proven durable, yet when weighed in the scales of our present needs they, too, have been found wanting.

Granite pavements are very expensive in first cost, and as there is no uniformity in the degree of hardness of the individual blocks, they do not wear evenly; the blocks wear off at the edge the fastest, assuming the "turtle-back shape," which makes the pavement the noisiest pavement made, and absolutely worthless for light and rapid travel for the electric carriage and the bicycle, while heavy loads on wagons with small wheels pass with difficulty, as the wheels are blocked continually; and the uneven surface is very severe on horses, causing them to fall frequently if driven faster than a walk, and many a noble animal has been ruined by the jerking of the tongue.

So many are the reasons against this class of pavements that it is now laid only because it will last, in this uneven state, under heavy traffic, and as soon as a fit substitute is found, it, too, will be a thing of the past. This substitute, we claim, is found in vitrified brick well laid on a concrete foundation.

In some of our cities, through the subtle scheming of large monopolies and the influence that money always exerts, it is claimed that asphalt will prove a fit substitute, and will give at the same time a smooth and even surface for the passage of the lighter vehicles. While these pavements are all that can be demanded as to smoothness, time is proving their defects, and is showing conclusively that they are too much affected by climatic influences to be laid with safety, and that they are absolutely worthless for traffic streets. A common sight that greets the eye of the traveler along these streets is the warning sign, "No traffic allowed on this pavement." Frost and snow cracks these pavements, and too often we find that when the snows of winter have passed away the smooth and even pavement of the fall before is filled with cracks and seams, along which the wheels cut a channel, and through which the water easily passes. As a result the pavement is soon destroyed, as these seams can never be repaired successfully, and in them filth accumulates, so that this class of pavements is not a success on sanitary grounds, being very absorptive also.

"But," its friends say, "being smooth, it is very easy on horses." As to this we only have to ask the opinion of the liverymen in any of our cities, and they will tell us that asphalt pavements are very slippery, especially when wet or frosty, and that, therefore, the horse moves with constant fear of falling; there is a continual strain upon him, and this soon stiffens him in all his muscles. And that when a horse is down on asphalt it is impossible for him to regain his feet without assistance. A friend of mine at Minneapolis counted fifteen horses down on Nicolett avenue one frosty morning last fall, and all of them were raised with difficulty. Enlarged knees are common as a result of this constant falling.

Again, these pavements are not a clean pavement, as they cannot be sprinkled without injury, and so marked is this that in Europe, we are told, asphalt pavements are never washed, but are swept dry in the night time, the filth and dirt being wafted by the breeze in through the windows of the residences along the street. Who can say that the germs of disease are not thus carried to the lungs of the unconscious sleepers?

The durability of this class of pavements depends on the climate in which it is laid, and the ingredients used in its construction. No city can tell, therefore, as it is being laid, whether it will be satisfactory; time alone can tell this. With brick this is not the case; each brick can be examined and tested before being laid, and if the bricks are found well vitrified and a suitable foundation is laid, there can be no question as to the durability of the pavement. With brick you pay your money and know just what you are getting; with asphalt you pay your money and take what you get.

Asphalt pavements will of necessity always remain in the hands of a monopoly as to the first construction and all future repairs. With brick this is not the case. There are many reasons which might be given to show that asphalt is not the best material for paving. Some of these reasons are very forcibly set forth in a letter to my company by a man whose position renders his opinion very valuable. I refer to J. G. Flagg, chief engineer of the city of Chicago. He says:

"Comparing brick pavements with asphalt, I believe that for general use shale brick, properly burned and of the right size, properly laid on a hydraulic cement concrete foundation, to be superior to asphalt as to its first cost, its facilities and cheapness for repairs, its sanitary qualities, its ease upon horses, and last, but not least, its durability. Properly constructed, a shale brick pavement, built of the best repressed brick, will last, if not disturbed, on streets of ordinary traffic, fifteen years with scarcely no repairs. As at present constructed, asphalt costs from four to eight cents per square yard to maintain. Brick streets will cost no more than one-half cent per square yard to maintain. Brick can be laid on a grade where it is out of the question to lay asphalt. Brick can be washed continually without injury. Asphalt, if kept wet, decays rapidly, and in Europe asphalt streets are never washed. Shale brick absorb scarcely any moisture. Asphalt, unless kept scrupulously clean, absorbs animal and vegetable matter. Brick, when wet (strange as it may appear), is not more slippery than when dry. Asphalt is always dangerous, and if wet is more slippery than when dry, and when a horse is down on asphalt it is with difficulty that he regains his feet. Brick are not more noisy than asphalt, and as it can be continually sprinkled, it is far less dusty. Brick streets can be built first-class for 33 per cent. less than asphalt, and as for maintenance, asphalt cannot compare with brick. If the manufacturers of brick will not rest until they have reached the degree of perfection I believe can be obtained for a paver, the paving brick industry will soon reach a tremendous height of popularity. Respectfully yours,

"J. G. FLAGG, Chief Engineer,
"Department Public Works, Chicago."

The Winnipeg Free Press, in commenting upon this question, says: "Weighing the pros and cons, the argument is decidedly with vitrified brick pavements. The following is given in the Third Report of the Ontario Bureau of Mines: 'A brick pavement, made of good material and properly laid, is almost everything a pavement should be. It is smooth and offers a minimum amount of resistance to the passage of traffic, and inflicts a minimum amount of wear and tear upon horses and vehicles. It has the advantage over asphalt that, while it is smooth, the small spaces between the bricks afford a foothold for horses and prevent their slipping. So far as sanitation is concerned, it leaves little to be added, as it can be washed continually without injury. It has none of the absorptive qualities, and escapes, therefore, the odium that attaches to wood of harboring filth and decaying organic matter. No pavement is noiseless, but in this respect brick comes next to asphalt, and far excels granite, being void of the "bumpiness" that characterizes the latter. It is easily laid and easily taken up and replaced when underground repairs are necessary. As to durability, it is everywhere the opinion that brick is not excelled by any other material.' "

Continuing, the same editorial says: "Perhaps better evidence is found in favor of brick pavements in the experience of towns and cities having tried it for years." Then, referring to some twelve towns by name, it adds: "From all these come verdicts of perfect satisfaction. Judge Thayer, of Clinton, Ia., says: 'For heavy traffic there can be no superior.' "

The Free Press then gives in detail a letter from the chief engineer of Chicago. I mention only a few of the points made that are not in the letter above quoted. He says: "Brick pavements have been in use in the United States for over twenty years, and wherever properly laid have never failed to give perfect satisfaction. As to first cost it stands next to wood; first as to ease with which it can be repaired; first as to cost of maintenance; first as to durability under heavy traffic; third as to noiselessness; second as to freedom from dust; first as to freedom from decay; second as to freedom from absorption, being next to granite; and first with granite for affording a foothold for horses, and second as to ease of traction."

The Free Press adds: "The C., B. & Q. railroad, of Chicago, experimented with all kinds of pavements and finally used brick as the best, and found that after a tonnage of 12,500 tons had passed over it daily for four years not a single brick had been broken."

In St. Joseph, Mo., brick has been used under heavy traffic for eight or ten years, and shows scarcely any wear, and gives perfect satisfaction.

City Eingineer L. W. Rundlett, of St. Paul, says: "I was told it was a slippery pavement, but find this is not true. I drove a horse at full speed down hill on a wet pavement to determine this, and have watched teams hauling heavy loads, and am satisfied with the result. It is as easy on horses as cedar blocks are, and ten times as durable. We have tried asphalt and do not find it durable enough; it will not stand the winter weather, and it is so slippery that we have to sprinkle it with sand after every snowfall."

The Iowa State Register of Jan. 19 says upon this question: "Des Moines had a narrow escape from a failure in street paving through the efforts of interested parties to force asphalt pavements upon this city's streets. But the asphalt combination was able to induce the City Council of Minneapolis to order asphalt pavement, and a recent issue of the Penny Press of that city thus tells the certain result of constructing asphalt pavements in any city where the ground freezes deeply. It says: 'The chilly condition which existed last night played havoc with the asphalt pavement laid by the American Asphalt Company last fall on Nicolett avenue, and as a result the cushion between Seventh and Eighth streets looks like a map of South America, with the rivers and mountains depicted thereon. Very large cracks run from sides to center. This particular block suffered most, but in other places the damage was extensive.' "

W. A. STEVENS, Ottumwa.

The city engineer of Minneapolis, in speaking of it, said: "It is my opinion that the work done on our streets is as good a job as it is possible to have done, but the severity of our winters is too great for almost any kind of pavement." "As good a job as it is possible to have done," testifies the city engineer, and "cracks running from sides to center," declares the local paper, and all who have seen the pavement corroborate the statements. What more need be said against this class of pavements or to show that asphalt is not the best, especially in any locality where the mercury falls to zero?

So we might multiply illustrations, did we deem it necessary. Suffice it to say that from all over the land, wherever brick has been tested, comes the same corroborating testimony as to its fitness and durability. We have yet to hear of a single place where the proper material has been used and the proper foundation laid where brick pavements have not given perfect satisfaction. While from all around us comes the same testimony as to the unfitness of asphalt for traffic streets in any locality, and for any street in cold climates. And we say that all that is necessary to insure the future of brick pavements is for brick manufacturers to see to it that not a single brick leaves their yard that is not up to the standard. It costs money to burn brick to a state of vitrification, but good and expensive seed must be sown if we would reap a bountiful and certain harvest.

The patrons of the brick manufacturer can materially assist in this matter by allowing living prices, and by a just discrimination between bricks that are suitable and those that are not. Bids upon an inferior article should not be allowed to come in competition with those on a superior article, and all bidders should be required to use the brick from which the samples were selected, which is not now the case. If all bricks used were equal to the samples furnished, no man would ever live long enough to see the pavement worn out.

Let all work together for the best. When this shall be done, then will brick be acknowledged by all as the only suitable material for all climates and conditions, and for all kinds of traffic.

Then adieu to granite, asphalt and wood,
  They are tried and each found wanting;
For our present needs they are "no good"
  For traffic or a pleasure jaunting.

The asphalt street is smooth and neat—
  Like the speech of those who make it—
But the frost and snow will carry woe
  To all who are led to take it.

Thrice welcome brick! it can't be beat
  For light or heavy travel
When it is laid on a bed well made
  Of concrete, on sand or gravel.

Each brick well burned, with corners turned
  To prevent the edge from chipping,
And to make a hold, as we are told,
  To keep the horse from slipping.

And when thus laid, the wheels of trade
  Along a street may rattle,
Yet, when three decades have their records made,
  It will be good for another battle.

DISCUSSION.

Mr. Billingsley: I have derived a peculiar satisfaction from the reading of this paper. I read the first paper on this subject before the National Brick Manufacturers' Association, several years ago. Some thought me an enthusiast. This paper verifies my predictions.

Mr. Richardson: This is the best presentation of the subject that I have ever listened to. Such literature will greatly aid the business of brick paving. Minneapolis is peculiarly in need of such instruction, on account of the recent influence and efforts of the asphalt people there. Minneapolis, like all other cities, wants the best, but she don't seem to know what is best. We of Cleveland have advanced beyond this stage. In our county (Cuyahoga) the roads are being paved with brick, and it will be done here before long. We have a special law that permits assessments of taxes for this purpose.

Mr. Holman: The city engineer of Minneapolis recently said that the new asphalt pavements were in need of and had to be repaired within six months after being laid, and were not giving satisfaction. They are very slippery in winter, and when wet are not adapted to northern climates. One gentleman counted no less than fifteen horses down in going from his home to his business. Many of them were raised with difficulty.

TAXING TILE ON HAND.

Mr. J. M. Keerns asked for information as to listing stocks of tile and brick on hand for taxation.

Mr. Goodwin: It was decided in the District Court, in the case of the Iowa Pipe and Tile Co., that stocks could not be taxed, but I think the case has been appealed.

The Secretary read a letter from the Carbondale Fuel Co., of Des Moines, in which the members of the Convention were invited to visit the mines of the company, and a special train was offered for the convenience of those who would go. On motion a vote of thanks was tendered the manager, Mr. Thomas L. Wood, for the invitation, and definite action upon the invitation was deferred until near the close of the Convention, on Thursday.

The President appointed J. B. McHose, D. W. Stookey and T. E. Haines a Committee on Resolutions.

THE MODERN BRICK PLANT.

—By W. H. Stevens.—

To build and operate a modern brick plant under the most favorable conditions is not so easily accomplished as it sometimes appears to persons not schooled in the art. To be successful in this, as in most any other business, requires experience and the exercise of sound judgment both in its construction and operation. I shall not attempt to make a detailed account of the improvements that have been made in brickmaking even in my time—and I am comparatively young in the business. That there has been very great improvement, both in quality and in cheapening the cost of the product, is very perceptible. These results have been obtained through the experience of men long engaged in the business, and the introduction of improved kilns for burning. During the short length of time that I have been engaged in the business I have made some observations which I am sure would be profitable to me should I build another plant.

All well-built brick plants are by no means successful. They may lack in skillful management, or in some of the natural elements that are very essential to the business—oftentimes both. We all know that it would be folly to build a brick plant without first demonstrating that we had the best and the most easily accessible clay for the kind of brick we desire to make that there is anywhere in the vicinity. We must have plenty of water available, cheap fuel, and a market in sight for the output. If either of these requirements is lacking, it will be very difficult to make a financial success of the plant.

If I was building a new plant I would certainly make it as nearly fireproof as possible. It is true fireproof buildings cost more in the start than the ordinary wooden ones, but when we consider the high rate of insurance that we are compelled to pay, not only on the buildings, but on the machinery as well, we find the difference in this item alone will soon cover the difference in the original cost of the building, besides the satisfaction we have in feeling secure from loss by fire is worth a great deal to the average brick man. Having had some experience in this line, it has probably had the effect of influencing me into favoring the fireproof buildings.

It is not my purpose to advertise anybody's brick machinery or kilns. In all of the Conventions that I have attended there have been a number of gentlemen well skilled in this profession and waiting an opportunity to impart information on this subject. This Convention, I presume, will be no exception in that respect. I will say, however, there is plenty of good machinery on the market, and great care should be taken to equip your plant with the best. You will find the best none too good when it comes into practical use.

I believe artificial heat has been adopted by nearly all modern brick plants for drying brick. I do not know who has the best dryer, but I would recommend the use of artificial heat for that purpose and leave the selection from the various kinds of dryers in use to the parties building the plant. They are as liable to guess the right one as I would be. It is very important, however, that a good dryer be selected. The kilns should also be of the very best.

After all is said, the selection of the machinery, dryer and kilns, and in fact the building and arranging of the whole plant, depends on the character of clay and the kind of brick desired to be made. The superintendent of the works is a very important factor, and great care should be taken in selecting him. He should be more practical and less theoretical than the average expert. He should be a practical and experienced brickmaker, and bring no pet hobby or wild theories with him, and feel that on him depends the success of the plant, as well as his own success. He should be on the ground when the first stone is laid for the foundation of the plant, and be consulted on all matters of importance until it is completed.

See that the machinery is properly arranged so as to utilize it to the best advantage, and when the plant is completed, and he is found to be the right man in the right place, he should have charge of it in detail from the time the clay is gathered until the kilns are burned and closed, and come as nearly as possible living at the plant while it is in operation, and if he is as successful in the end as he would deserve to be, there will be a crown awaiting him, and a satisfactory dividend will be the reward of the proprietors of the "Modern Brick Plant."

DISCUSSION.

T. E. Haines: I went to two or three factories before I built. I employed an expert burner; he was all theory; he turned out about half well-burned and half soft.

Mr. McHose: My idea of a modern brick plant is to build it a little different from what we have it. (Laughter.)

CLAY.

—By J. B. McHose.—

Fellow-Clayworkers:

J. B. McHose, Boone.

The subject assigned to me, is, I believe, the most important one with which our craft has to deal. It is the first one that the operator is called upon to investigate when he would locate a plant. He must have it uppermost in his mind at every step of his progress. His methods of making, drying and burning are all vitally concerned in the quality and peculiar characteristics of his clay. Even after his plant is, as he thinks, completely established and equipped, he must continually revise his methods and readapt his machinery to newly-discovered attributes of his clay.

We have all seen operators who thought that clay was just clay, and a subject too trifling for their attention and abilities. These persons vainly imagine that their success depends upon the particular make of machine they are to use, or upon which is the best dryer or which is the best kiln. Yet each of these problems, and many others, are dependent wholly upon the nature and peculiarities of the particular clay to be worked.

To the casual observer clay is a very simple material and needs but certain formal manipulations to produce a finished brick, tile or other product. But in truth it is one of the most variable and subtle of substances and in manipulation develops the greatest diversity of characteristics.

—What Is Clay?—

A little reflection upon what clay is, how it was formed, and the many varied and long-continued influences which have acted upon it throughout the vast ages of the past, in fact, ever since the first crust of the earth was formed, will tend to prepare the mind for the wonderful variability of this material.

The word clay has no more definite meaning than that it is a plastic kind of earth and it is composed of a great variety and indefinite number of elements, very few of which are always found, and none of them in any given proportion. To have plasticity, it must contain Alumina and the plastic nature is due to this element, but the amount of Alumina will vary from a very small per cent. to nearly the whole. Silica and water are always to be found in clay, but in equally indefinite proportions. All the other elements of the mineral world may be found in it or may be entirely absent.

If the entire solid portion of the earth's surface, from the soil to the lowest rocks inclusive, were ground up and mixed together, the product would be clay. This is exactly what nature has been doing for us in all the unnumbered ages past, and she has not ceased in her work even now.

If nature had stopped here, after grinding, mixing and weathering the clay, we would have a material somewhat different, perhaps, from the clays we are accustomed to handle and containing elements not generally found in our clay beds. But it would have a uniform composition, and whatever might be the characteristics of this clay, once they were mastered, no further doubt or experiment would be necessary in the clay business. To such a clayworker it would be as if all the present clayworkers were working from one homogeneous bed of clay. The methods and experience of one would of necessity become the methods and experience of all. As there would then be no varieties of clay so there could be no variety of product except such as could be made by mere burning and manipulation.

But nature, in her creation of our beds of clay, did not stop here, neither did she mix all the various strata together into one common mass. As soon as the first crust of the earth appeared, nature commenced her work of destruction and of re-formation. The various elemental forces acted upon and disintegrated these rocks, and the materials were carried to places more or less remote from the place of their origin, by wind and wave, and in their journey were worn and ground to finer particles. Some of the soluble parts were held or carried away by the action of the water—the coarser particles being first dropped, and the finer carried in suspension to more quiet waters, forming beds of finer clays. As these beds became exposed above the water, vegetation also assisted in the work of separation, and of extracting various elements from the clay, and in its turn forming those vast beds of vegetable origin which we know as peat and coal.

But nature is never satisfied with her work, and she as ruthlessly destroyed these later formations as she did the earlier ones and kept constantly at work grinding and sifting and transporting and depositing all the various rocks and strata which had been formed. As all these formations differed more or less from each other, both in the material of which they were composed as well as in the physical condition to which they had been reduced, so the beds of clay must likewise vary and be variously affected by many influences since then.

Some clays have been formed by decomposition of the rock as it lay in its bed, by the water dissolving the binding material and carrying it away, leaving the clay in position very much as the rock lay. In this way our purest clays were formed. Others as they were decomposed were carried away by floods and deposited many hundreds of miles from the parent rock or ledge, to mingle perhaps with clays from many different rocks.

—Clays of Iowa.—

Nearly all the surface clays of Iowa, in some places hundreds of feet in thickness, have thus been carried by either flood or glacier far from the place of their origin in the north, and covering up the former surface of the State. The sifting of these clays in their progress over the State from north to south is quite noticeable. In the north we find, as we might expect, that the coarser clays, sand, gravel and boulders were first dropped by the mighty agencies by which they were transported and the finer clays were held and carried to the south. Thus, while in the north even common brick clay is found only where the beds have been modified by subsequent action of the elements, and then quite sparingly, in the south vast beds exist, extending over many counties, of great fineness and entirely free from gravel or other coarse particles, and the approach from these extremes is quite gradual.

—Hard Clays.—

Many clays laid down in the earlier ages have by pressure and lapse of time become indurated or hardened so that they partake much of their original or rocky nature and can only be obtained by the use of explosives and reduced by the heaviest of modern machinery.

As the softer surface or drift clays were in general more accessible, and capable of manipulation with simpler appliances, they have in the past been more generally resorted to, to supply the more common needs of the people. But a better knowledge of the value of the harder and finer clays together with better facilities for working them have latterly given a wonderful impetus to their use and an unprecedented investment of capital.

—Classes of Clays.—

In this State the classes of workable clays are, in the main, but two—the drift, or surface clay, and the carboniferous clays. Some other classes might be named for small areas, notably in the northeastern part, but it is not to our present purpose to follow them more specifically.

The drift clays cover most of the State, as already indicated. The carboniferous clays extend in general over the south two-thirds of the State more or less completely. The drift clays cover the carboniferous from a few inches to some hundreds of feet in depth. In places, therefore, these beds are easily worked; at others only by extensive stripping, while in many places they are practically inaccessible.

—Their Chemical Nature.—

A few words now as to the chemical nature of clay. It has already been noticed that alumina and silica, with water, are always the necessary elements of clay, but in no constant or regular proportion to each other.

Alumina is itself a compound of oxygen and aluminum, the latter being that valuable metal which of late years has been attracting so much attention. It is to this metal, therefore, that we must ascribe the most valuable properties of clay—its tenacity and plasticity—and in a general way these properties are increased as the proportion of this metal is increased in the clay. But it is never found free or pure in nature, but usually in combination with oxygen, when we call it alumina. In a brick made of clay fairly rich in alumina, for which we are glad to get a cent, we deliver enough of the metal of aluminum, if it were separated, to weigh one-half a pound and of the market value of say twenty-five cents. Thus are we benighted brickmakers getting only one twenty-fifth of the value of the aluminum in the brick. The only error in our estimate is that the brickmaker has not separated the metal from the 90 per cent., more or less, of other material, which process alone gives this metal its present value. Were it not for the difficulties involved in getting it pure, it would be one of the cheapest metals, as it is in the earth the most abundant of all.

Silica is also a compound of silicon and oxygen, and may be understood as the sand in the clay.

—Proportion of the Elements.—

It has been estimated that the known crust of the earth is made up in about these proportions: Oxygen, 45 per cent.; silicon, 25 per cent.; aluminum, 10 per cent.; leaving but 20 per cent. for all the other elements combined. The three named, therefore, constitute three-fourths of all.

From an analysis of a large number of clays, but most of them carboniferous, we learn, after averaging one with another, that alumina, silica and water make up about 85 per cent. of the material, leaving 15 per cent. for lime, potash, soda, iron and other impurities, and these proportions may be taken as fairly typical of the clay elements and its impurities. Yet, as before stated, they will be widely different in different specimens.

—Fire Clay.—

Clay with a low percentage of these impurities, and more especially of potash, soda and iron, are fire clays. Alumina and silica are practically infusible, but the presence of even 3 per cent. of potash or soda renders the whole mass easily fusible. The presence of lime, iron and magnesia has a similar but not equal tendency. But while the presence of these so-called impurities are undesirable and, if in a considerable degree, inadmissible, in a fire clay, they are absolutely essential where vitrification is desired, since a true fire clay will not vitrify, and the ease with which a clay will vitrify depends in large degree upon the percentage of these respective materials, called fluxing agents. Thus vitrification and the economy of fuel are dependent upon the percentage and kind of these agents. So we see that what we have just denominated impurities are, when speaking of clays other than fire clays, not only not impurities, but when in proper proportion to the rest of the material, only proper elements, and actually as necessary as the alumina or silica themselves. A clay can, however, have so large a percentage of fluxing materials as to make it too easily fusible, whereby it becomes difficult or impossible to burn safely.

—Names of Clay.—

Attempts have been made to classify and give names to the different varieties of clays. These names, useful in some respects, can give very little information as to their properties or workable nature. We have often referred to "drift" clays, but the term has reference not to their characteristics, but to their origin and deposit. These clays are found in endless variety, those from one locality presenting little similarity to those of another, and those of the same locality may, and generally do, present numberless varieties in the same bank at different depths. Those called carboniferous refer to the age of the world in which they were deposited. These also have a wide range of characteristics. The terms shale and fire clay are terms supposed to denote certain well-known attributes, yet there is no certain dividing line between these important clays, and there are clays that can as well be classed with one as the other. We thus discover that the very names of clay are elusive and afford no data upon which to predicate its practical working qualities. A chemical analysis affords but little more light to the operator, but will, if rightly understood, give him some valuable suggestions. There is more in clay than the elements which compose it. It may have just the elements by analysis which would make a good clay, but fail in the practical test. The physical condition of these elements has an important influence in the production of the ware.

Max Wolff, Chicago.

—Testing Clay.—

There is but one way to really know the value of a clay, and that is by working it up and burning it under the same conditions that the ware is to be subjected. Anything less than this may lead to the most disastrous consequences. The man does not live, no matter how experienced, who knows either from inspection or chemical analysis what a given clay will do when treated in the usual way for making ware until he has thus tested it. He may make a good or a poor guess, but it is only a guess, backed, it may be, owing to his experience, with some probability. In fact, it has come to this: that when a man decides dogmatically what a given clay will do before it has been tested, it is an unconscious admission that he is not a master of clayworking. In our conventions and journals there is a vast amount of discussion about methods of making, drying and burning which is, in fact, but a discussion of the peculiarities of some one's clay, but supposed to be the attributes of all clay. Every clayworker should thoroughly understand that his clay is almost certainly different from anybody else's clay, though there be many appearances in common. That the rules and methods that should be followed in one clay are in their entirety almost certain to be useless in another.

We have seen how clays have been formed from different kinds of rock, of different composition, decomposed by different agencies, transported and deposited in a variety of ways, mixed together, sifted, separated in endless fashion, and since subjected, in different degrees, to time, pressure, chemical and solvent action, with an ever-differing chemical and physical nature. Is it strange, therefore, that the clayworker finds many complications and perplexities?

Observation, experiment, test and analysis are means by which the clayworker must work out his own salvation. He must work it out himself, and with his particular clay. The experiences of other clayworkers are good as suggestions, but as suggestions only.

—Finally.—

The biggest question connected with the clay business is clay, and it is the last, as well as the first, great concern of the craft. But there is yet one ingredient necessary to proper and successful work. In one respect this ingredient is like aluminum—it is never found free in nature, but it must be supplied by each and every operator for himself. You must mix brains with your clay. Unlike any of the other elements mentioned, you cannot get too much.

A vote of thanks was tendered Mr. McHose for his instructive paper, in spite of an objection on his part, he arguing that such compliments were not in order, unless, perhaps, in the form of a resolution at the close of the Convention covering all papers and addresses.

No attempt was made to discuss Mr. McHose's paper; the idea prevailed that he had covered the subject so thoroughly that there was no need for further remarks.

There was some talk of holding a night session, but it did not materialize, and the session closed.

THIRD SESSION.

Thursday morning, at 9 o'clock, the Convention was called to order by President Goodwin, who announced the regular order of business according to the programme.

DRYING CLAY WARE BY HOT FLOOR SYSTEM.

—By C. J. Holman.—

There is probably no business carried on in this country as extensively as the brick industry—that is so diversified or so dissimilar in method and operation as brickmaking. From the old sand-molder brick to the dry clay, scarcely any section of country can claim that a particular kind of brick prevail. Even when one kind (it may be the soft mud) is well established, the brickmaker changes his machinery, and the "side-cut or "end-cut" takes the lead, only to find the dry clay brick soon in sharp competition. But through all the different systems the principle is the same—they must be dried; they must be burned; the clay must be tempered or prepared.

Our Secretary has assigned to me the duty of preparing an article on one method of performing one of these operations, "The drying of brick by hot or dry floor system as it is known to-day."

Perhaps the first hot floor that was ever used (we have not tried to fix a date) was a good dry-yard a hot day—at least this was our first experience. But as the days are not all to the brickmaker's liking, rains and storms coming in their season, it became one of the necessities of the trade that a section of this floor should be taken in and placed under cover, that the work might go on during unfavorable weather. Especially has this been the case since the industry has made such rapid strides as it has during recent years. To do this the first and most natural way was the use of furnace heat, placing furnaces at one end of a building and connecting them to chimneys in the rear by small brick flues, covered first with brick and then with clay and sand; and, if properly constructed, should be well rolled and made hard and smooth. The furnaces are located across one end by excavating the earth to a sufficient depth to be below the level of the floor, the fire leading up and into a heated or cross flue, from which it enters into the small conductor flues running the entire length of the floor (which may be one hundred feet long and perhaps forty feet wide). A large cross flue at the rear end, raised somewhat higher, conveys the smoke to the chimneys, usually two or more in a floor of this width. The flues should be built with an incline upward of three or four feet in one hundred, and the clay at the furnace or lower end made thick enough to equalize the heat the entire length. This floor is now used quite extensively, but is always expensive as a means of drying brick, and seldom built to a capacity to meet the requirements of the yard adopting it. It is also a source of danger from fire, and sooner or later will be converted into the tunnel dryer, or be remodeled and rebuilt for the use of steam.

While the dry floor does not furnish a complete system of drying brick, it may be made very useful as a help in connection with either pallets or sheds when builded for steam heating. There are several methods of construction for this purpose. Steam pipes may be used and covered with brick clay; also, an open brick floor covered with cement; but the particular style of which we wish to speak at this time, which is quite inexpensive in construction and operation, is made of hollow brick or terra cotta lumber, such as is commonly used for partitions, laid flat and covered with Portland cement. To build a floor like this —say 40x100 feet—the ground should first be made level and smooth and well rolled, giving a decline of 12 inches in the length, the brick bedded in mortar as they are laid on the flat side (a preferable size being 12x12x4 inches thick), with two partitions laid end to end, the holes running lengthways of the building. Holes should be cut every 16 feet in the ends of two rows, one-half in each brick at the joint, for the introduction of the steam, breaking joints occasionally, the floor laid in halves, making two parts each 20 feet wide, the whole covered with one to one and one-fourth inch of Portland cement. The steam or exhaust pipe enters the building in the center of one end, about 6 feet above the floor, running to the last opening, 16 feet from the lower end. Smaller pipes convey the steam down and enter the floor at each of the 16 feet openings, with a short "T" cemented in and directed each way; also small pipes leading across to each side of the building, and entering the floor in like manner from above. A floor of this kind can be heated with only exhaust steam, and the drying of the brick costs nothing, unless live steam is used at night to shorten the time. The back pressure is very slight if the floor is provided with sufficient openings at the lower ends.

Setting the brick on their ends, a floor of this kind will hold 40,000 brick, and requires two days to dry and one day to take out and refill, exhaust steam only being used. Where more than one boiler is used two floors of this size may be used alternately, or by dividing the exhaust both floors can be kept hot at the same time. The advantage of this style of floor is that the heat being close to the brick, it warms up quickly, holds the heat well over night, costs less in construction than furnace floors, and the expense of drying is reduced to nearly nothing—an item that most brickmakers will appreciate since our "financial crisis" of the last three years.

Any improvement or outlay made upon a brickyard which, when once adopted, is attended in its operation with a minimum expense may be classed as successful in proportion to its capacity, whereas the same expenditure when it is the source of continual outlay and expense will very soon meet with disfavor and be cast aside and replaced with other methods, always adding still more to the wrong side of the ledger, which is, unfortunately, an item of too common occurence with the brickmaker's books, and should be well considered, to the end that any and all improvements that may be introduced or made upon the yard should form a complete and permanent character, thus being the means of both improving and cheapening the product.

DISCUSSION.

Max Wolff: What would be the expense of building such a dry house as you describe of 40,000 capacity?

Mr. Holman: I do not know exactly, do not remember just what mine cost.

Mr. Wolff: In your system you have to handle your brick three times; from the machine to the barrow, from barrow to hot floor, and from floor to barrow, when setting kiln. The more you handle brick the more you mar them. Handling so often injures the quality of the brick. You spoke of the cheapness of drying with exhaust steam only.

Mr. Holman: The exhaust steam during the day heats the floor and it stays warm all night.

Mr. Wolff: Tunnel dryers are much cheaper now and can be built for much less than they used to cost.

C. J. Holman, Sargeants Bluff.

Mr. Carl Neis: I use a hot floor. House is 80x73, and holds about 65,000 brick. It cost me a little over $2,200. With my outfit I can get brick from machine to kiln cheaper than those with modern dryers. But on account of other considerations I think I would employ tunnel dryers if I were starting again. I knew more when I started than I do now. I argued that we would not use heat as economically with steam as with the direct furnace. I argue that yet, but I have learned that heat cannot be distributed as well as with steam and the matter of the distribution of the heat and the application of it at the proper place is very important. My brick are beautiful and smooth when taken from the machine, but we run them lively when the weather is good. They are injured some in the handling, and when the floor is not clean the ends get stuff from the floor on them. The men handle five brick at a time, and by the time they get to the kiln the brick are defaced. When the paving brick business will pay I will have a tunnel dryer that will enable me to handle brick conveniently. I made a mistake in making a dry floor. I would like to ask Mr. Holman about retaining steam in the terra cotta lumber of his floor.

Mr. Holman: My floor tile are not terra cotta lumber made by mixing sawdust in the clay, but are hard-burned hollow blocks. The floor is well cemented over, making it tight, smooth and hard.

Mr. Lewis: The Secretary instructed me to prepare a paper for small plants and common clays. All the papers that we have had related more directly to large plants and paving brick.

DRYING DRAIN TILE MADE FROM TENDER CLAY BY TUNNEL AND CAR SYSTEM.

—By Wm. Lewis.—

Mr. President and Members of the Convention:

It is with a great deal of reluctancy that I undertake to write an article on a subject that I know so very little about. But our worthy Secretary informs me that there are few, if any, in the State that have attained the success that we have in using a tunnel dryer on a small plant with common yellow clay. While I was not aware of the fact that we were an exception in this line. I do feel if we are I am willing to give what information I can to help any other member of the craft.

If it were possible for me to condense the experience of those present at this Convention who are engaged in the manufacture of brick and drain tile and publish it, it would make a very large volume. And I do not know, then, that it would be of any benefit to a person that was about to engage in the business, only this far: it might give him some idea of what he would have to contend with; but as far as real knowledge was concerned, it would not amount to anything.

I know of no other business that a man can engage in that offers so many different experiences as does the brick and tile business. This is largely due to the difference in clays. A tile or brick manufacturer, with the experience of years, working with success, might, with another clay, be almost as an apprentice in the business.

There are several things that are essential to make the business a success. The first and most important one is good clay. And that clay may be of the very best and make excellent brick or tile, but it might be very difficult to dry. This subject has brought more gray hairs to the honorable heads of those engaged in the business than anything else. Every clay has its peculiarities, and every man engaged in the business has got to handle that clay in a way to get the desired results. If your clay will stand drying in the sun or open air, when newly made into tile, you are in luck, for when you want to dry that clay by artificial means you can rest assured you will not have trouble in finding some plan by which you can dry it.

The car and tunnel system is the more practical way of drying drain tile; in fact, in our case it is the only way we could dry them with any success. It is in the saving of labor, as this is where the bulk of the cost comes in. The material costs very little, if anything, and if we can cut down that expense to a minimum we have accomplished a great deal toward the success of the business.

I will say right here that we can dig the clay from the bank, haul to mill (about 300 feet), and make it into 1,500 three-inch tile and set that many in the kiln in one hour with seven men. If any member of this Convention has any way by which he can do any more work than this, I would like to have him call me aside and give me the combination, and if he has a monopoly on it I will pay him something to get in on it. We have what is known as the down-draft dryer, and I know of no other dryer that has down draft. It works much the same as the down-draft kiln; the heat and vapor passes out of small flues placed about 12 fect apart in the tunnels. In an article in some of the clayworking journals some time ago I read something like this: "Oh! that dryer! Is it not a thorn in the side of many brick and tilemakers, with especially those who have adopted the car and tunnel system?" And he goes on to say that it had proven so in his case, and that with the narrow passageway and insufficient ventilation it is a failure, and he further states that it is an easy matter to dry the ware, but not to get rid of the vapor. He also complains about the goods warping and twisting out of shape. Now, while I have all due reverence for every one engaged in the manufacture of brick and tile, there appears to be something lacking in some of them. If we had continued to use the tunnel dryer as we were instructed by the parties that put it up, it would have proven a failure in our case also. Not that the builders did not know how to use it, but with the experience we have had we are in better shape to get the desired results than anyone else would be by trying it only a few times.

I do not want to put myself on record by saying that ware will not warp and twist out of shape in a tunnel dryer, but I will say that we have never been bothered any on that line. And as far as the vapor is concerned, it has always taken care of itself.

In our case, with reasonably good sheds and natural drying, we could not take out of our sheds more than 75 per cent. of good tile. At one time the past season I remember of our men reporting only the loss of 29 tile out of one dryer full of 10,000. While this is very likely less than the usual amount of culls, it very seldom ever happened that there were more than one common wheelbarrow load if everything was working right about the dryer.

I stated in the first part of my article that we could make and set 1,500 three-inch tile in one hour. Do not understand that we set the tile in the kiln the same day that we make them. We have men taking out at the same time we are making. With two men in the clay pit, one man to feed the mill, one to take tile from cutting table and set on the cars, one man to keep engine going and put empty cars in place and look after loaded ones, putting them in the tunnels, and two men to empty dryer, this makes the complete list, and it is a very nice gang to run on a small plant. There is no trucking done at all, as there is with natural drying or with hot floor system. By this system you have a saving of two or three men, and have much better quality of tile, as they are handled only by one man when they are green.

I have given you a few points that are in favor of a car and tunnel dryer. There are surely many others, but as I am not an agent for any dryer I will turn the prospective purchaser over to the tender mercies of the agent. Let me say, if you are contemplating adding a dryer to your plant, make up your mind what kind you want, then ship or haul an average load of your clay to that dryer and go with it and see it tested yourself. There is no one that will refuse you that privilege, I think, and it may save you some money.

The machine and dryer men are all good fellows, but remember they are not on the road for their health. Their business is to sell and get a settlement as soon as possible; and it might surprise you how soon they will have business at some other place when the settlement is made. I have not tried to explain to you how tender clay can be dried in a car and tunnel dryer, but have only tried to give you some of the points in favor of it, and it remains for you to say whether your clay can be successfully dried or not. There is too much difference in clays to admit of one man telling another how to do something that he cannot do himself, when he knows nothing about it.

There are three things essential to be successful in drying tile with a tunnel dryer: First, good clay; second, good judgment; third, get a dryer that you think will do the work all right and experiment until you get the desired result.

DISCUSSION.

Max Wolff: How long does it take to dry the tile?

Mr. Lewis: Twenty-four hours. We use live steam day and night.

Max Wolff: I think he ought to use exhaust steam in the daytime and live steam at night. The exhaust steam will not crack the clay in day time.

Question: Will your clay dry by air process without cracking?

Mr. Lewis: We have to close the dry room for three days to dry with air without cracking, but with the dryer we can dry them in twenty-four hours.

Mr. Haines: It depends on the clay. I have had more loss in drying than in any other way. I use no artificial heat, but my clay will crack if forced. I don't understand how exhaust steam will be moist passing through iron pipes.

Max Wolff: Exhaust steam is not so hot, and it consequently throws off less heat, and the tile will not dry so fast, and the moisture passes off slowly. The dryer must have ventilation which you can regulate to suit you clay. The drying is done by absorption.

W. W. Lewis, Williamsburg.

D. W. Stookey: I don't believe it, this thing that exhaust steam is more moist than live steam. What does he mean by drying by absorption?

Max Wolff: The heat absorbs the water.

Mr. Stookey: That don't wash in this age of the world.

Mr. Underwood: Every brick has a certain amount of moisture. We have to get rid of it, and as soon as we get good ventilation, then we succeed in drying our clay.

Mr. Sidney: I don't know what Max means by absorption, but we know that the temperature must go up to 100 degrees before we can dry successfully. When we shut off the circulation, then we do not dry so fast; but we have some clay that we have to dry slowly or the clay will crack. Heat is heat; that is all there is of it. We turn on live steam to raise the heat; the clay will only stand a certain degree of heat.

Max Wolff: I built a dryer at Fonda for Straight Bros., where we have to use exhaust steam or the clay will crack.

Mr. Neis: I was formerly a builder, and my experience in that line tells me there is a little difference between exhaust and live steam. A house heated with steam becomes too dry for comfort. The hot water system of heating dwellings is an improvement over steam because the heat is more gentle and healthful. In a house heated by steam the furniture will crack because of the excessive dryness. So I think there is a difference between live steam and exhaust, in that one is hotter, or, as some say, dryer than the other.

Mr. Richardson: If the exhaust heat is used at the end where the brick enter the kiln, the brick will not crack. We have a strong circulation at the delivery end of the dryer, and the brick do not check. Much depends upon the clay and the air, whether dry or moist. In watersmoking in a down-draft kiln the moisture passes through the lower brick. We use a strong draft to give best results.

Mr. Lewis: Our steam pipes are fastened on the wall, and we have cold air pipes, which admit cold air, and then the cold air passes out through the ventilators. We must keep up the circulation.

Mr. President: Mr. Richardson is right. We set our brick three on three, forty high. We tried to dry the brick, and they would crack. It would take from ten to fourteen days, and then dump eight or nine courses. I then set the brick wider, and the draft was increased, and they would dry in a few hours, and they were perfect brick. We regulated the circulation by platting on top as the drying advanced, but it took more fuel; so we went back to closer setting, but we control the draft by platting. I am now putting in a tunnel dryer for dry press brick.

SEWERS IN SMALL TOWNS — THEIR NECESSITY AND BENEFIT.

—By W. D. Lovell.—

The topic assigned me, "Sewers for Small Towns, Their Necessity and Benefit," is so suggestive of unpleasantness that I fear for the comfort of my hearers. However, if this address becomes unbearable we will give it an airing through the press and permit the next speaker on the programme to improve the atmosphere by the excellent paper on "Clay."

My topic is comprehensive in its extent. I am inclined to call it a "combined system," as it includes all that is good and bad, yet looking at it from the "greatest good for the greatest number," my topic—not my paper, understand—is among the most important on the programme.

In the last few decades much has been learned of the relation of sanitation and disease. Some of our brightest minds are filling a God-given mission in making clear the laws which govern public health and in devising means of making unthinking and unthankful communities healthier and necessarily happier.

This work, in a practical way, consists in bringing them a supply of those things which promote health and in carrying from them those things which injure it. For the promotion of health wholesome food, pure water and pure air are required. The former is facilitated by improved and inexpensive methods of transportation; pure water by a supply from a well-protected source; pure air by removing those things which tend to pollute it; that is, by a proper system of sewage and garbage disposal.

Man pollutes his own surroundings; his presence brings defilement to earth, air and water. The remedy which nature provides is limited in its application. Refuse from the animal kingdom is sustenance for the vegetable, but when men congregate in large numbers nature is no longer able to meet the demand made upon her, and pollution occurs.

In sparsely populated districts a disposal of refuse matter is of small concern. Each householder follows his own ideas. If he is not wise in his methods, none but himself and family suffer. However, the method he usually adopts is poorly adapted to thickly populated districts. In our towns and cities conditions are changed. No longer is each householder a law unto himself. The sanitary condition of his premises concerns not only himself, but his neighbors and the immediate surrounding community, and so what in rural districts is a personal matter in towns and cities becomes a question of public safety. In such densely populated districts the disposal of liquid and solid refuse is an important problem, and one that in many of our towns is not satisfactorily solved. To store filth within a city is but to invite, in the course of time, certain disease and death.

Yet this is exactly what any town is doing which has no method of effectually removing from its boundaries its sewage. The use of pits dug in the earth are especially objectionable. The soil becomes soaked with sewage; the decomposition of so much filth and the putrifying masses in vaults fills the air with noxious gases. Cesspools become especially dangerous when wells are used as a source of water supply. A well is simply a hole in the ground, into which water below the surface may drain, the quality of the water depending on its source and opportunity of defilement. Where no sewerage system exists cesspools are used by hundreds; drippings from these undoubtedly reach the wells. True, the sewage has been filtered by passing through the soil and relieved of the suspended matter, but retaining many substances held in solution. The water—our water especially—is clear and agreeable to the taste. That, however, is no proof of purity. Water from Saratoga Springs is as clear as crystal, though highly imbued with various minerals. The peculiar flavor and sparkle of the water of our well, which we like so much, may be caused by the proximity of a neighboring cesspool.

Even a casual investigation of most any one of our older towns will prove the great need of some sewerage system. Many of them, since the day of the "first store," have made no effort whatever to rid themselves of the accumulation of filth. For years refuse has been thrown on the surface of the ground to our sense of self-preservation for the removal of the decomposing mass.

Medical science has been the pioneer in fighting disease, and has made rapid strides in developing a system of preventive medicine and bringing to our very doors the causes of the disease from which we suffer. That there is vital relation between disease and filth, and that water is a common carrier of disease germs, there is but little doubt.

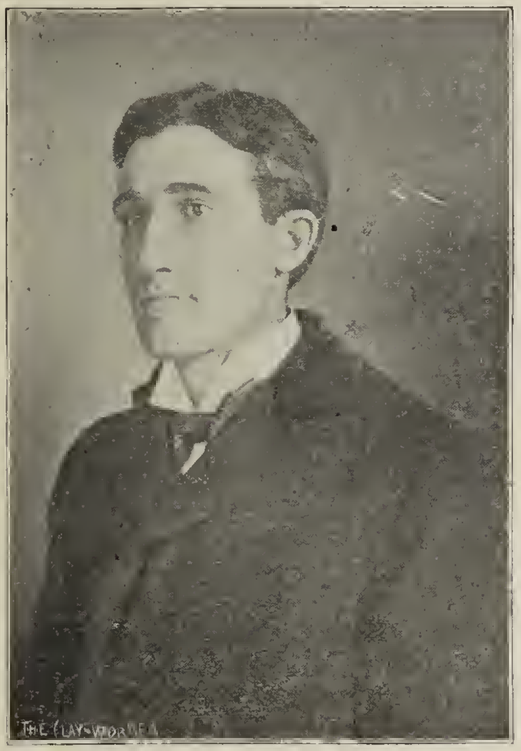
How shall we expect to be free from malaria, typhoid fever, and so on through the list of diseases, if the very soil over which we live is saturated with sewage and reeking with the filth of former generations? We never shall be free until some effective system for removing the debris is installed.

Again, there are many cities which have provided themselves with an abundant supply of water, and pride themselves upon having the most efficient waterworks for fire protection and domestic use, but have made no provisions for a system of sewerage. Increasing the water supply without providing for its outflow after it has been fouled only makes a bad matter worse. Instead of draining the soil, as common sense would dictate, additional water by thousands of barrels is poured on, and year after year the soil is more thoroughly saturated with sewage.

All that I have been saying is nothing new in your ears—simply a summary of what is known to the general public; yet the average citizen so indeed negligent for display of these matters which are of vital importance. The instinct for display is inherent in man. We build waterworks and use fire streams in our celebrations; parks, drives and fountains are things a visitor may see, and they are agreeable to our own eyes. But sewers? Oh, sewers!—they are below ground and out of sight. No one sees them. Like nature's laws, they are silent and unseen, yet they are effective. The fact remains, the population of our smaller towns do not realize the necessity of a system of sewers to maintain public health, or the sure and disastrous result arising from the lack of them.

A system of sewers for a small town is not such a costly piece of work. The statute is very clear and explicit in defining how a system of sewers may be built. And to suit the convenience of all sections, several methods are provided, or a combination of the several methods may be used. Because a town is going to grow and the system must necessarily be enlarged is no reason for allowing future generations to reap the benefits of a system. If funds are limited for a few days in advance, protect yourselves. Let future generations do likewise. Get the system started, if it be only half a mile; add to it year by year as the revenues come in, and meanwhile the sanitary condition of your town is improving, and before you are hardly aware your town can rightfully boast of a thorough system of sewers.

For small towns a greater part if not all of the sewers may be what is known as the pipe sewers, built of vitrified pipe especially manufactured for this purpose. For the smaller sewers this class of work, if properly put in, is very effective and satisfactory, besides having the additional feature of being inexpensive. The manufacturers of the glazed sewer pipe have indeed wrought an important service to humanity in giving to it this efficient system of sewerage. One matter of great importance that should be guarded by both manufacturer and user is that the pipe should be smooth and thoroughly glazed inside and out.



W. D. Lovell, Des Moines.

The actual cost per running foot for a system of sewers in a small town cannot be determined without investigating the local conditions. The size of sewer will depend upon the system used, the population using it, and many other factors will enter into its design. In this city the cost of laying twelve-inch sewer pipe, including all material, labor, hose, etc., varies from about 75 cents to $1. And this may be used in a general way as a base for calculation for the smaller and larger sewers in the average town of Iowa.

President Goodwin: Mr. Lovell's paper is instructive and deserves a place in our records. Its discussion is now in order. If there are no remarks we will listen to the next paper on the program.

FARM DRAINAGE.

—By John Cownie.—

Mr. President and Gentlemen:

The subject assigned to me for discussion at this time is not new, but it is none the less important on that account. In the arid regions of our country it is found necessary to irrigate the soil that a crop may be produced, and while water is absolutely necessary for plant growth, it is just as true that a surplus is equally as destructive as the want of a sufficient supply.

Extreme heat and intense cold have many properties in common, and the human limb, whether frozen or burned crisp, is rendered useless, in like manner as is the parched soil or that covered with water. But there is this difference: While the limb seriously injured, either by intense heat or extreme cold, must be amputated, and its use forever lost, the arid soil may be made productive by irrigation and the swamp reclaimed by providing a channel wherein the surplus water may pass away. When America was first settled much of the land near the coast was found to be covered with a heavy growth of timber, which required a vast amount of manual labor for its removal, and the clearings, although disfigured by stumps that made the cultivation of the land irksome labor, were the sole means of support for the family of the hardy pioneer. As the population increased, settlements were extended westward, until at length a prairie country was reached, wherein no ax was required to clear the forest, the only tool needed being the plow.

It was fortunate that the Western prairies were surrounded by mountains and forests, making them difficult of access, for had nature's order been reversed, with the forests and mountains in the heart of the continent and the prairies on the coast, it is very doubtful if ever the forests would have been cleared and settled by civilized beings.

The ease with which prairie country is brought under cultivation is in striking contrast with the labor required in a heavily timbered country, and as the prices of Western lands were merely nominal, it is no cause for surprise that those portions which required additional labor to make them productive were largely neglected.

Irrigation is now largely practiced in Colorado, and soil that was formerly barren is now highly productive, and the wheat, barley and oats grown by artificial means excel in many respects in quality and prove more certain in yield than do the crops where natural climate conditions are depended upon to produce a crop.

The discovery of the precious metals in Colorado and the large influx of people into the territory, far from railroad communication, enhanced the value of the cereals, which had to be transported by wagons for hundreds of miles. Thus profitable irrigation became a possibility. Only those who have seen the irrigating ditches in actual operation can form any just conception of the magnitude of the labor involved and the outlay required to secure water for irrigation purposes. And while the annual cost per acre is usually much more than the extreme price paid for rental in Iowa, still the labor involved in distributing the water adds immensely to the cost of producing the crop, and with all these expenses the Colorado farmer must now compete with the farmer of Iowa, for railroads have annihilated distances, and the miner is no longer dependent upon his own State for supplies.

And yet, with no need of the ax for clearing away the timber or the blasting of rocks to make a channel for the water for irrigating purposes, we have in Iowa tens of thousands of the richest and most fertile land upon this globe, requiring but a small outlay in labor and money to make it the most productive of any in the State.

When land cost but a few dollars an acre it could not be expected that the farmer with limited means would undertake the reclaiming of swamp land, even if it was a great inconvenience to cultivate the dry ground adjoining, often necessitating the turning of the teams amidst mud and mire. But with the rapid advancement in land values it is now evident that to allow these wet lands to remain longer unproductive is to incur the most severe loss, and the farmer who owns such grounds must be well to do if he can longer afford it. To make from the forest a well-cultivated farm or to carry water from a stream along a mountain side for irrigating purposes where the channel must be cut in solid rock involves labor that might well dishearten any but the strongest and most energetic men, but to tile drain a slough or a pond, and convert the waste ground into the most productive soil in such a simple manner, the only wonder is that there should be a single farmer in Iowa who has not at least made a beginning in reclaiming his waste land and straightening out the sides of his cultivated fields.

A number of years ago I tile drained a slough on my farm embracing over ten acres of land. Extending, as it did, almost through the center of a forty-acre field, it necessitated the cultivation of the land in two pieces and turning the teams in the mire. Since tiling, the entire field has been cultivated, and the teams are never turned till they reach the fences. This slough was exceptionally wet, so much so that stock in crossing in the springtime were in danger of miring, but even in the wet season of 1892, when the rainfall exceeded fifteen inches in May and June, it proved the driest part of the field, and the ten acres of swamp land produced almost as much corn as the other thirty acres. In the dry seasons that have followed there has been no abatement in the yield, and it required little more than a single crop to pay the entire expense of the tile draining, to say nothing of the convenience in cultivating the field.

Oh, says some one, but you are carrying away all the water with these tile drains, and that is the cause of the late protracted drought. I like humor, especially when it is of the unconscious kind, and for pure mirth-provoking laughter I can recommend nothing better than some of the articles published on this subject. Mark Twain, and even Douglas Jerrold, pale into insignificance when contrasted with the wit and humor of these so-called agricultural writers, for their ignorance and innocence is so apparent to every one who has given it the slightest thought that the humor is at once seen to be unassumed and genuine.

To show how little foundation there is in fact for such conclusions, I will take Iowa county, with the conditions of which I am somewhat familiar, having resided there since 1856. The Iowa river crosses the northern part of the county and the English river traverses the southern portion, with a number of creeks scattered over the intervening space. The bottom lands of these rivers and creeks are somewhat extensive, and much of the land is too wet for cultivation. As the surface is, in general, somewhat rolling, there are a large number of sloughs, the greater portion still untilled. But of all this vast amount of swampy ground, I am within limits when I state that not one per cent. has yet been reclaimed by tile draining, and yet men are found outside of the lunatic asylums who claim that the drought of late years has been caused by the tile drains carrying away all the water.

The year 1826 was noted in Scotland for the extreme drought, and I have often heard old people relate how the straw of the oats was so short that they were compelled to pull up the crop by the roots, it being found impossible to even reap the grain with a hand sickle. Tile draining was at that time practically unknown, and although nearly all the ponds, mosses and wet, rushy lands have since been transformed into dry and productive fields no such drought has since been experienced. During my residence of forty years in Iowa I have seen dry seasons and wet seasons. I have seen crops ruined by drought and hot winds, but I have seen far worse losses from excessive rainfall than from extreme drought. For me, the drainage of every swamp, slough and stagnant pond in the State has no terrors. For I can see in the superfluous water, as it is carried away to the creeks and rivers, and thence to the gulf, assurance of the atmosphere being freed from hovering vapors, injurious alike to general healthfulness and salubrity in the climate. And while there will undoubtedly be in the future, as in the past, seasons of drought and seasons of extreme rainfall, I would trust to the southeast winds to again bring back from the Gulf of Mexico the necessary moisture, which, falling as rain, would cause the well-tilled earth to bring forth crops in abundance.

But the cost of tile draining is the great obstacle to a more general determination to reclaim lands in many instances at present absolutely worthless. While it would require but a few crops, at most, to compensate for all the expense incurred, to say nothing of the added value to the adjoining land by ease and convenience in working, and while the reclaimed land would prove the most valuable on the farm, alike in wet or dry seasons, still the great majority of farmers have not the means at hand to invest, and they dislike to involve themselves in debt and be compelled to pay high rates of interest. Others consider that with the droughts of the last few seasons tile draining will be unnecessary, but they will find in due time that present conditions will not always exist, and that much of the land now in cultivation will again, on the return of a wet season, have to be abandoned.

I have already referred to tile drainage in Scotland, and there is no question but that this one factor must be considered the most valuable improvement connected with British agriculture. Much of the land in Scotland was formerly low, marshy ground, covered in many places with stagnant water. But all this has been changed, and the pond on which I skated when a boy has long since been transformed into a productive field. But the same difficulty presented itself there with the farmer as there does here, viz., the lack of means to make the improvement. The government seeing this took the matter in hand, and laws were enacted to enable the farmer to tile drain his land and pay the costs from the proceeds of his crops. The great body of farmers in that country are tenants, and were powerless to do anything, while the landlords did not wish to advance the necessary means to make the improvement. Consequently it was arranged that the government would advance the money for the work, and that the repayment should be made to extend over a long period of years, the payment each year to be sufficient to pay the annual interest and enough more to create a sinking fund that would in the specified time also extinguish the principal. This amount was added to the yearly rent, the tenant had the increase of acreage, and the landlord his farm enhanced in value by a permanent improvement without any outlay whatever. If the same system could be adopted in Iowa tens of thousands of acres of land now worthless could be reclaimed and made the most valuable in the State, and that, too, without any additional taxation, but simply by lending the credit of the State to the individual who was able to furnish ample security. Allow me to illustrate: "Iowa is to-day practically without any bonded indebtedness and her credit is equal to any sister state, or even to our Nation itself, whose credit still remains unimpaired. Long-time bonds, bearing 4 per cent. interest, could readily be floated at par, and the money obtained from these bonds loaned to farmers for the purpose of tile draining their waste and unimproved lands. It would be provided that the annual interest of 4 per cent. should be paid, and in addition sufficient to create a sinking fund that would in a specified time extinguish the principal. Say that a farmer borrowed $1,000, agreeing to pay 8 per cent. per annum for 25 years; it is readily apparent that in addition to the 4 per cent. required by the State to pay the interest there would be an additional 4 per cent. to place in the sinking fund, and this in 25 years would extinguish the principal. But, as this additional 4 per cent. is paid each year, it could be again invested and we would have $40; the first payment above the interest, at compound interest for 24 years, $40; in like manner for 23 years, and so on until the end of the 25 years.

JOHN COWNIE, South Amana.

It is thus seen that an annual payment of 8 per cent. for 25 years would not be necessary, and that a rate of 7 per cent., or even less, would indemnify the State for both principal and interest. The farmer who would thus borrow $1,000 could tile drain from 30 to 50 acres of land, thereby converting it into the most productive land on his farm, and the annual cost would not exceed on an average one dollar and fifty cents an acre. When desirable the annual rate could be increased and the time of payment reduced, always holding in view that the annual payment would in the time prescribed pay the interest and cancel the principal.

This is no commercial proposition emanating from the brain of some shallow theorist who looks to the government to supply the indolent and shiftless with money that they may escape labor, but a straightforward business proposition wherein the State could not possibly be a loser, for no money would be loaned except on real estate security, and every precaution should be taken to prevent loss.

If the necessary legislation could be secured to carry this plan into effect there are few farmers in Iowa but would gladly avail themselves of the benefits to be derived, for all that prevents them now from tile draining their waste land is the high rate of interest demanded for the money and the dread of being unable to pay the principal when due. By this means the interest to be paid annually would amount to no more than is usually charged, while there would be no principal whatever to pay. It simply means that the State can borrow money on better terms than the individual, and why should not Iowa assist her own citizens in developing the great agricultural resources of the State, especially when it can be done without cost and with a safe margin for profit? Tile drainage is unlike any other improvement, for when properly done it is there for all time, and nothing short of the destruction of the earth itself would impair or destroy its usefulness.

In the present depressed condition of financial matters I cannot imagine any legislation that could be so productive of good as what is here outlined. We have within our borders the material for the manufacture of the tile, and also the necessary labor, both to make and lay them in the ground. Men who are now idle would be given employment at remunerative wages; land that is now unproductive would soon bring forth abundantly, and the farmer would find the consumer of his products at his door, thus providing him a home market, which is the best of all.

These thoughts are given to you frankly; they are offered in all sincerity, and with no other desire but to build up the agricultural and manufacturing interests of our great State. I urge you all to give this matter careful consideration, assured that by its adoption no one would be injured, but, instead, the State at large greatly benefited.

Mr. Holman: It is seldom that we hear a more able paper. We have in Iowa a law of exemption on fruit and other trees, and it seems to me that it would be well to have a law of exemption on farm drainage.

On motion the recommendations of this paper were referred to the Committee on Resolutions.

THE SOOTING OF DOWN-DRAFT KILNS—CARE AND HOW TO PREVENT IT.

As the gentleman to whom this subject had been assigned was not present, and had not sent a paper upon the subject, the President called upon Mr. J. B. McHose to open the discussion.

Mr. McHose: I did not expect to be called upon, and am not prepared to discuss this subject. One cause is an insufficient draft to start with. The draft at first must be free, and can only be secured by a clear, bright fire. Sooting varies with different coals. I have found the remedy of using a charge of gunpowder effective in loosening soot and starting draft that has become choked. By setting the kiln more open and with larger spaces between the wares, a better draft can be secured. Watersmoking with wood until the heat is up will tend to prevent sooting. Dampness of the ware in the kiln tends to facilitate the accumulation of soot. I cannot recall an instance in which sooting occurred where there was sufficient draft.

Mr. Haines: Sooting has often been caused by trying to watersmoke with a smudge or a smouldering, smoking fire. Kilns of brick have been injured by putting on heat after two or three days of smudge which did not supply the amount of heat that should have been given to the kiln during the first few days. I find by experience that a good, lively blaze and the attendant heat give excellent results.

Mr. McHose: I want to emphasize the thoughts against smudging. Build a good smart fire at first for awhile, and when the kiln begins to get warm hold the heat steady. The kiln is cold at first, and requires considerable heat to warm it and start the watersmoke.

WHERE ARE WE AT?

—By D. W. Stookey.—

He who embarks upon any undertaking and would succeeed must know from time to time what his condition is and how he has progressed. Enterprise, enthusiasm and energy are important elements of success, but they must be governed and guided by judgment, knowledge and discretion. Those who travel upon the seas must not depend alone upon swift and powerful propelling machinery, but must also have those delicate instruments which will daily tell them how far they have gone, in what direction they have traveled and where they are.

In ancient times cities set watchmen upon the walls whose duty it was to call out the hours of the night and proclaim to the people within whether or not all was well.

The old-fashioned Christians periodically examined their own hearts, that they might surely know whether they were growing stronger in the faith or falling from grace.

The careful business man keeps strict account and regularly takes inventory of his stock, that he may know whether he is succeeding or failing under the methods employed.

The clayworkers of Iowa, and of the Nation as well, are passing through a period and have reached a time when they should carefully study their condition, draw such lessons as they can from the experience of the past, and decide upon their future course as surroundings, experiences and judgment may guide.

Trusting that a few thoughts upon the present condition, past history and future outlook may be of interest and profit to the craft, I beg to guide your minds along these subjects in the order named.

—Present Condition.—

The present condition of the clayworking industries is very unsatisfactory to those most concerned, and may be told in the following few words: Meagre demand, unprofitable prices, and in many instances cold furnaces, idle machinery and unemployed labor. This may seem to many as a tale of woe, but its correctness is attested by the reports of the various clayworking conventions already held during the present winter. Local influences have modified this condition in many instances, and many plants of moderate capacity have prospered. Some of the larger ones have also done well, while others have been operated upon such an extensive scale that it was found necessary to appoint a receiver for the wares after they came from the kilns. Those plants that were wisely located, judiciously planned and intelligently operated by men of experience and ability have rewarded the talents given them, while those that were conceived by a greed of gain, built by unguided ambition and operated by ignorance and incompetence have failed.

—Past Experience.—

By gathering together such facts as can be gleaned from the past, it is hoped that a careful study of them will evolve some lessons that will be useful in guiding our actions in the future. There was a time several years ago when the brick and tile business was in a prosperous and profitable condition. Enterprising manufacturers organized associations, held conventions and gave accounts of their prosperity and inability to fill their orders. These reports were fairly aglow with contentment and happiness. Each member seemed to strive to give the impression that his business was more prosperous than those having reported before him. From the fullness of hearts that swelled with that good will born of joy the members naturally exchanged experiences, warned each other of their mistakes and failures, and publicly proclaimed the methods that gave them success.

But alas! this happy condition could not last. Those accounts of prosperity were given to the public through the press. The attraction was too great to be resisted. Men all over the country rushed to the diggings somewhat after the spirit of the forty-niners to California. Every man who had a clay bank, a blind horse and a sycamore gum pug mill, and who claimed to be a brickmaker, put in a brick and tile machine and advertised "first-class drain tile and pressed brick." Every man who owned an old sawmill outfit thought all that he had to do was to rip out a few rough boards, tack up a cheap dry shed, sell brick and tile and take in what money he might need for rainy days and old age. Merchants and farmers who had a surplus of a few hundred or thousand dollars formed partnerships of capital and experience with men who had worked at the business and who posed as experts, and thus other new plants were established. Thus merry times gave a new impetus to the manufacture of brick and tile machinery. Improved outfits were placed upon the market, and each firm vied with the others in producing machines of larger daily capacity. The old methods of drying were then found to be too slow and cumbrous for the capacity of the machines. Again necessity was the mother of invention, and artificial dryers were produced that would thoroughly and successfully dry brick in twenty-four hours—a feat that was before considered impossible. These outfits of large daily capacity called for greater investments of capital than brickmakers were ever before known to control. In their dilemma they went to the capitalists and laid the matter before them.

D. W. Stookey, Cedar Rapids.

By a cunning set of figures that were mathematically all right, but practically fallacious, they showed that a machine would cost so much, dryers so much, kilns so much, with a daily capacity of so much, worth so much. Daily expense would be so much, leaving the handsome daily profit of so much. "Figures don't lie." The capitalists jumped at the bait, corporations were organized and stock readily sold at par. These new plants were fired with enthusiasm, and the busy hum of clayworking machinery was heard throughout our land in a way never before equaled in the history of the world. The bosom of mother earth was drawn upon for clay and coal. Dense clouds of watery, black smoke from furnaces and kilns floated upward and attested the rising hopes and aspirations of those who had newly embarked in the business. In due time stocks of brick and tile were placed upon the market, and that lively competition which some one has said is the life of trade began. Competition may be the life of trade, but the clayworkers of the Middle and Western States will attest, almost to a man, that it is the death of the tradesman.

Probably the first disappointment came with the knowledge that the capacity of the plants was greater than the demand. In many instances it became fearfully apparent that the self-satisfied expert, who acted as superintendent, was not equal to the demands of his position. The quality of the product was not what had been expected nor what the market demanded. The clay was not as good as he had thought. His methods of working it had not produced the results that he had anticipated. The machinery and kilns had not turned out the quality and quantity of wares under his management that his enthusiasm had led him to expect. The location of the plant with reference to market and transportation was not what it should have been. Unforeseen expenses had been forced upon him, and more money was required to operate the plant than his estimate had shown. Delayed and irregular sales, together with slow collections, necessitated a larger capital to keep the plant in operation than the proprietors had been led to expect. These embarrassments required that sales should be made or the machinery stopped; as the latter course was not to be considered, strenuous efforts were made to dispose of the product. Probable purchasers were beset by representatives of several plants who offered various grades of goods. Other things being equal, the best would naturally be chosen. Realizing this, the representatives of plants that were financially embarrassed and those with wares of inferior quality knew that their only hope of taking the order lay in cutting the price. However loathe they may have been to do this, they saw the money that they so much needed and felt that they could not let the opportunity to secure it pass. This desperate measure only relieved their condition temporarily, while it permanently injured the selling price of their wares, and not only theirs, but of their competitors' as well. This condition has been aggravated by the unusual period of drought, together with the financial depression, until to-day the business of the craft is very much prostrated. The battle has been given to the strong, and only the fittest survive. As the trails from the Missouri river to the Pacific were strewn with the wrecks of the gold-seekers whose enthusiasm led them forth only to fail, so the country from the Missouri river eastward to the Alleghanies is dotted with the remains of ill-starred and badly managed brick and tile plants. It has finally dawned upon the people that intellect and culture are essential to success in agriculture, and it is hoped that the experience of the last decade and a half will go far towards teaching the necessity of intelligent preparation and practical experience in those who essay to manufacture clay goods.

—The Outlook.—

The experience of the past and the present condition have some lessons for him who will study them. One that has been hardest to learn is that success and profit is not proportionate to the capacity of the plant. Many realize that their capacity for producing goods is greater than their market demands or will sustain. They have also learned by bitter experience that reducing the price does not create an active demand. Capitalists do not decide to build or not to build according to the price of brick. That subject is not considered until the details and estimates are being made.

Possibly there are only a very few plants that have a capacity greater than is demanded by the territory in which they are located, but no wise man will build for and hope to supply the whole demand in his own locality. Each one must expect and prepare to meet competition, and that competition will obtain a share of the trade in spite of all that he can do. Any man, firm or corporation that has a profitable business must expect that they will be asked to divide with competitors who are tempted, by the success they see, to engage in the same business. The attempt to enlarge the capacity of the plants and to build new ones of large capacity has been carried to or beyond the limit justified by the demand for the goods. It is time now to trim your sail to the wind and adjust your output to your market.

The lesson that is needed most now is how to sell the product of your factories and to sell at profitable prices. Your integrity, industry and skill have fitted you for making good goods, and in sufficient quantities. Now you need to know what to do with them after they are made. Many practical men who operated factories of modern capacity, where they owned a controlling interest and secured a reasonable profit, have permitted their avarice to lead then into trouble. Not satisfied with a comfortable income from a moderate business, they invited outside capital to come in, enlarge the plant and divide the profits. The natural result was that the market was overstocked, the prices went down, and they thus killed the goose that laid the golden egg.

The possibilities of the clay business are such and the events of the last fifteen years have placed it in a condition that justifies the conclusion that it must necessarily be conducted within certain limits. He whose ambition galls under the restraint of those bounds must either curb his enterprise or seek freedom in other occupations, but those who can be content to accept a reasonable reward for their efforts, and who have learned to look beyond the commercial and industrial world for measures of happiness and contentment, may live successful lives where they are. You may call this conservatism or what you will, but the facts testify to its truth. Many clayworkers would have been in better circumstances and more contented had they been satisfied to do the business that their own markets demanded. The clayworkers have nobody but themselves and their own avarice to blame for the condition they find themselves in to-day. In their haste to increase the capacity of their plants and the amount of goods produced they failed to see that the market did not increase with the production. A little caution and foresight that might have been obtained by careful observation and reasoning would have been advantageous to the craft in general and to many individuals in particular.

We had just as well consider this matter sensibly and reasonably. If clayworking is to be our life work, let us extract all the enjoyment from it that we can, and not sacrifice our possible happiness in life by an attempt to gain wealth from a source from which it cannot possibly be wrung.

The experience and testimonies of the older clayworkers will bear out the statement that he who hopes to become a rich man by manufacturing clay wares will almost certainly be disappointed. He who aspires to riches must seek in other fields.

On the other hand, I rejoice to know that wealth is not a measure of success in life. Happiness is not to be obtained from nor bought by riches. The world knows that those who make the acquisition of wealth their chief object in life fall far short of being satisfied, contented or happy. They spend their lives in anxiety and die in disappointment.

Lazarus, the poor beggar, whose life, as measured by financial standards, was a dismal failure, hardly had enough rags upon him to flag a train, and yet he rode upward in joy and triumph, while the rich man, with all his wealth, failed to even get a ticket that would entitle him to one of the lowest places in that land of eternal joy.

Shrouds have no pockets. We cannot carry one cent with us across the dark river. We cannot even use it to pay the boatman to take us over.

The Greeks used to have a custom of placing coins in the mouths of their dead to pay Charon for ferrying them over the river Styx, but those coins may yet be found, tarnished and unused, within the ghastly jaws of the dead.

The wealth of this world will not be accepted even in Hades.

Mr. Neis: There is a striking similarity between the thoughts expressed in this paper and mine read yesterday. As Mr. Stookey and I never met before, and have never communicated with each other, we came to the same conclusions independent of each other. I have known of him by his writings in the Clay-Worker, and am glad to have him sympathize with me in my conclusions.

Mr. Stookey: I am very glad to know that so practical a man as Mr. Neis thinks upon this subject as I do. I feared that I might be considered cranky if I read this paper, but I was impelled to do so by a feeling that it was right. It is very gratifying to me to find this sympathy of feeling in Mr. Neis, and to find my thoughts verified by him.

President Goodwin: We will now again adjourn for dinner.

FOURTH SESSION.

The final session of the Convention was called to order by President Goodwin at 2 p. m. Thursday.

Mr. J. A. Williams, an attorney of Boone, Ia., was introduced, and after a few preliminary remarks read the following paper:

DRAINAGE LAWS.

—By Joseph A. Williams.—

The two main objects of government through law are, first, protection for the individual in his person and property rights, and secondly, the promotion of the general good of all the people.

Jos. A. Williams, Boone.

When useless swamp lands are changed into productive fields and blooming gardens, then individuals are benefited, the state is enriched, and all within its borders feel the good that has been done.

Drainage, in the natural and usual sense, is effected by the streams which flow in self-made channels to the sea. Of these there are two classes in respect to ownership. All navigable waters are the property of the State, for the use and benefit of all the citizens. All other waters come under private ownership and control, subject only to restrictions imposed by law.

Drainage in agriculture is the art of carrying off water from the soil and subsoil of lands by means of open or closed drains or trenches, generally closed drains. The Roman agriculturist drained his land by means of wooden trenches, and during the centuries various devices have been used. It is of comparatively recent date that the earth itself has been turned into the means of carrying off the water that oppresses it by its unwelcome abundance.

With the coming of the millions has arisen the necessity for drainage laws to assist in and regulate the reclamation of lands that would be otherwise useless for cultivation and oftentimes productive of serious diseases. The State of Iowa, like nearly all the sister States, has made provisions for adding to her domain and to the health and wealth of her citizens by prescribing the way in which any swamp, wet or marsh land may be drained. The laws have not been passed simply to secure a few individuals in more good land.

Wet lands not only retard cultivation, but are the certain source of malaria, the prolific parent of disease. This is a fact known to all men in all ages, which the law presumes without proof, and of which the courts will take judicial notice as a matter of common knowledge which nobody questions. Drainage tends to remove disease and attendant evils. It is therefore a public purpose, and the Legislature, in enacting the laws relating to it, so regarded it, and authorized the construction of drains as a public purpose. Incidental to this general purpose are the benefits to individuals and for which they pay as provided by law.

I will try to briefly present the law of drainage in this State as it now stands, under three main heads:

1. Drainage conducive to the public health, convenience or welfare.
2. Drainage of private lands by means of open ditches over the land of another.
3. Drainage of private lands by means of tiles or, rather, underground drains through land of another.

First, as to drainage conducive primarily to the public health, convenience or welfare. In 19 G. A., Chap. 44, it is provided that the supervisors in any county of 50,000 or more people may locate and construct levees, ditches or drains, or change the direction of any watercourse whenever the same will be conducive, in their opinion, to the public health, etc. This, however, cannot be done until there shall be filed in the office of the county auditor a petition for the same signed by a majority of the persons resident in the county and owning land adjacent to the line of such improvement. A bond must be filed conditioned to pay all the costs in case the supervisors do not grant the petition. The land is surveyed, and the result of the survey, together with an estimate of the cost and any other evidence touching the condition of the land, are laid before the supervisors for their action. In case anyone feels that he will be damaged by the construction of the ditch, drain or change of watercourse, he must lay his claim before the supervisors, and appraisers are appointed to ascertain what, if any, damage he may suffer from the improvement. The damages allowed, together with the costs of the proceedings, are assessed against the lands which shall be considered to be benefited by the improvement. Any party interested may appeal from the decision of the supervisors to the District Court.

When a drain or ditch is desired through two or more counties, the supervisors in the respective counties appoint a commissioner, and these commissioners representing the counties meet and proceed in much the same manner as the supervisors in each county when the work is confined to one county.

Second, drainage of swamp or marsh land by private individuals by means of open ditch over the land of another. If a person owning swamp or marsh land desires to drain it and cannot do so except by making a ditch over the land of another, and if he cannot agree with such other person as to the terms on which he may make such ditch, then he may ask the State to step in through the township trustees and help him out of his difficulty. He does this by filing with the town clerk an application for relief, setting forth description of land, names of parties, description of proposed ditch, etc. If the trustees are satisfied that such swamp or marsh lands are a source of disease, that the public health will be promoted by draining the same, that such ditch is necessary for the proper cultivation of the land, that the permanent value thereof will be increased thereby, and that it is necessary in order to drain said land that such ditch should pass through the land of others, they shall determine the direction, depth and width of such ditch, and may order its construction. Provision is made for the payment of damages, if any be suffered by party through whose land the ditch may go, but no provision is made for the payment by him for any benefits that he may derive from the ditching. When the ditch shall have been established, the lower owner shall in no wise obstruct it or turn the water back. It was clearly decided in Vannest vs. Fleming, 79 Iowa, 638, that where a ditch has been constructed conducting surface water from the premises of one across those of another, the lower owner will not be allowed to obstruct such drain to the detriment of the upper owner without the consent of such upper owner. Nor will the lower owner be allowed to complain if surface water be discharged through the ditch onto his land. In Dorr vs. Simerson, 73 Iowa, 89, it was held that where the owner of land collected water from ponds into ditches on his own land, by which it was discharged upon the land of an adjoining owner, and it appeared that the water was not discharged in a different place from where the overflow from the ponds was discharged before the construction of the ditch, nor in a greater quantity, the lower owner was not damaged and was not entitled to recover. It was held in Wilson vs. Duncan, 74 Iowa, 491, that the owner of land has the right to have surface water flow unobstructed from his premises, and also to have it cared for by an adjoining proprietor onto whose premises it flows from his own, so that his premises will not thereafter be injured by it.

Thus far we have considered open ditches. Now we come to the consideration of the law in respect to tile or other underground drains for swamp, wet or marsh land. Chapter 96, 22 G. A., deals with this subject. The original act relating to this matter was Chap. 188, 20 G. A. To this latter I shall have occasion to refer again. In Chap. 96, 22 G. A., it is provided that anyone owning swamp, wet or marsh land which on account of its condition may endanger public health, or is not for that reason in a proper condition for cultivation, and who cannot agree with owner of adjoining land for the construction of tile drains through that other person's land, may apply to the township trustees for a decision and order in the premises. If they decide favorably to the applicant, the said trustees may fix the points of entrance and exit of said tile or other underground drain, the general course of the same, the size and depth of same, when the same shall be constructed, how kept in repair, what connections may be made with the same, what compensation, if any, shall be made therefor, and any other question arising in connection with the same. An appeal is allowed to the District Court by any party feeling himself aggrieved. It is further provided that a person may go upon a highway to construct an outlet to a drain, provided he leave the highway in as good condition as it was before the drain was constructed.

Reference will be made to drainage of mineral land in connection with a question which I will not suggest. In the present state of our law a very interesting question remains without a definite answer. That question is this: Should the lower owner pay the upper owner for manifest benefits accruing to the lower owner's land by reason of tile drainage put in by the upper owner on his own land and on the land of the lower owner? We saw in the first division of our subject that where the ditch is ordered by the supervisors the persons benefited pay for it. The question has never been before our courts directly, I think. The original act relating to this matter of underground tile drainage by one party through the land of another was declared unconstitutional by the Supreme Court in Fleming vs. Hull, 73 Iowa, 598, on the ground that it was not limited in its application to lands which were wet and swamp or to cases where the public health required that it should be drained, but was applicable to cases where the owner of land simply desired for his own advantage to construct a drain over the land of another, and as therefore providing for the taking of private property for other than public purposes. Beek, Justice, dissented, on the ground that nothing is taken from lower owner, and he really received only benefit from the drainage. The act in force at present (22 G. A., Chap. 96) relates only to wet, marshy and swamp lands, and clearly contemplates advantages to others than the one who does the tiling.

It will be remembered that the act provides that the township trustees may order the tile drains put in, etc., and shall decide what compensation, if any, shall be made therefor. I am aware that it is generally thought that the compensation contemplated is necessarily to the owner of the land through which the drains are laid by the upper owner. But is this the necessary construction? If it be the necessary, and therefore only, construction of the words of the statute, then do we not need an additional enactment?

We have seen that by the decision of our court the upper owner may flow surface water on to the land of the lower owner, and he is bound to take care of it and has no damages. We have seen further that the upper owner may collect water from ponds, and by means of a ditch discharge it upon the land of the lower owner, and that the lower owner cannot have damages. We find, further, that it was held in Wharton vs. Stevens, 50 N. W. Rep., 562, that where, in the ordinary course of nature, a ditch running from plaintiff's land through defendant's land had been washed out in a swale, and in that the water flowed from plaintiff's premises over those of defendant in times of rain, and plaintiff had laid tiles along the swale on his own land, discharging water therefrom near the boundary of defendant's land into such ditch, the defendant could not obstruct the ditch so as to stop the flow of water therein and dam up plaintiff's tile drains.

Now, when the upper owner obstructs underground tile drains through the land of the lower owner and leaves his land free from ditches or other obstructions to cultivation, and when, furthermore, by so doing the upper owner saves the lower owner from the annoyance of the surface water from the upper owner, and to which we have seen the lower owner could not object; and since, moreover, the upper owner necessarily drains his own land and the land of the lower owner by the drains put in and lessens the danger from disease, especially to those near by, as the lower owner, and necessarily increases the value of the lower owner's land by making it more productive and healthy—in view of all these considerations, does it seem necessarily conclusive that the Legislature meant that compensation could be ordered only to the party through whose land the drains should be constructed by another?

In Illinois the evidence is passed by a jury called by a justice of the peace. "The jury, in considering the damages, shall also take into consideration any benefits directly resulting to such owner whose damages are to be assessed from the construction or establishment of such drain. If they find such benefits equal to or exceeding the damages, they shall return their verdict accordingly."

By the Illinois statutes, however, no provision is made for compensating or contributing to the upper owner in case the jury find the benefits greater than the damages.

T. E. Haines, Altoona.

I am not sure but that in a test case in which the facts clearly showed great benefits to the lower owner from drainage by the upper owner our court would grant the upper owner compensation therefor in the way of contribution from the lower owner.

In consonance with this idea of justice, I may refer to the idea that is recognized in the provision of our laws relating to the drainage of lead mines. It is provided (10 G. A., Ch. 37) that any person who, by drains or in any other manner, shall rid any lead-bearing mineral lands or lead mines of water, thereby enabling the miners and owners of mineral interests in said lands to make them productive and available for mining purposes, shall be entitled to receive one-tenth of all the lead mineral taken from said lands as compensation for said drainage. Now, surely in the case of tile drainage the lands of the lower owner are made more productive—indeed, they may become, in a sense, a mine of wealth because of the drainage. In brief, nothing is taken from the lower owner; he is saved untold annoyance and damage from water from the upper owner; his land need not be injured by construction of the drains; it must be made more productive and healthy, and if our courts, under our statutes, cannot decree compensation to upper owner for benefits proven to lower owner, then the sooner our statutes are adjusted the better it will be for the cause of drainage and of justice among men. I think time will not permit of any further discussion by me.

Pres. Goodwin: We will now hear from Brother Haines on the "Cause and Cure for Wet and Dry Seasons."

RAINMAKERS AND THE ALLIED CAUSES OF DROUGHT—A BURLESQUE.

—By T. E. Haines, Altoona.—

"Good morning, Mr. Johnson; glad to see you. How are you standing it this hot, dry summer, and what is your prospect for a crop?"

"Well, Mr. Snyder, I am just about plum discouraged. It's gettin' powerful dry; corn is tassel'n out not more'n knee high, an' fired half way up, and nary nubbin started yet. Taters not bigger'n walnuts and tops all dead, with a teetotal failure of garden sass; water gettin' skeerce; a short crop of hay, and pastures all dried up. I can see nothing for next winter but starvation for man and beast."

"Yes, Mr. Johnson, I can readily see why a man who gives all of his attention to his farm and home duties, as you do, and seldom reads the daily papers, and who pays no attention whatever to the signs, should be somewhat discouraged; but to a broad-minded man who reads the news, closely observes the signs and carefully studies the mysteries of nature, the outlook is quite different."

"Well, Mr. Snyder, if there is any chance for gettin' through next winter, I'd like to know it; but I kaint see it."

"I know you can't, Mr. Johnson, and it is because you have not observed the signs. Why, sir, all the signs indicate a very short, mild winter; that being the case, a much less amount of feed will be required to winter the stock."

"Now, Mr. Snyder, do you really think we will have a short, mild winter?"

"I don't think it; I know it. Have you not noticed the hornets are building their nests much higher on the trees than usual; the bumble bees and field mice are both making their nests near the surface, and that the hair and fur of animals and the husks on corn are unusually thin this year? And by consulting the almanac you will find that during next winter the moon always becomes full during the warmest part of the day. I have observed many more signs, but these few are sufficient to convince any ordinary thinking man of the certainty of a very mild winter; and besides the advantage of a mild winter, we will soon have abundance of rain, which will enable us yet to raise a good crop of buckwheat and potatoes. But in sowing and planting these crops the head must be used as well as the hands. To insure a good crop of buckwheat perhaps nearly every farmer knows it must be sown 'the 25th of July, wet or dry,' but the planting of potatoes requires more scientific treatment. They should always be planted when the sign is down and in the dark of the moon, and in order to secure a good crop I would drop them out of a basket instead of a bucket, and the good rains that we will get within a few days will start the pastures, which will cause a great saving of our winter supply of feed."

"Well, railly, Mr. Snyder, that seems quite incouraging; but are you right sure it will rain soon?"

"Why, yes; sure. The rainmakers are around now, and all we farmers have to do is to make up a purse of ten cents per acre and send for them, and we will get it sure; and the beauty of it is, neighbor Johnson, they can make it rain just on whichever field you want it. Yes, sir; it beats the old-fashioned way by a long shot."

"Well, did I ever! And have they made any rain yet, Mr. Snyder?"

"Why, yes, they are at it now. The great Rock Island Railroad Company have them employed to make rain all along the line of their road between Des Moines and Council Bluffs, and you know, Mr. Johnson, that these big corporations never do anything unless it pays."

"Well, Mr. Snyder, I'd like to know! And how on earth can they make it rain?"

"Well, on last Thursday they arranged to make it rain on one of the dryest sections in Iowa. Everything was dried up and the cattle were bellowing for water. So all the farmers in the country gathered in to assist in the work and to enjoy a good rain. There, on the side track, they had a car well loaded with barrels of acids, large jars of electric batteries with great copper wires running out through the roof of the car, and piles of great sky-rockets and terrific dynamite bombs. When all was ready some began to squirt the acids high in the air, while others were working the batteries and throwing streaks of electricity up the wires like lightning, while still others were throwing the sky-rockets and dynamite bombs to a great height. The atmosphere soon became terribly agitated; just then, as a climax, they fired twenty of their largest bombs, making a terrific explosion, and——"

"And Mr. Snyder! It just poured down, did it?"

"No, it didn't; for just at that important moment, when everything was looking favorable for a perfect deluge of rain, a great big black cat hopped up into the car door, and, with her tail spread like a feather brush, whisked through the car and vanished out of sight. The charm was broken, and we got no rain that day. But who would expect them to make rain when there is a black cat around? Everybody knows that black cats always bring bad luck."

"Why, you don't say so Mr. Snyder! And so they lost all that good big rain. Too bad! Why on earth didn't some one kill the cat?"

"Kill that black cat? You might just as well try to kill old Nick himself."

"Mr. Snyder, have they been running this rain business anywhere else that you know of?"

"Why, yes, over on the Fort Dodge road, near Perry, where all the farmers went plum crazy and tiled out all their sloughs, ponds and all the moist bottom land, so that there was no hope of ever getting any more rain in the old-fashioned way; so they made up a purse of four hundred dollars and sent for the rainmakers. But they were in such great demand along the Rock Island road that they could not go, but sold them four hundred dollars' worth of the stuff and gave directions how to use it, assuring them that if directions were closely followed an abundant supply of rain would be the result. So before noon the whole neighborhood had gathered in to assist in the work and enjoy a good, refreshing rain. Everything being ready, all hands went to work with a will, and soon the air was filled with furious gases, terrific streaks of electricity and bursting bombs. All was going well, and just as the last and largest bombs were exploded—"

"Did they get a splendid big rain, Mr. Snyder?"

"No. Mr. Johnson. I was going to say, just then, when everything looked favorable for a perfect downpour of rain, an old man, who was more thoughtful than the rest, reminded them that it was Friday, and that no rain need be expected on that day. Of course, everybody was disappointed, but it was all their own fault, for in their great anxiety for rain they had forgotten that it was Friday."

"Too bad, Mr. Snyder, that they spent all that money and then didn't get no rain. But now do you railly think that it didn't rain because it was Friday?"

"Most assuredly, sir. Who ever heard of good luck coming to anyone on Friday?"

"Say, Mr. Snyder, you know we hev had three or four tolerable dry summers right along; now, what do you railly think is the cause of so much drouthy weather?"

"Mr. Johnson, you ask me what I think. I will tell you what I know. The fact is, as I have before intimated, the farmers themselves are responsible for these dry seasons, the direct cause of which is the reckless manner in which they have tiled out their sloughs and ponds, relieving the surface of all stagnant water, thus destroying all chances for evaporation, and it is well known that without evaporation we can have no rain."

"Well, now, Mr. Snyder, do you railly think that's what's the matter?"

"I know it, Mr. Johnson, and it will continue to be so until the tile are all plugged up and good, substantial dams have been made across every slough and ravine in the State, thus making an abundance of stagnant water. Then the evaporation will again become normal, and we may expect an abundance of rain."

"Say! Mr. Snyder, I kinder think you're a leetle off. Like the man we read about, 'Much larnin' hes made you mad.' Now, larnin' is all rite, but when it comes to farmin' and tilein' land, a little experience and common sense is a mighty good thing to hev along with your book larnin'. See here, Mr. Snyder, I hev bin farmin' this quarter for nigh on to twenty years, and ever since I tiled it out I hev raised about twice as much grain and other truck as I did before. That's my experience. And them ponds you talk about makin', why, they'd be good for nothin' but for breedin' frogs, muskeeters and ager. That's common sense, and as for its makin' rain, why, it wouldn't be more'n a small drop in a bucket. Why, Mr. Snyder, if I had a ten-aker pond on my farm that was a foot deep all over, and it would all go up in mist at once, spread itself out over the whole quarter section and all fall at once, it wouldn't make over two-thirds of an inch of rain; so that, in order to raise a crap, it would hev to be filled and emptied about twice a week during the whole summer. Now, it don't do that way, but generally rises in a thin mist, mixes with the dry, hot air, floats out west and never tetches the ground agin till it strikes the snow-kivered p'ints of the Rockies—and who on earth wants to make rain for the Rocky Mountains?"

"But suppose, Mr. Johnson, that our prairies were interspersed with ponds, as they used to be; then would we not get an abundance of rain?"

"Nonsense, Mr. Snyder! Why, if all the ponds in Iowa were full and could be evaporated and fall all over the State at once, it wouldn't make rain enough to wet that muslin shirt of yourn."

"Now, Mr. Johnson, if that is not the source from which we get most of our rain, will you please tell me where it does come from?"

"Well, now, Mr. Snyder, it seems a'most too much like meddlin' with the affairs of Providence for a poor mortal like me to pretend to tell just how we get rain; but to begin with, you know Providence hes made part of this world hot and part cold. That puts the air in motion and makes what we call wind. Now, when the wind in the south gets too hot it makes a flyin' trip north to cool off, and so when the wind in the north gits too cold it goes down south on double-quick to warm up—sometimes most too fast for comfort. So there is a kind of free trade kept up among the winds that keeps things kinder equalized. Besides regulatin' the wind as I have described, Providence has also provided the world with what I call a monster great big rain bird. Her business is to hover round over the tropical seas and gulfs, where the sun shines straight down. By and by she gets mighty hot, and then she absorbs a powerful lot of water that rises from these hot seas. Then, when she becomes well loaded, and the wind is in the right direction, she spreads her great wings and starts north with her heavy load, and just as she comes soaring over Iowa she is met by a contrary little cold wind, and after a sharp little scrap between the two she gives her great, broad wings a few flops and shakes off a good big rain. Relieved now of part of her great load, she soars on over Minnesota, where she meets a bigger and colder wind, and after a rough-and-tumble scuffle with it she shakes the last drop of rain from her great wings. Being now well cooled off, and relieved of all her burden, she returns home and prepares for another trip. Then, when she is well loaded again, if the wind is in the right direction, she will spread her wings and fly over Iowa again; but if not, she will soar over Illinois, Nebraska, or some other State, and they will get the rain."

"Well, Mr. Johnson, your theory seems to be rather plausible; but do you not really think that the drainage of land with tile has destroyed to a great extent our chances for rain?"

"Nary a bit of it, Mr. Snyder. Let me tell you. I hev a boy livin' over in Illinoy, where the land was so flat that for a long time the folks there didn't need no wells for drinkin' water, for they could take straws, lie down and suck water out'n crawfish holes most any place—by the way, Mr. Snyder, do you know that's the way these Illinois fellows got the name Sucker? Now, my boy says that flat land is all tiled out; in fact, he says the whole State is well tiled, and all this summer, when Iowa, which isn't half tiled out, got no rain, and everything got dryer'n a powder horn, Illinois hes had lots of rain, and they hev raised a powerful big crop of corn. Sich like argument always strikes me as the best kind. Fact is, Mr. Snyder, the proof of the puddin' is eatin' it."

"Now, Mr. Johnson, we have had a long talk, and I hope it has been mutually profitable. I must now be going; but before we part let me advise you hereafter to carefully study the scientific side of all these important questions, as well as their common-sense side. By so doing I think your conclusions will be quite different. Good day, Mr. Johnson."

"Say! Mr. Snyder, afore you leave let me give you a little grain of advice. If eny of them smart Elecks ever say anything to you agin about makin' patent rain, or makin' ponds and pluggin' up the tile to make it rain, or that the moon is made of green cheese, or sich like nonsense, don't you believe 'em."

Different members expressed their approval of the paper and their disgust for those narrow-minded writers who had attributed the drought to such local and limited influences as tile drainage.

After the reading of each paper a vote of thanks was tendered the writer by the Convention.

Question: Does anyone carry employer's liabilities; if so, state the reasons and results?

Mr. Holman: I carry such insurance, and had a man killed last summer by a cave-in of a clay bank, and they settled the loss—very satisfactory.

The Treasurer reported $22.25 in the treasury, after paying expenses.

On motion the Secretary was authorized to use all necessary moneys to defray the expense of printing Constitution and other matter.

ELECTION OF OFFICERS.

Election of officers resulted as follows:

President—M. H. Underwood, Des Moines.

Vice President—W. E. Sidney, Buffalo.

Secretary—C. L. Smith, North English.

Treasurer—T. E. Haines, Altoona.

On motion a rising vote of thanks was tendered the retiring officers.

Report of Committee on Resolutions was called for, but as the chairman of the committee was absent and the other members had no report ready, the matter was passed.

The new officers were installed, and a few well-timed remarks were made by President Underwood, after which the Convention adjourned, subject to the call of the Executive Committee.

MEMBERS ENROLLED.

D. J. Spencer, Afton, Ia.
T. E. Haines, Altoona, Ia.
J. M. Keerns & Co., Adel, Ia.
Carl Neis, Burlington, Ia.
W. E. Sidney (Bonnot Co.), Buffalo, Ia.
J. B. McHose, Boone, Ia.
Frey-Sheckler Co., Bucyrus, O.
D. W. Stookey, Cedar Rapids, Ia.
J. M. Starbuck, Cherokeee, Ia.
J. M. Crabill, Clarinda, Ia.
Cedar Falls Brick and Tile Co., Cedar Falls, Ia.
George Hartwell, Jr., Chicago, Ill.
George J. M. Ashby, Chicago, Ill.
Simpson Brick Press Co., Chicago, Ill.
Wolff Dryer Co., Chicago, Ill.
The Bonnot Co., Canton, O.
W. D. Richardson, Cleveland, O.
Iowa Brick Co., Des Moines, Ia.
L. Aulman, Des Moines, Ia.
Dale-Goodwin Brick Co., Des Moines, Ia.
Globe Machinery and Supply Co., Des Moines, Ia.
J. M. Harris, Des Moines, Ia.
J. B. McGorric, Des Moines, Ia.
Flint Brick Co., Des Moines, Ia.
M. H. Underwood, Des Moines, Ia.
J. W. Hicks, Des Moines, Ia.
W. L. McKissic, De Soto, Ia.
C. W. Raymond & Co., Dayton, O.
W. S. Porter, Eldora, Ia.
L. A. Thcrson, Ft. Dodge, Ia.
Ft. Dodge Clay Works, Ft. Dodge, Ia.
L. S. Straight & Bros., Fonda, Ia.
S. McHose, Grinnell, Ia.
G. C. Stoll, Grant Park, Ia.
Frost Mfg. Co., Galesburg, Ia.
Hawarden Brick and Tile Co., Hawarden, Iowa.
C. E. Shaw, Iowa Falls, Ia.
J. J. W. Billingsley, Indianapolis, Ind.
T. A. Randall & Co., Indianapolis, Ind.
Lehigh Brick and Mfg. Co., Lehigh, Ia.
Frank Cory, Lehigh, Ia.
O. T. Denison, Mason City, Ia.
George Eckert, Madrid, Ia.
C. L. Smith, North English, Ia.
W. H. Stevens, Ottawa, Ia.
Fate, Gunsaullus Co., Plymouth, O.
H. M. Pentecost, Panora, Ia.
C. J. Holman, Sargeants Bluff, Ia.
John Cownie, South Amana, Ia.
W. B. Lower, Sioux City, Ia.
W. B. Lower, Sioux City, Ia.
C. B. Platt, Van Meter.
W. W. Lewis, Williamsburg.
Charles McHcse, West Boone, Ia.
J. W. Penfield & Son, Willoughby, O.
Webster City Brick and Tile Co., Webster City, Ia.

THE OHIO TILE, BRICK AND DRAINAGE ASSOCIATION.

THE BRICK AND TILE makers of the Buckeye State met together in annual Convention for the seventeenth time Wednesday, Feb. 12, in the cozy Council Chamber in the City Hall, which the city fathers kindly donated for the occasion. Secretary Justice was kept busy for a half hour or more converting dollars into badges, so that when President McClure tapped for order at 9:45 the hall was fairly well filled with Ohio's sturdy and enterprising clayworkers.

President McClure expressed himself as well pleased with the attendance, and, with characteristic enthusiasm, insisted that every member take an active part in discussing the various questions that would come before the Convention. The first matter he wanted settled, he said, was the furnishing of copies of the papers to be read to the trade journals. On motion of Mr. W. A. Eudaly, seconded by Mr. E. M. Pike, of Illinois, the Secretary was instructed to have the necessary copies made at the expense of the Association and distribute same to the trade journals represented.

REPORTS OF MEMBERS.

President McClure then announced as the first regular order of business the reports of members as to their trade for the past year and the prospects for the coming season. Several of the members responded as their names were called by the Secretary, stating that trade was dull, but better times were anticipated.

Mr. Randall moved that the reports of members be deferred till a subsequent session. Mr. Eudaly seconded the motion, stating that he thought that part of the programme could be dispensed with altogether, to the advantage of all concerned. Mr. Fate demurred to this, saying he considered the reports of members an instructive and valuable feature of the Convention. "We come here to learn from one another," he said, "and if our trade is not satisfactory we want to know it and seek a remedy. Two years ago the reports were all right. The brick and tile men were prosperous. Last year the reports were less favorable, and now they are worse yet. Now, what is the cause? That is what we want to know. Is it the drought, the hard times, or unwise competition? If we can determine the cause we will be more apt to find a remedy." Mr. Randall's motion prevailed, and the members then gave an attentive ear to the

ANNUAL ADDRESS OF PRESIDENT.

—W. B. McClure, Warsaw, O.—

One of the most encouraging aspects of clayworking is the desire of clayworkers generally to investigate all subjects pertaining to their vocation. Clays, their adaptability to being molded into any desired form, their partaking of any color in finish, have led the investigator to realize that "Below each deep another deep opens." While the progress that has been made in clayworking is great, it is not complete. Old ways must succumb to the new. It has been wisely said, "There is nothing that has any degree of permanency while great thinkers are abroad."

President W. B. McClure.

The improvements in machinery, kilns, dryers, literature and the diversified products of clayworking industries, need no ecomiums. They are witnesses to the fact that clayworking and its allied industries have produced their full quota of great thinkers. We all feel a just pride in the successes of the past. Yet we are not satisfied. One improvement is rapidly followed by another.

Gentlemen, the question of the hour is, how can we put an improvement on our Convention? If the Seventeenth Annual Convention of the Ohio Tile, Brick and Drainage Association does not probe deeper into all questions that beneficially effect clayworkers than any convention we have hitherto held, we should know why. Clayworking is one of the progressive industries of our State, and this Association should be a very fair exponent of clayworkers' ideas. The unrest that exists among clayworkers generally demonstrates very forcibly that we are not satisfied with our present knowledge pertaining to clay and clay products. What clayworker is not asking himself such questions as, how can I improve my wares by adding a certain per cent. of this or that kind of clay or shale, or by deducting a certain per cent. of this or that kind? Does our clay temper and mold satisfactorily? If it does, do we do the work as easily and cheaply as is possible to do it? Do our wares dry satisfactorily? If they do not, are we intelligent as to the best methods for us to adopt, every phase of the subject having been thought over carefully? Are we satisfied with our present burning system when we realize that quite a per cent. of our wares as they come from the kiln are not first class? If we are not satisfied, are we making any improvement? Is the present demand for our products satisfactory? If not, what are we doing to increase it? Are the present prices satisfactory? If not, are we studying upon some feasible plan which will enhance their value? These inquiries are few to what might be suggested that are of importance, but these are sufficient to show that successful clayworking is a field for thought and action.

Gentlemen, we know there are many departments regarding clayworking upon which we need information. We came here for the purpose of obtaining that information. Are we to be disappointed? If clayworkers ever needed facts it is now. Bombast is no good. The long, broad, high piles of clay products ricked with care and the hope of at least a fair market, are better evidence than Greenleaf's that something must be done. It is not the question of securing large profits that breaks our slumbers, but it is a question of disposing of our stock so we may at least be able to show an appearance of life the coming year. An honest, truthful investigation of the true situation of the average clayworker will prove an ally of strength and stability.

If an opportunity presents itself whereby we can create a demand for our products by legislation, seize the opportunity. Some men make opportunities. If an idea should develop during this Convention that would be feasible in maintaining fair prices, it is our duty to consider it thoroughly. Hugo says, "There is a crisis in every man's life, and if he chooses wisely he will succeed." We know it is pleasing to the ear and looks well on paper to spread out a little at conventions. To say that the people are falling over one another to purchase our superior stock, that we have large orders booked ahead, etc., the true condition of clayworking will not justify the statements. Spread-eagleism has been and is a curse to the best interests of clay manufacturing. It has been, and is to-day, inviting unnecessary competition. The successful clayworker of the future will be the survival of the fittest, with large plants equipped with everything that is necessary and doing large volumes of business on small profits. We are told, and it is true, that the weeding out of back numbers has been going on for years; but we have overlooked the fact that a fogy clayworker never fully surrenders till after he has gone to seed. And his seed, gentlemen, is more prolific than a Russian thistle.

The small and average-sized plants are year after year being confined to smaller territory. We want to commence protecting what are left. In making our annual reports it is a very common thing to hear a report or reports similar to the following: "I have enjoyed an excellent year's trade; have been out of goods for months. I have no idea how many I might have sold had I had them." We go home feeling good. But when we realize that competition is springing up around us we are surprised. It is really surprising, we admit. In some very mysterious way (probably by chance, for we heard two years ago that some good things come that way) a few reports of the State Association have crept into our vicinity, and around our names is a great, big red or blue pencil mark, and as by magic a brand new clayworker (or possibly a whole family of them) is born in our community.

Do they come by chance? The general depression in business has affected us very materially. But from what I can observe clayworkers are accepting the present condition of affairs as philosophically as the deacon who planted a patch of potatoes and, returning in a few days to see if they had come through, observed nothing but a large number of Colorado bugs. From all appearances they were enjoying themselves doing nothing, simply waiting for future developments. The deacon, sizing up the situation, addressed his newcomers as follows: "You are here, are you? Just have patience—the 'taters are coming." We are here, apparently enjoying ourselves. Better times are coming. Let us assist in breaking and disintegrating the crust between us and good times; let us assist prosperity in coming much more rapidly—much more abundantly.

When papers are read suggesting some valuable ideas that we desire to hear more fully developed, what are we going to do? Are we going to discuss them until we secure the information desired, or are we going to let them go by default lest in the discussion we will drop an idea that will be of value to a fellow-craftsman? Upon questions of importance let us adopt Brother Eudaly's idea and make this Convention a "broad gauge." A few facts that will assist us in raising sufficient revenue to pay running expenses, at least, will be more valuable than volumes of theory. If there is one place better adapted than another for the discussion of clayworking, we have the vantage ground. Our State leads in the production of clay products. Here, also, is located the clayworkers' school, assisting very materially in deducting facts and data from a former chaotic condition. While the clayworker school is a source of State pride, it is national in character, and its influence will be felt as far as modern methods of clayworking are adopted. This is the last State Convention of the year. Make it the best. Let it be known as a Convention that does business in a businesslike way. Turn on the searchlights, and the success of the Convention is assured.

At the conclusion of his address President McClure was loudly applauded. He then announced as the next in order the following paper:

THIRTEEN YEARS IN THE TILE BUSINESS.

—F. Halbeisen, Erlin, O.—

As I have been a number of years a member of this Association, I have made it a point to attend its annual meetings if it is possible for me to do so. Having been one of the few who was in attendance at our annual meeting at Cleveland last year, I was somewhat surprised that there was not a larger attendance, and I naturally made inquiry of our worthy secretary as to what he thought was the cause. Well, he really could not tell, unless it was on account of hard times or on account of the National Association being in session at the same time and place as the State Association, which might have had something to do with keeping away some of the smaller manufacturers. "But," said he, "let that be as it may, if we are alive and well we will no doubt meet at our old place again next year; and, by the way, I would like to have you put your shoulder to the wheel (or something to that effect), and let's have a rousing big turnout when we meet again." I told him I would do all in my power in my section of the country to have a larger attendance at our next annual meeting, which was to be held this year. But imagine my surprise when I received a letter from him stating that he wanted me to write a paper for this Convention. Little did I think, when I promised I would do all I could to make the Convention a success, that he would call on me to take part in this way. But I presume he thought I was rather inquisitive and he would get even with me some way, and took this course. However, not knowing what his object was in putting me on the programme, and having promised to do all in my power to make the Convention a success, I wrote him that I thought there was but one subject about which I could write which might do some one good who intended going into the tile business, and that was to tell of the mistakes I have made in the thirteen years I have been in the tile business.

Now, gentlemen, first, I want to impress upon your minds that I was in pretty much the same predicament when I started to make tile as I was when I started to write this paper—I had no experience; in fact, I had never seen a tile made. You members who started into the tile business under those conditions know already what that means. But if there are any here who contemplate going into this enterprise and have had no experience in that line I hope I may be able to do you some good, for in my opinion that is what we are here for—to tell one another our mistakes as well as our successes. It matters not how little or how much you know, if you come here and go away again without opening your mouth, the Association will be none the better for your coming. And if there is anything you do not know or that you want to know, make it known, and I have no doubt there are members here who will enlighten you and put you on the right track.

A great many of us, in choosing clayworking for a trade, have made the mistake of beginning wrong or starting out on the wrong track. I know from experience such was the case with me. Had I known then what I know now I might be several thousand dollars in pocket. Therefore, I will say to those who contemplate going into the tile business, and also those who are not making a success who are already in it, be sure that you start right, and in order to do that you must have some knowledge or experience in that line. Experience, as we all know, is one of the most important parts in any line of business, and most especially so in the manufacture of clay goods. There are hundreds of thousands of dollars sunk annually in the manufacture of clay goods just from lack of experience or knowledge in the business. Now, if I was to start in the business again, I would go to some plant quite a distance from where I intended to start my yard. I would look up some place where everything was in first-class order. Then I would frankly tell the proprietor I wanted to learn the business of making tile and brick—that is, if he made brick in connection with tile, and would be willing to pay him for a year's tuition. First, I would ask him to instruct me how to temper and mix the clay, for this is one of the most important parts, and here is where a great deal of the trouble comes in when you fail to make a success in the tile business. It has been, and is yet, a very difficult matter for me to get a man that I can trust to do the mixing and tempering of the clay. And I will venture to make the statement that nine-tenths of the breakdowns in our factories come from this one cause of not having your clay properly tempered.

F. Halbeisen, Erlin

I have had men shovel three or four shovelfuls of clay into the tile mill, which caused a break-down that cost me forty dollars for repairs, where with a little care and experience it would have been avoided. Then, again, I would ask my instructor to show me how best to handle the green tile in taking them from the machine and placing them in the drying sheds; also the best methods of setting them in the kiln to insure the best results.

But the most particular part, and one in which I would ask him to give me full and thorough instructions, would be the burning. You may learn to do all the other parts successfully, but if you do not learn the art of burning you can never make a success of the tile business. What I mean by this is that you must know from the experience of your ware in your kiln when the heat is up to the proper temperature to insure a good, hard-burned tile. I will just state a little of my experience in the first kiln of tile I burned, to show you how important it is to know something of your business yourself, and not trust altogether to others' skill.

I had employed a man to do the burning who said he knew his business and gave pretty good reference; but, to my sorrow and the diminishing of my bank account, he did not prove to be what he was recommended to be. When we got the kiln burned and some of the tile taken out, they looked rather pale; but he said my clay would not burn a very dark red, but that those tile were all O. K., No. 1. So I sold them to whoever wanted to buy and recommended them to be number one—for hadn't my burner told me so? Sure, he ought to know, for he had lots of experience and knowledge in burning. Well, the result was that I found he did not know so much as he thought he did, for every one of those tile that were lying on top of the ground the following winter melted down. And it was a long time before I could convince the people that it was not the fault of the clay that those tile melted down, but was the fault of the burner.

The next important thing, after you have learned how to burn, is to have a good kiln; and do not for one minute let the thought enter your mind that any kind of a kiln is good enough. Neither allow anyone to persuade you to build the old style kiln or use the old methods of burning, for if you do you will be money out of pocket.

To prove this, I used to use one of the old style kilns, and it took us four and one-half to five and one-half days to do the burning that I do now in from forty-eight to sixty hours with a great deal less work, and I think somewhat less fuel, and with but very little loss. While speaking of kilns I will state that the kiln I am using is one of my own origin, and no doubt the most of us came here to gain information; therefore, I will state how I came to observe the different points of advantage in this kiln. Having worked a number of different kilns—some up-draft and some down-draft—I always noticed the hardest tiles were the ones closest to the fire; in the up-draft they were hardest at the bottom, and in the down-draft they were just the reverse—hardest at the top. Quite frequently you will see the tile nearest the fire all melted down or drawn out of shape. Now, this is done in trying to get the tile the farthest away from the fire or furnace up to the proper heat. To avoid this I so constructed my kiln that it is both an up and down-draft. But for fear that some of you might think I want to do a little advertising, I will say no more about kilns at present. However, if there are any of you who wish to know more about this kiln, I will be pleased to give full details after the session, or any time when it is convenient for you.

In closing I will read you a few business methods that I got from a little book entitled "Never," which I think will fit some of us tilemakers pretty good. I know some of them hit me fair and square, but those are the ones I will leave out.

"1. Never advertise that you are selling your goods at cost when you are selling them at a profit of 100 per cent. It is lying, and the meanest kind of dishonesty.

"2. Never purchase your goods in some far-off city because home manufacturers charge you too much—your neighbor may have sold the goods to your New York or London merchant.

"3. Never begin business again on a large scale soon after having paid ten cents on the dollar. It is unkind, and may cause your creditors much pain.

"4. Never be harsh and uncivil to your employes. Some day you may need their friendship; besides, it is unmanly.

"5. Never misrepresent your competitors to your customers. You will sometimes suffer for it.

"6. Never put on airs in your business. Airs and ass both begin with an a.

"7. Never under any circumstances, after you get rich in the tile or brick business, forget that once you were poverty-stricken and endeavor to put on airs. It is evidence that you are a little cracked."

DISCUSSION.

E. M. Pike: The paper is good. I notice that he recommends that anyone wishing to go into the business had better go to some one competent to instruct him. The writer misses the point that what he learns about one clay has to be learned over in the use of another clay.

Mr. Eudaly: There is not much room for discussion, the paper covers the subject so thoroughly. One point I am inclined to take issue on is the idea that one may profit by going to some real good factory a long distance off. Why not seek for information nearer home? Then perhaps you wouldn't have to learn all over again, as friend Pike puts it.

Mr. Halbeisen: You may not be able to get accurate information right at home, for some manufacturers do not relish the idea of educating a prospective competitor.

FROM CLAY BANK TO KILN.

—By F. E. Frey.—

"From the Clay Bank to the Kiln" is the text given to my worthy conferee, J. A. Ebersole, who, unavoidably, has been called away, and for want of a better subject (not referring to the text, but the substitute) has delegated your humble servant to serve you in his stead.

The subject matter of this thesis, as I understand it, is of rather a prosaic nature, although some rather amusing circumstances come to my mind, while looking up the past experience of my observations in seeing the raw material pried from its bed of many centuries, and, through the manipulation of the clayworker, made into burnt ware. How to make clay ware cheaper and better is the great desideratum which called forth an effort in this direction. Although not actively engaged in the pursuit, my connection with the clay trade dates back many years, and I have watched the progress of the art in its different phases, and its evolution up to the advanced state of the present time.

I will briefly state that if I succeed in giving any valuable information in this paper it has mostly been secured by seeing the failures of others. Ill success leads us to the study of the subject and opens our eyes to the way of more successful procedures. First and foremost, the principal requirement in the successful handling of clay from the bank, grinding, tempering, molding and burning it into marketable ware, is "system." System is economy. The progressive clayworker cannot handle a factory at the present time in the same manner as it was done ten or twenty years ago, when we had only brickyards. Machinery has changed this very materially, and the depression in trade, with the low prices for the products, has made the systematic operation not only imperative, but a matter of life and death to the owners. Now it has become a question of the survival of the fittest.

But you ask, "What system do you recommend?" This may be answered in a few words, although the subject, if properly treated, would make a book as large as the Bible. The system consists in having a given quantity of ware made per day with the best machinery, and every man to fill his place like the wheels in a clock—each man paid by the quantity made. The clay diggers or miners, the shovelers, the temperers, the machine men, each to receive his proportion per thousand, as well as the dry kiln men and setters in the kiln. This is done in several ways—by checks, tally boards or accountants. The burners usually get paid by the day or month, or per kiln. An exact account should be kept of the fuel used, as well as the amount for freight to get the product to market; in fact, every cent of expenditure should be charged daily, so that the loss or gain can be readily ascertained as the work progresses, without waiting to the end of the year to figure up whether to shut down or go on.

Owing to the many different methods in making the principal clay product, "bricks," our time will not admit us in detailing the best methods—how to make dry press, semi-plastic, stiff clay, soft clay bricks, and the various other bricks of fire clay, shale or drift clay into fire brick, pavers or building brick. The digging of the clay by steam power, where the locality and quantity needed allow the use of a steam shovel, reduces the cost to the lowest point. Then, again, when the factory can be so located that the raw product can be run in by gravitation again reduces the expenses. Next, when the nature of the clay admits its dumping into large hoppers, from which it can be drawn at will into the grinding machinery; next, after being ground, screens used that are not a continual bother—which, thank God, can now be had, working at their full capacity all day without any attention, by means of steel brushes inside of the rotating drum of screen plates; then the tempering—the most important process in the whole journey from the clay bank to the kiln. A good, large pug mill and an attentive water dispenser (this in a high thermal state) keeps the works running steady, without brick too hard or too soft alternating, breaking wires, cracking corners, daubing the machinery or requiring an extra man to throw the faulty product back to enact the same farce over again. Thanks to the ingenuity of the machine men, an automatic device that works admirably in many clays has now come forward to measure the clay and water as it enters the pug mill, doing the work much more exact than the best temperer is able to do. As stated, the clay must be suited for this automatic temperer. It was the writer's privilege to watch one of these tempering devices last summer for days, doing the tempering more perfect, without a man being near, for an output of 70,000 brick per day. This is another item of saving where admissible. Allow me to comment somewhat further upon this subject. Many of you have no conception of the pangs a machine man has to endure from bad tempering of the clay. Fully confident in his own mind that the machinery he has made and set up is just the right kind and suited for the clay, but the owners have found a man or boy that will do this very job for a dollar a day or probably two cents per 1,000, while a good, practical man wants $2 per day or four cents per 1,000. So here it goes, the corners on the auger machine column as it emerges from the die are continually cracking, the wires break, the brick are thrown back until they pile up around the machine so as to nearly hide it, and finally tumble into the gearing; and back of the over-strained machine man, while the owners are cursing the machinery for not correcting the faults of the mistaken economy. At one place not long ago a new machine was put in a factory where one wet-pan was to do the tempering for the ground clay of two dryers. The wet-pan had a discharge spout which could be lowered by a screw to first skim over the surface, and as it got lower finally to take out nearly all the clay, a water pipe dropping the water in the wet-pan. The output was from 40,000 to 50,000 brick. As will be seen this was an intermittent process. At times no clay came, then an avalanche, which filled the hopper chute and elevator and caused a heap of trouble. The manufacturers were compelled to use several devices in the hopper to overcome this alternating choking and emptiness. Two rotating shafts with interlocking knives proved a partial remedy, as it acted somewhat in the place of the much-needed pug mill; yet the clay will be an uneven temper with the best endeavors of the temperer, as many times the wet-pan would not revolve more than once with the last clay admitted before the scoop had to be lowered to keep clay in the machine. As auger machines are the most numerous for making brick, I will mention the automatic cutting tables which are coming in general use. Much thought and expense have been exhausted upon these valuable adjuncts to the auger machine. Several almost perfect side-cut tables are in the market, which, however, will be very much simplified in the near future. I refer to those cutting side-cut brick mainly, inasmuch as those are now conceded to be better for general purposes than end-cuts, for which automatic cutters have been used for many years. Inasmuch as one or two men are saved here again another gain in cheapness of production is added.

F. E. Frey, Canton.

Next, the proper designing of the brick factory in regard to the tracks on which the cars travel from the delivery belt machine, or represses, to the dryer also may save the labor of a man or two; turntables and long distances from the machine to the dryer must be abolished in the model factory.

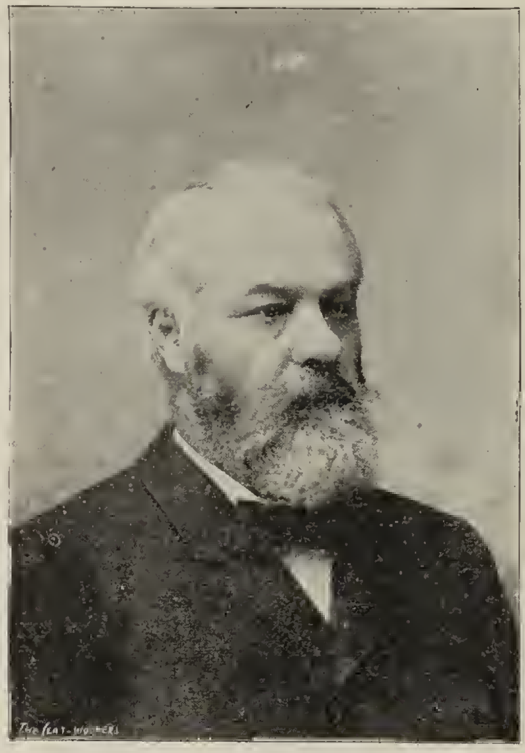
Now, what will we say about artificial dryers? The expression that God's free air is the cheapest and best dryer for brick is not heard any more in our midst. It is needless to touch upon this subject. Which is the best dryer is now the important question up to this time. Where cheap natural gas is not to be had steam dryers show the best record. The construction should be such as to have plenty of steam pipes and a good circulation; the pipes put in so as to be easily gotten at and kept in good alignment; as few joints as possible, and to deliver the dried brick as near to the kiln as possible. We hoped to be able to eulogize a new system by this time, which had been very much talked over last season and even largely advertised in Europe, viz., the forcing of direct heat from the fuel through the tunnels by means of fans, but alas, so far it has not realized our expectation in economy or usefulness. We hope, however, that it is yet in state of progression. However, the carbonic oxide gases, the soot and whitewashing of the brick by the excessive sweatings may always prove a hinderance to this mode of applying the heat to the ware. But, now we have reached the kilns. If you will excuse me from going into the kiln question, after stating that I believe the continuous kiln is the coming kiln, I will wind up by relating to you one of the amusing journeys from the clay bank to the kiln which first came into my mind when I tackled this wide effusion. Surmising that you are tired after the slow journey in which you have followed me, I will relieve your minds somewhat by mentioning that this was the fastest journey I ever saw the clay make from the bank to the kiln.

Some years ago, when the booming of Southern towns was in order, a syndicate from one of those mushroom growths ordered an outfit from one of our Northern manufacturers of brick machinery to make 30,000 brick per day. Bad management, negro labor, and worse clay played the mischief in getting it to run right and a settlement. I went down to nurse it awhile. I fared sumptuously on hog and hominy for several weeks while prescribing for the patient a new superintendent, oil and temperers. The old superintendent had found what he claimed would bring the winter of their discontent in failures to beautiful summer of success. This was a deposit of shale on top of a hill over two hundred feet high, back of the factory in opposition to the kilns. A railroad was built with a double track to reach the summit. A large friction shive pulley drew up the empty cars by means of an inch steel rope by the loaded car going down. The track pointed direct into the middle of the factory, entering on trussle work about fifteen feet high. A large dry-pan was secured to grind the shale to be mixed with the obnoxious clay that caused so much bother. The shale, by the way, proved about half lime, and the balance very effective fluxing material. The rope referred to was utilized in the construction of the track to haul dirt and ties up the partly-finished track, and as it was about 600 feet long, hitches were made on it in different places of its length and beautiful kinks left in it all along between the two ends. A force of negroes was started to blast and scratch the shale out from amongst the rocks, and one nice spring day the cars commenced descending and ascending. These were of a very heavy pattern, holding about three tons. On the signal being given the loaded car was started, but aslas, one of those pesky kinks in the rope broke close to the car, and it started on its journey from the clay bank to the kiln. The factory was no obstacle; on it came with a velocity as if shot from a catapult. Before it reached the factory the wheels flew into pieces and made for the kilns on their own responsibility, leaping over the factory and alighting on top and around the kilns in pieces weighing from one to eighty pounds. The car endeavored to take a short cut, first encountering some posts ten inches thick, which were splintered, then the dry-pan, breaking the gearing and a nine-inch shaft, also demolishing the platform where an ex-cowboy of New Mexico was acting as temperer. In its endeavors on the journey from the clay bank to the kiln it encountered a very solid wall, behind which the secretary of the company and myself were standing. I was just on the point of having him say that he would settle, when the earth rocked and a dust filled the air so that we lost sight of each other. With a cry, "The dynamite magazine has exploded," I rushed through the nearest opening followed by the secretary, and clawing our way through the debris we hunted for the mangled corpses of the men, but miraculously no one was hurt. True, the cowboy had fainted from fright, and was just about ready to roll off the platform as he was coming to when we caught him in our arms. Upon being asked if he was hurt, he groaned, "Shot all to pieces," and showed signs of another faint when a native produced a bottle of moonshine, which had seen its birth in the hills nearby. After a hearty draught he managed to stand without support, and allowed us to look for his wounds. The minutest search, however, did not reveal a scratch. Rubbing the dirt out of his eyes he looked at us rather sheepish, and gave voice to his astonishment by saying, "Gol durn, what was it, anyhow?" So ends the story from the clay bank to the kiln.

DISCUSSION.

Mr. Eudaly: I understand that the writer really intends to bring out the fact that many plants are poorly constructed, and that we should look out for hobbies. It is true many large concerns have been wrecked by small hobbies. Mr. Frey's paper calls particular attention to the slip-shod or careless way many plants are arranged. It is a mistake to build a plant without a carefully drawn plan, so that every branch of the work may go on systematically, in order that the material may be moved with the least cost and least delay from the time it is taken from the bank till ready to ship. I have known cases where men have failed through attempting to work out a hobby on the hauling of the clay from bank to machine. Where cars are hauled by cable the track should be so laid that the man operating the hoist can see the car at every turn. I remember a factory where the loaded car was only visible to the man who operated the hoisting drum at the lower and upper end of the run; that is, he could only see a portion of the track. I called the superintendent's attention to this point, and warned him that the cars were liable to jump the track and cause serious damage before the man at the hoist knew what was going on. Sure enough, while I was there just that thing occurred. The car left the track, and the men below yelled and yelled to no purpose. The car and a part of the track was wrecked. This would not have happened if the man at the hoist could have seen the entire line of track. The cable system is economical when properly built. Curves and irregular grades should be avoided.

Mr. McGowen: I had an unfortunate experience along this line. I built a tramway. The track was rightly designed, but the contractor who was to build the trestle disappointed me; the grade was imperfect and made me lots of trouble. It is necessary to lay the track to a true grade.



B. B. McGowen, Mt. Gilead.

Secretary Justice, being called on, related an experience he had had at a factory where the clay was hauled by a system similar to the one described by Mr. Frey. Accidents were frequent, and usually there was not much left of the car. One safeguard was provided, however. The track was curved so that if a car broke loose it was ditched, instead of going into the factory. Where it is practicable, the gravity system is effective and cheaper than steam, but a switch or some arrangement ought to be provided to prevent the loaded cars from crashing into the factory in case of accident.

Mr. Wilson: We have used both systems, and find we can get in our clay by gravity for little more than one-third the cost of hauling by steam.

F. M. Gardner: How much cheaper can we get in the clay by cars than with carts?

It was generally agreed that it could be got in by cars for two-thirds less than by carts.

President McClure: There are usually complaints heard after our sessions that the discussions of these practical questions are too limited. I want to say that members are at liberty to ask any questions they see fit, and that if they don't do so, but sit still in their seats, they have no one to blame but themselves.

LEGISLATION ON THE DRAINAGE OF PUBLIC HIGHWAYS.

—By B. B. McGowen, Mt. Gilead, O.—

Some two years ago I prepared a paper on the subject of the improvement of our public highways, and read it before the Convention of the State Tilemakers' Association. At the earnest solicitation of your committee, a few weeks ago, I finally consented to prepare a like paper to be read on this occasion in behalf of better roads. In doing so I have necessarily passed over much of the same ground as was passed over in my former paper, but to me it is a subject which will bear to be often repeated, as it is only through agitation that improvements and reforms are brought about.

In changing from the old to the new, or from the tried to the untried, two objects should always be kept in view—the defects in the old system, and their remedy in the new.

Under our present system of road-making we can hear and learn of the defects and objections to the same from all quarters, as it is natural for man to break down rather than to build up, while those who have even attempted to point out a remedy are few and far between.

In these days of electricity it is supposed by some that the question of country road-making in the near future will be a thing of the past, and that all products of the farm will be carried to market over electric roads, which promise at no distant day to form a great network over the farming territory of this State. I think they are laboring under a mistaken idea. So long as farming is carried on under the present system, and the crops are cultivated and gathered by the assistance of the horse, good roads will ever find a warm friend and substantial supporter in the farming community of this country. The marketing of the products of the farm will ever be a matter of economy with the farmer. Under a good system of road-making he can utilize his horseflesh at a time of year when otherwise it would be standing idle in the stable, and thereby save the cost of transportation over the electric roads, which, placed to his credit at the end of the year, will be no small source of income. Good roads will likewise give him the advantage of higher markets during the season of bad roads, when otherwise his products would lie in the bin at home, waiting for the coming of better roads, and with them the fall of prices.

The fancier of the fine horse will also welcome the beginning of a system of good roads for all time to come.

During these days of material progress the improvement of our country roads has by no means kept pace with improvements in other lines of progress; especially is this so when compared with our towns and villages in the improvement of their streets.

Under the present system, and the depression of agricultural products, farmers have lost interest, and have turned their backs upon the manner in which the road fund has been expended upon our public highways—and well they might do so.

Our roads in this county for the past number of years have been worked by the supervisor more for the purpose of getting the tax worked in and a receipt by the individual to apply on the payment of taxes than having in view the permanent improvement of the highway. With such an object in view the roads would be in a better condition if no labor had been performed, as it only results in stone piles on one portion of the road and mud on the other to drive over and through the coming season.

The trouble with the present road law is not on account of a want of funds to build roads, but from want of a system which will be carried out year after year. Should a supervisor commence work on a systematic order for a permanent improvement, his term of office would expire before it was carried out, and the chances are that on the election of his successor a different plan would be adopted and attempted to be carried out, which would result in a like failure. Such is the manner in which money is expended in our public highways, without bringing any return to the taxpayer.

In the small township of Gilead, in which I reside, the road fund amounts to about $1,800 per year under the present levy of two mills on the dollar. This amount of money is placed on our highways each year under the present system of allowing each individual to work out his own tax under the supervisor. It is hardly correct to say that this tax is worked out, as nine cases out of ten it is simply a question of putting in time, and the more that can be killed the better it suits both individual and supervisor.

Supervisors are elected, not from any peculiar fitness they may possess which would aid them in the discharge of their duties, but more on account of a fitness to allow men to kill time and do as little work as possible as will meet the requirement of the law.

I think we can all see the evil; but what shall the remedy be?

Let our present road laws be repealed, abolishing supervisors and road districts, and enact in their stead a general law making each township a road district by itself, giving the trustees of the township the power to levy a tax, to be paid in money into the township treasury, not to exceed two mills on the dollar, for the building and repair of the roads in the township; the trustees to have the authority to employ a practical road-maker or an engineer to oversee the working of the roads, or, if preferable, oversee the work themselves, with power to employ teams and men to carry on the work, but to allow each payer the privilege of working out his own tax, but to be done on the same terms as others are employed on the public highway. In so doing more work and better results will be accomplished with half the tax than is now accomplished under our present system. A like law should be enacted giving the commissioners of the county power to levy a like tax, not to exceed one mill on the dollar, for the improvement of our main roads leading into the largest towns, and also to lend assistance to the different townships in their attempt to make permanent improvements.

These laws would apply to the whole State, yet leave it discretionary with the trustees and commissioners to say what the improvement should be and the material used in the same, whether it be gravel, stones or a system of drainage.

On account of the great diversity of soil in the State of Ohio a different class of material may be used in one part of the State from that in another in the building of roads. For instance, that portion of the State which lies west and north of the Big Four railroad, including black loam and swampy lands, will even need gravel and stone pikes after they have been properly drained. A drainage system is essential to good roads under all circumstances, whether they be built over the swamps of the western portion of the State or the clay-gravelly soil of the eastern and southern portions.

In the eastern and southern portions of the State a drainage system on the following plan, I think, will provide us with good roads under the present levy of two mills on the dollar.

Place a string of four to six-inch tile on each side of the traveled road about sixteen to eighteen feet apart, and about three feet deep. This will give the road a good drainage and leave it in a shape to dry off quickly after a rain.

Take roads that are properly drained and use the road scraper at the right time, we will have good roads the year round—roads that will be preferable to the stone or gravel pikes in the saving of the horse.

The passage of the law as mentioned above cannot fail to meet the approval of the people, as the same system is now in vogue in our towns and villages and the construction of streets.

DISCUSSION.

J. W. Everal: Do I understand that you levy two mills on the dollar?

B. B. McGowen: Yes.

E. M. Pike: Mr. McGowen is correct in the paper on the drainage of highways. We have found that where a tile is placed in the middle of the highway the surface becomes puddled, and the drain does little good. Now we put in two lines of tile, on on each side of the travelway of the road, and grade the road crowning to the center, with much better results.

Mr. McGowen: I know of roads which have been drained as I suggested, and the result is remarkable.

Mr. Gardner: Our gravel roads which have not been underdrained soon become yielding and break through with travel in the spring of the year. Gravel roads need tile draining.

Mr. Menzer: I drained a piece of pike that always got soft, and since being drained it has kept solid.

Mr. Halbeisen: We have about a two-mill levy in our township, and the roads are no better than they were twenty years ago.

Mr. Darnell: Our cemetery board had trouble with bad roadways, but now they are underdrained, and are solid and firm.

The committee appointed on needed legislation last year reported that they had seen a number of the members of the Legislature, but the majority of them declined to take any action for fear they might not be elected the next time.

SECRETARY I. M. JUSTISE, Loudonville.

Mr. Wilson: There has already been a bill introduced to re-enact the two days' labor law on public highways.

On motion the Committee on Road Legislation was continued.

Adjourned to 1:30 p. m.

WEDNESDAY AFTERNOON SESSION.

The Convention met pursuant to adjournment.

J. W. Everal: The suggestion of Mr. McGowen favoring the tax levy to maintain highways needs consideration. Therefore, I move that a committee of five be appointed to consider this subject and report a resolution for action during the meeting of this Convention.

Carried.

The Chair appointed the following persons as members of the committee: J. W. Everal, Westerville; E. Biglow, West View; S. Snyder, Millersburg; J. D. Boyer, Winchester; Prof. Edward Orton, Jr., Columbus.

WHY I AM ATTENDING THE CLAY-WORKERS' SCHOOL.

—By E. E. Gorton.—

Mr. President and Gentlemen of the Institute:

It affords me much pleasure to thus address this Association, and especially so because it is the first time in the history of the United States that any one in the position which I occupy—that of a student of the ceramic art—has had an opportunity to address such a body as you compose. The very recent creation of this, the first school for clayworkers, makes such an assertion a safe one, and it is a further source of pleasure to me to feel that I am addressing you in response to an invitation from your executive officers, and therefore that the Institute regards the work of this school with interest and attention.

Gentlemen, you are all perfectly familiar with the process of making a brick, and you all know how extremely careful you are, even in the manufacture of such wares as common brick, to properly prepare the clay or crude material which constitutes their body substance. You know how the clay is first ground to free it of all coarse material and to make it more homogeneous, and then how the precaution is taken to screen the clay before it goes to the wet pan, where much care is observed to properly temper the same. And after leaving the machine the brick are placed in the dryer, and remain there until you feel satisfied that they are ready for the kiln, where again the greatest care is taken in the final step in the preparation of the raw material. And isn't it strange that for centuries past, during all these years of progress, the energies of clayworkers have been exerted simply to improve the machinery and methods of brickmaking and to prepare the clay, whereas the preparation of the clayworker, the very man who is to oversee all these things, has just recently been given the first thought? And what I have to say is that the preparation of a clayworker for his work is just as essential as is the preparation of the clay itself before it is made into the various commodities.

A vessel, equipped with the most modern machinery in midocean, in a heavy sea, without an engineer, would be in no worse condition than a similarly equipped brickyard in the hands of one inexperienced or otherwise totally unfit for the position. Both would soon be wrecked.

Look at any line of business or any profession, and we find the longer the training that leads up to its practice the better prepared is the individual to meet the demands thrown upon him. Preparation is the foremost feature to success in whatever one undertakes.

Would it be wise for any one to launch out and engage in the brick business or any other particular line with which he is unacquainted or inexperienced? I should say not. An illustration of this kind came under my observation a few years ago. He was a once prosperous merchant whose mind was turned toward the brick industry, as his former business was not as profitable as he could have desired, and undoubtedly he was led to believe that "there's millions in it." He bought his land at a place not easily accessible to the market in which he contemplated disposing of his brick; had an analysis made of his clay, which was to him satisfactory, and in a short time he was a full-fledged brickmaker. A little later he found that his clay contained so large a per cent. of lime and of such a composition as to render a large part of each burn worthless. That is not all. He experienced much trouble in burning and in various other ways. Had he taken a two years' course in ceramics or its equivalent he would not be as we find him to-day—a discouraged brickmaker.

The science of clayworking should be governed by the study of cause and effect. The haphazard, cut-and-try methods too often employed about clayworking establishments must sooner or later give way to methods based upon sound scientific principles. Clayworking and ceramics should be treated as a science. We have long since passed the mud-pie stage of the game.

And now as to the kind of education. Does the clayworker need a theoretical education, or is a practical education sufficient, or does he need both? With theory alone, one would make grave mistakes in the commercial world, and he would constantly be confronted by questions involving dollars and cents with which he could not confidently deal. His views, also, would be very narrow, and he would encounter much difficulty at all times to put his theory into practice. To one who has had some practical experience, however, the application of the principles involved in the theoretical study of the work would be easier. With practice alone, one would be far better fitted to solve the daily problems of everyday life, and at least one could follow in the same footsteps his forefathers have trod for centuries past, and perform the same routine of work. We have now come upon a time when the demands of all industries are for highly specialized knowledge and manual skill or dexterity of hand, coupled with great scientific attainments, have become necessities. And the only way to meet these demands is to combine theory and practice. Not one alone, but together. This main thought should be an incentive to every young clayworker of the country to avail himself of the advantages offered by technical training. The value to be derived from such a course is often realized only when it is too late.

Many a capitalist has been ruined by investing his all in a would-be paying mine because of an incorrect report of an assayer, and many a brick plant has been fatally handicapped from the start, although other things may have been favorable, by a misleading and incomplete test of the clay. How much better and more satisfactory it is for the manager of a plant in determining so vital a point to depend upon no one else but himself, so that he may not fear that the report has been influenced by a bonus from an outsider who either favors or disapproves the starting of the plant. We do not have to leave Columbus to find plants which are located on clay deposits that are almost debarred by their high per cent. of sulphate of lime; and not many miles away we find others working on clays in which iron pyrities abounds to the same hurtful extent; and, reaching out a little further, we find a plant making vitrified ware out of clay containing so high a per cent. of the alkalies and other fluxes as to bring the points of incipient and complete vitrification within such narrow limits that the result of each burn it a lottery. From these instances it may be plainly seen that the proper location of these industries lies to a certain extent in the hands of the chemist.

The need of a technical education in ceramics is gradually becoming apparent, not only to all clayworkers, but even to outsiders to whom the idea is proposed, and no better place in the world can be found for this kind of instruction than at the Ohio State University. Although the greater part of the work of the two years spent here is theoretical, yet much practical work is intermixed with it. With a year or two's active experience in outside work, we hope to give an example of the very union of theory and practice of which we have been talking.

Let us look for a moment at any of the engineering courses—the electrical, mechanical, civil, bridge, sanitary engineering and the like. How far, for instance, would mining engineering be advanced to what it is to-day had not such a course been fostered by the leading colleges throughout the land? It has indeed made a marked progress, and yet but few weeks pass that improvements are not made and patented on some of their appliances. Like advancement has been and is being made in all other departments of science. Two years ago, after many years of discussion, the clayworkers of Ohio came to the front and established the long-talked-of and much-needed ceramic course. Before this winter is over the Legislatures of four other States will consider a bill, similar to the one commonly known as the "Bell clayworkers' bill," for the establishment of such a course in their respective State Universities. Even Canada has become awakened by such a procedure in Ohio, and every effort is being made for the establishment of a like department at Ottawa. When we consider what Germany has accomplished in this direction, we cannot but feel our shortcomings in the line of a technical education.

My attention was most strongly directed to this course through the advice of the President of the Buffalo Brick Manufacturers' Association, who said: "You can't afford to miss it. You will learn as much by taking that two years' course as you will on an ordinary brickyard in fifty years." After considering his urgent advice, together with what I knew of the course and those back of it, I made up my mind to act accordingly, and should have always regretted had I not fallen in line when I did. Since the Ohio State University affords the only course of instruction in this line in the United States, I had no choice to make as to which school was the best.

No other branch of science is susceptible of so great a range nor offers a better opportunity for advancement than the one under discussion. And, to use the words of a noted geologist of the day, "Clay is the coming mineral." This fact was also a convincing argument in itself that determined why I should take a course in the ceramic department.

We may say improvements are being made in brick machinery, kilns, dryers, etc., as well as in other departments. Quite true. But it is only within the past few years that these improvements have advanced so rapidly. Thirty years ago nearly every brick in the United States was manufactured in open air by the old wooden machine, the gray mule and sweep. But a short time ago it was thought impossible to satisfactorily burn paving brick in a continuous kiln. To-day, according to one of the clay journals, this is being done at a cost of burning of 37 cents per 1,000, against $2 by other kilns in the same city.

The possibilities and probabilities of what developments might actually take place also entered my mind while I entertained the idea of taking a course in the ceranic department. The spectacle of a great industry, full of life and activity, but ignorant and untrained in its own powers and resources—not only anxious to do better, but willing to give a fair trial to science as its teacher and guide—these ideas were the ones which came to me when choosing this work. In such a field how can an earnest worker, willing to learn the humblest steps of practice, and yet keen to absorb from each practical lesson its theoretical reason, fail to make a place for himself?

VICE-PRES. ED. F. DARNELL, Grove City.

Moreover, one could not wish for a more healthful occupation. The pale-face merchant who is housed all day never gets enough of the sunshine, breezes and concomitant pleasures of a brick yard to enjoy life in the same degree as the clayworker.

Before closing I might say that the almighty dollar entered into the question, for it occurred to me since the college work at least is in its infancy, that those who completed the course would stand on a level with the graduates who first completed the electrical engineering course. Those who were proficient in their work experienced little difficulty in securing well-paying positions, and it seemed reasonable to suppose that there would be a similar demand for O. S. U. ceramic man

Probably the greatest difficulty with which the graduates of this course will meet will be that too much will be expected of us from the start. Clayworkers are generally conceded to be a most conservative class of people, and it is probable that among many of them the need of this work will be very slowly recognized. Among others the error will be in thinking us able to do all that they have so far failed to do. Either of these views will be doomed to disappointment. The true support of the clayworkers will be shown by the manner in which they continue to lend their aid toward the maintenance of this department; especially towards keeping it supplied with prospective clayworkers, and helping its graduates into places where they can complete the training begun at this school.

The representatives of this course do not differ from those of any other in two respects at least. First, that they require an opportunity to show what they can do, and, second, that they be given sufficient time to get their bearings. This college does not claim to turn out expert potters or brickmakers, nor could it be expected to do so. But a careful investigation of the ground covered will convince the most skeptical that the value of such a training is inestimable.

And now, what do we, as graduates of this course, expect from the clayworking public? A fair chance, and that is all.

Mr. Pike: I want to commend the young gentleman for his instructive paper. It is one that I will read carefully at my leisure. It ought to make us all appreciate more than ever the grand work that Prof. Orton's school is doing for the clayworkers. With such bright young men coming to the front we old bald-headed fellows must soon take a back seat.

HOLLOW BUILDING BLOCKS.

—By Ed F. Darnell.—

The manufacture of clay products has grown until it is a mammoth industry. It has only been a few years that any statistics were taken to tell how much money was expended for labor and what the finished product was worth. A consideration of the clayworking interests of Ohio forms a leading feature of the annual report of Labor Commissioner W. T. Lewis, which was filed with the Governor Jan. 27th. The Commissioner states that it is the first time that the Labor Bureau has made an investigation of this important branch of manufacture, but that it has always been an inviting field of inquiry, because of its magnitude and widespread character. There is scarcely a community in the State which is not more or less engaged in it. Ohio is the greatest clayworking State in the Union, having an annual product valued at nearly $11,000,000. Millions of tons of Ohio clay are yearly worked up into articles of utility and beauty, ranging from the commonest clay product to works of art, which find a market in various parts of the world.

Commissioner Lewis, in his report, refers to hollow blocks made to imitate stone, which it is largely superseding for foundations and even entire buildings. Hollow blocks are no more an experiment. They are like drain tile—their experimental days are past; they have come to stay. The day is not far distant when some building material will take the place of wood, and there is no better or cheaper material than hollow blocks.

Hollow blocks can be used in every place that common bricks are used, and they are far superior for the construction of dwellings, factories, barns, foundations, walling wells and cisterns, paving cellar floors, building smokestacks, and many places that I need not mention. They are being used in the fireproof buildings for partitions. They make a light fireproof and dead wall. Every tilemaker of this Association should manufacture hollow blocks. The trade is a local one. They are similar to drain tile—too heavy to ship long distances, but they can be shipped at less expense than common brick, on account of being 50 per cent. lighter. In introducing hollow blocks in a new territory you will have the common-brick men to contend with, as anyone can see their superiority over the common brick. When a bricklayer lays one hollow block he is laying equal to from five to eight common bricks; a 12-inch block is equal to five and a 20-inch to eight bricks when laid in the wall. A bricklayer will lay twice as many feet of wall of hollow blocks as of common brick, and then the saving of mortar is quite an item.

For house-building a block 18 or 20 inches long is better, as there are less mortar joints, and a man will rock-face or lay one of the long blocks as quick as a smaller size. The only inconvenience is in drying; they require more time to dry. Hollow blocks are not as easily made as drain tile. They require a better clay, and a clay that is more plastic, especially with the blocks that have two or more cores. The better the clay the better the block. The clay should be well tempered and pugged. In burning they should be burned hard enough that they will stand any kind of weather or frost. One soft block will condemn a whole foundation. A salt glaze will add nothing to a block. Whenever you get a heat sufficient to glaze you will have a block burned that will stand any kind of weather or frost, and if you rock-face a salt-glazed block after it is burned it takes the glaze all off.

With the Durant patent roller die, that rock-faces the blocks when they are made, the glaze can be used. With this die any pattern of ornamental block can be made. The only objection to this block is on account of not getting a uniform color after they are burned. Most of the tile manufacturers' clay will stand sufficient heat to glaze. With a block that is rock-faced after it is burned, there will be a uniform color—red.

A house or other buildings can be constructed wholly of hollow blocks of the common pattern die that would be pleasing to the eye, and of any architecture you desire. The photo that I have illustrates a house that was built of this pattern block that I will describe. It contains seven rooms, with a cellar under it. Not a stone was used in the whole construction. From the cellar up it is only one block thick, nine inches, including plastering. The blocks were rock-faced, with the exception of the corners around the windows and doors and the belt courses. When the foundation was completed a course of blocks were edged up for a water-table, set out one-half inch. On the top of this four courses were laid; then a plain course, set out one-half inch, for the window frames to set on and to make window sills. Above this plain course rock-faced blocks were laid up to the tops of the doors and window frames. A plain course between and straight arches over them completed the course. The straight arch is made by cutting the blocks at right angles in a mitre box when they are green. Above this the same was followed until the house was completed.

The corners and belt courses used hard-burned blocks that were dark-colored; the rock face was all the same shade—red. There is a 4x8 lintel back of the straight arches over the windows and doors that helps support the weight of the wall. The chimneys were built into the wall as the house was built, hollow blocks being used. They were topped out with common bricks.

What is more pleasing to the eye than a house built of rock-faced blocks, with the corners plain and a plain course above and below the windows? It looks like panel work, and breaks the monotony of the plain wall, so objectionable to brick houses. A house built of one thickness of blocks is more solid than a 13 inch wall of common brick. There are fewer mortar joints. A brick wall never gives way only at the mortar joint. With a hollow block wall there is not as much mortar used as with common bricks, so the danger is not as great. In building a house you should have a few of the odd lengths, 6, 8, 10 and 12 inches long, so they can be used without cutting. For building a 13-inch wall split the blocks by placing a piece of cutting wire across the die. In the center of the partition wall the half blocks can be used to cover the ends of the joists in building a 9-inch wall.

In constructing a building of hollow blocks we should make every course cover a certain number of inches. A block like this (showing block) should cover four and one-half inches. Take your plumb-board and make a mark every four and one-half inches, or whatever the size block you use, so you will get every course the same. When you are carrying up the corners you can see at a glance how it is coming up. The door and window frames must be made so they will come out the right number of courses. By dividing the number of inches high by 4½ you can see what length they must be. A house built of hollow blocks is like a pressed-brick—it does not look well if you have to piece out over the doors and windows.

If you have your foundation level, by measuring the corners up when your building is done you will have it level for the roof. There should be enough cement used in the mortar to make it set quick, and it will make a better wall. The wall will not need washing or cleaning when it is complete if you are careful. The house that I have described and illustrated was not washed or cleaned. This house was built last summer, and up to the present time there are no signs of moisture coming through the wall or dampness coming up from the cellar.

A house can be built of hollow blocks that will not cost any more than a frame, and then you can have a dwelling that is fire and frost proof, warm in winter and cool in summer, that you can have insured for 25 cents less on the hundred, never has to be painted, and will last for generations to come.

In the discussion following, Mr. J. W. Everal read the following paper:

HOLLOW BLOCKS.

—Discussion by J. W. Everal.—

The value of hollow walls made from hollow brick or hollow blocks is apparent to any one, being proof against heat, cold and dampness. Upon this point I need not elaborate or cite any proof of the already accepted facts.

The crushing strength of hollow building blocks, made in correct proportions, tested by hydraulic pressure and by the use of the blocks in large buildings, has been sufficient to convince any one as to their strength.

During the past three years we have sold blocks for foundations for bank barns, putting in single walls eight inches wide and sixty feet long; barns filled to the roof with hay and grain and no signs of crushing or swaying laterally. However, we do not recommend putting in barn foundations with single eight-inch wall. They should be sixteen inches thick.

Durability—Even to those inexperienced in clay ware, the glazed blocks present the appearance of being hard and capable of resisting frost. Glazing is not always a sure sign of the ware being proof against frost. I have seen well-glazed sewer pipe shell off where exposed to frost.

J. W. Everal, Westerville.

The red blocks unglazed are looked upon by some with suspicion as to whether they will stand frost. To this I would say, for the past eight or ten years that we have been making blocks we have put them to all manner of uses and subjected them to all manner of conditions and have found that a block burned to a good cherry red resists the frost equally as well as the glazed ones. We have no war to wage against glazed blocks. They have their place in the construction of buildings as surely as the unglazed; and would say if you have the clay to make them you are right in doing it.

We are all well aware that in burning the red block there are ofttimes quite a good many blocks that are not hard enough to stand frost and should only be used for partition walls and where not exposed. Each manufacturer should carefully guard his trade and see to it that nothing but hard-burned blocks are used where exposed to frost.

At the introduction of the red block in our locality and for several years following it was thought they were only intended for foundations, cellars, etc., and little was thought of using them for superstructure.

We saw no good reason why they should not be used for the entire structure, the same points of excellence holding good in the superstructure as in the foundation or elsewhere. One thing we have found detrimental to the beauty of the plain block laid with either 4-inch or 8-inch face, is to secure a uniform color of blocks. It is quite apparent that a brick or block having face dimensions of 4x16 inches, or 8x16 inches laid in a wall and not all of a uniform color will present a much worse appearance than a common size brick will with different colors. To increase your trade, the selection of blocks should be carefully guarded by the manufacturer. This will apply equally as well to the glazed block as to the plain red.

Rock-Facing—This adds much to the beauty of the block in the construction of a building. It greatly lessens the variety in color over that of the smooth-faced block and gives to it a rich, imposing appearance. To get the rich and uniform color the rocking must be done by hand after the block is burned, costing from one-third to one-half cent per lineal foot.

Ornamentation—This may be done in many ways to suit the taste of the builder. In the construction of a house I built at Westerville the past summer, we used the red rock-faced block laid with 4-inch face, and for the corners used brown blocks 8x16, imitation of rock-face, with a brown or black belt course at the second story. After this structure was up, pointed all mortar joints with black mortar, making a beaded joint.

The brown corner blocks are good imitation of brown stone, together with the black mortar joint giving the structure an imposing appearance. In this building we used light-colored stone caps and sills and water table.

There are other combinations that might be used to good effect, using brown, black or buff for trimmings, all of which can be made from clay.

It was my intention in opening the discussion on this topic to be brief and confine my remarks to the question of hollow blocks, and more particularly to the red, unglazed block, as the manufacture of this block can be done by the majority of tile-makers who have a good quality of clay. If the clay is well pugged and well burned you need have no fears as to its durability.

During times when tile sales are dull, as the have been during the past year or two, it is a good thing to have some side issue or side track to run off on, and still do a little toward making a living and keeping the wolf from the door.

I have just one thing to add. When Russel H. Conwell delivered his famous lecture in Westerville, entitled "Acres of Diamonds, or Where to Get Rich," he said the opportunities tor getting rich were just as good in Westerville as anywhere else. The point is this: study what the people want, manufacture it and it will be a seller. If they want hollow blocks in your town, make them. If they do not, make what they want. There may be acres of diamonds near your factory; it remains for you to find them.

Mr. Biglow: What do you use for partitions?

Mr. Darnell: I used blocks off in color and imperfect.

Question: How about plastering the wall inside?

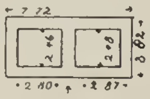
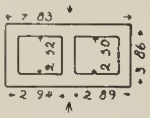
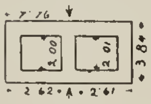
Mr. Darnell: Plaster on the smooth surface of the bricks; have no cracking of the plaster on the bricks.

Mr. Biglow: In building, use a four-inch course outside and leave an inch space and lay four-inch inside, and bind wall with strips of galvanized iron. I have met with some objection to the block on the ground that they would crush under a heavy strain, so I sent three blocks 4x8x12 inches, to the United States testing department at Watertown, Mass. The report effectively proves that the blocks are plenty strong enough for any ordinary building.

Mr. Bigelow exhibited the original

official report, of which we show a copy:

Mr. Powell: I have had some experience in making hollow blocks of the same size, and I fully corroborate what has been said.

Nº OF TEST	END VIEW	LENGTH	WEIGHT		SECTIONAL AREA		FIRST CRACK	ULTIMATE STRENGTH		
					GROSS	NET		TOTAL	PER □ ON GROSS SECTION	PER □" ON NET SECTION
		INCHES	lbs	oz	SQ INCH'S	SQ INCH S	lbs	lbs	lbs	lbs
8113	Nº 1 	1176	14	9¾	90 79	2411	138,000	154.700	1,704	6,416
8114	Nº 2 	11.75	14	11	92.00	23.50	106.000	161.500	1,755	6,872
8115	Nº 3 	11.61	17	13½	90 09	29.37	195.000	236.200	2,060	8,042

THE STRENGTH OF HOLLOW BLOCKS—A Government Test

S. Snyder: I think this organization ought to take some steps to show up the merits of hollow blocks.

Mr. Darnell: I can build a house of hollow blocks for less money than the cost of a good frame house.

Mr. Hagy: I have been engaged in making hollow blocks for several years. I built a house of hollow blocks to hold my farm implements, and we have been highly pleased with it. I put up an outdoor cellar, and we kept vegetables in it without freezing. In burning, set the bottom of the kiln with tile; then set on the hollow blocks, and they will burn even and hard. In setting, we leave a little space between the blocks, but not too much space. The space should be uniform.

Mr. Biglow: I alternate tile and blocks from bottom to top of kiln.

J. W. Everal: I lay the blocks down face to face.

On motion of Mr. Rumsey a committee was appointed to report as to the merits and cost of constructing buildings out of hollow blocks, the following names constituting the committee: E. Biglow, West View; Ed Darnell, Grove City; W. S. Hight, Bucyrus, O.

W. A. Eudaly: I have recently seen a die to ornament the face of blocks which makes the blocks beautiful.

Mr. Hagy: I have used hollow blocks cut in a mitre for walling up wells and cisterns, and think they cannot be equalled for such purposes.

THE NEED OF ORGANIZATION TO REGULATE PRICES.

—By J. J. W. Billingsley.—

We assume that present prices of clay products are unsatisfactory, that the cost of production in many instances is not fully lowered, and the business as a whole is not sufficiently remunerative. A brief review of the causes which have brought about such conditions in the trade may be instructive and serve in part to point the way to a partial recovery of better prices. It is only a few years since the demand and prices of clay products were very satisfactory, when those who were in the business of making either brick or drain tile, or both, were elated with the prospects before them. Sales were brisk and prices satisfactory, and the demand seemed almost without limit. This tide of prosperity resulted in the establishment of more factories and the enlargement of others until in some instances the capacity was doubled, and even quadrupled.

Capital was invited to large investments in the business, and many men with little capital also established plants, looking forward to a marvelous growth of the business. Those who were fortunate enough to have even the name of experience in clayworking were made superintendents with salaries that were exhaustive of bank balances. Machinery was bought on a credit, long drawn out with interest attached. For a time all were hopeful, some even prosperous.

Then there came a chilling frost to the general business of the country. Capital, always easily alarmed, hid away, and as a Jew clothier said of his stock of clothing in the panic of 1873: "My cloding is all good, better enough for the trade, bought dirt cheap, but the consumption wouldn't took 'em." So it was with the clayworking products—"the consumption wouldn't took 'em." The financial depression, however, is not the only cause which has led to the present unsatisfactory condition of the trade. In some localities there were too many plants, and not only too many plants, but there was a great lack of practical experience in the business. Once in the troughs of the sea without the lamp of experience to guide them they drifted helplessly on to the reefs. With a lack of experience, or none to speak of, they met with difficulties in the management of their clay, their machinery, or maybe their kilns.

RESIDENCE OF ED. F. DARNELL, Vice-President of the Ohio Tile, Brick and Drainage Association. Built by himself of Hollow Blocks.

It was an easy matter to induce them to make a change in almost any department of the work. Not a few changed machines, changed kilns, changed help, and kept at it until the round was complete, with an indebtedness all the while increasing, until in some instances the sheriff stepped in to change the scenery.

Only a few knew what it cost to produce a given amount of products, and hence the safe margin of profit. Before engaging in the business they had, in many instances, the kindly aid of interested parties to figure up large profits—profit margins so wide that it looked as if an inexperienced man, though a fool, could not fail of success.

It is said that figures do not lie, which may be true, but they are often misleading. It is well to figure and count the cost before we engage in almost any undertaking. We should first count the cost, but do it ourselves, with whatever light we can get, and then we will fall short enough in realizing our expectations. There are so many things out of sight in the beginning of any important enterpries that become so surprisingly large when we get to them that we are often astonished that we did not take them into account. But as before remarked, many good men were misled by well arranged figures, to their sorrow afterwards.

When the financial depression, sharp competition, dry years and want of business management all came the most natural thing to do was to cut prices to increase sales. And the sales did not increase to any gratifying extent.

When farmer Jones was offered drain tile at 20 per cent. off he whistled and drove home, saying, "They'll sell 'em cheaper yet," and they did offer them cheaper, but Mr. Jones waited for a still further decline, and he is waiting yet.

The same is true of the brick trade. The cutting of prices does not increase the demand to any appreciable extent. In fact, selling brick below the cost of production will put out the fires sooner or later, and generally "sooner."

If those who have the works in charge have a tithe of business sagacity they will hesitate to cut prices. It is true that with some their local advantages are favorable and the competition business-like, and with a little hustle they have been able to make it go, and have money enough to attend this Convention.

The sewer pipe and fire brick manufacturers are in the same box. The last sale of pipe which we have heard of was made at 93 off from the list price. Only a few weeks ago we heard of fire brick manufacturers wandering around New York city in search of a scale of prices. We have not heard what became of them.

With these conditions of trade we have been requested by the Secretary of this Association to write upon "The Need of Organization to Regulate Prices."

The need is apparent, but when and how? are questions not so easily answered. It would be very gratifying if we could, by a single resolution with a rising vote, fix a scale of prices which would give a satisfactory margin of profit by which every clayworking manufacturer would govern himself accordingly.

It would be a very nice business arrangement if every factory would make only enough to supply the demand at a regulated remunerative price.

It would be very nice, indeed, if every manufacturer of clay products would hustle around and help to increase the demand for their goods and thus aid in setting the wheels of trade in motion. But what of the men who are engaged in the business, directly or indirectly? Can you depend on them? Will they do their duty in an emergency like this? Where are the one thousand clayworkers of the State of Ohio? They are not all here to-day, that goes without saying. Not even a majority of them answer to roll call. No, not one in ten. Where are the nine? A majority of them ought to be here, but they are not.

With many the clayworking business is their only employment—their means of a livelihood. In it they have invested their money and business energy, be it much or little, but the nine out of ten are conspicuous for their absence to-day. They doubtless feel that they cannot afford to be at the little expense likely to be incurred to learn as to the status of the business. Some of these feel that they are not in need of any further knowledge along this line, and some do not care a whit for the experience of others.

We have met a few who would not attend these Conventions through fear of being called upon to give their experience in practice of the art of clayworking, and thus give away to others important secrets in the conduct of their business. Such persons, however, have little to impart in the way of practical information to the craft.

We have met some who have attended these meetings who have been in and out without paying a dollar to defray the necessary expense, and went their way feeling that they had been especially shrewd in absorbing valuable information without cost. We have met others who did not care for such meetings if a hundred were held, or as to what they did.

Gentlemen, does it occur to you that it will be difficult to influence or control very many of those to whom we have made brief, if not complimentary, reference? Of such it may be said they are suspicious, stealthful and unreliable in trade relations. The question now rising before us is, Can we in any way depend on them to aid in effecting an organization to protect the craft from disastrous methods in business? Is there any inducement that will lead them to co-operate with the members of the craft in bettering the conditions of trade? We cannot answer the question. It must be considered, however, in the effort to perfect an organization for needed protection.

If one hundred clayworkers should organize and enter into an agreement as to scale of prices, there are many in the classes before referred to who would take advantage of the movement, to their own advantage, by making a small discount on the scale agreed upon. Hundreds of others would go on, the same as in the past, cutting and slashing prices right and left, until the sheriff comes or a receiver is put in charge of the business. The sewer pipe organization, though composed of few in number and in the main large manufacturers, and fully acquainted with the written and unwritten laws of trade, have not been able to control the trade. Whether the trouble is due to defects in the organization or to the individual membership, or from outside influences, we are not informed. If there are pitfalls which may be avoided in a better organization, they should be pointed out in the further discussion of the subject. Organized efforts in many lines of trade have been successful and are so far encouraging. But the many conditions to which we have referred should be considered in the investigation of the question. Shall we organize or not? It is unwise to disregard the conditions surrounding the business in an effort to organize to better the trade. We have briefly mentioned the facts, not for the purpose of discouraging an effort to organize for the protection of mutual interests, but for the purpose of discovering, as near as possible, the ground on which we stand, together with the conditions likely to affect the undertaking.

As before remarked, the one in ten present at this meeting cannot safely ignore the existence of the nine who are absent. If every one of those present could be depended on to carry out in good faith the agreement of the majority, yet the largest factor in the success of the undertaking is in the absentees.

May we reasonably conclude that a special effort to secure a large attendance of clayworkers by sending to each an invitation to be present at some convenient point on a given day for the special purpose of organization to protect against unbusinesslike methods would secure a large attendance—say 40 per cent. of those engaged in the business? We cannot say, but if so many should attend it would be sufficiently encouraging to justify an effort to organize. Some would attend such a meeting because of their self-interest in the proposed organization, who would never put in an appearance at one of these social and educational conventions. Possibly it is not creditable to the heads or hearts of such men to say so, but it is nevertheless true. "It is money that makes the mare go" is an oft-repeated proverb, and true in many things. Some men are quite ready to enter into almost any undertaking if they think there is a dollar coming their way, who would not invest a nickel for information, however valuable, where the pay goes the other way. It is hardly creditable to appeal to selfishness to move men to action, but in some instances it becomes necessary to gain other advantageous points.

President Elect E Biglow, West View.

I am not prepared to say that the brickmakers or drain tile makers can or cannot secure the co-operation of a sufficient number to justify an effort at organization, and I do not say that they cannot. That there is need of uniform prices, so scaled as to give a fair margin for profit, I verily believe.

Possibly there may be trade relations between factories that need to be more fully understood to strengthen the confidence of the craft one toward another. Possibly there are other questions of interest to the trade which might be considered in an organization such as is contemplated in outline.

—Some Practical Suggestions.—

In an effort to effect an organization, we suggest that a circular should be prepared setting forth the state of the trade and the need of co-operation to put it upon a healthy business basis, inviting all who are engaged in the particular line of clayworking represented in the call to meeet at a given time and place to consider the needs of the hour in the trade. We think it would be best to include only those engaged in a special line of clayworking. That is, brick manufacturers, if they so desire, should perfect their own organization, and drain tile manufacturers do the same, if they deem it advisable, and if sewer pipe and fire brick makers determine to organize for the better protection of their trade, let each interest act for themselves. By so doing a confusion of interests will be avoided. If the co-operation of leading manufacturers can be secured, a further effort to form an organization will, we think, be justified.

While it may be true that a large per cent. of those interested do not become identified with the movement, yet the fact that after a full consideration of the interests of the business a given scale of prices has been agreed upon by leading manufacturers will serve to tone up the trade.

Further, we suggest that it is a matter of vital importance in the undertaking not to place the scale too high. To do so is but to tempt men to discount them in order to effect sales; and a high scale would have a tendency to lessen the demand. In trade, as in other things, it is wise to do the reasonable thing—the right thing.

We are living in an age of the world which is tending toward a community of interests. The means of communication are multiplying daily, and rapid transit by sea and land is extending and interlacing our trade relations until the nations of the earth are our neighbors. To join hands in laudable enterprises for mutual protection and trade reciprocity is the spirit of the age, from the newsboy to the giant corporations involving the investment and management of millions of capital.

If other lines of industry organize and secure a better regulation of their business interests, is there any reason why clayworkers may not do the same?

The need is apparent. Look along the path we have traveled the last two years and you will see the wrecks that strew the way, with still more to follow unless some uniform method of business shall be agreed upon and better trade relations thus established. And we are firm in the belief that to do this there must be a campaign of education, as well, to help many of the craft to higher ground in their view of things.

Difficulties will have to be overcome—some of them very discouraging, perhaps—in perfecting an ideal organization. Remember, however, the inspiring lines of the poet:

> Are riches worth the getting,
> They must be bravely sought;
> With wishing and with fretting
> The boon cannot be bought.
> To all the prize is open,
> But only he can take it
> Who says, with Roman courage:
> "I'll find a way, or make it."

Mr. Billingsley's paper was listened to with more than ordinary interest, and at its close he was loudly applauded.

President McClure: I will take the liberty now of introducing to you Prof. T. F. Hunt, of this city, who has kindly prepared a paper for us, and as his time is limited, we will listen to his paper at once and discuss Mr. Billingsley's essay afterward.

Prof. Hunt then read a very instructive paper entitled "The Importance of Water in Plant Production." The subject was treated exhaustively, and those of our readers who wish to investigate this branch of scientific agriculture will find in Prof. Hunt's paper a great deal of valuable information. We think their number too small, relatively, to justify its publication in these columns. It will appear in the Drainage Journal, which is devoted in part to progressive agriculture.

A vote of thanks was tendered Prof. Hunt and Mr. Billingsley for their valuable papers, and the question of an organized effort to maintain prices was discussed briefly. On motion of Mr. Randall the matter was referred to the Committee on Resolutions.

THE PREPARATION OF CLAYS.

—By W. A. Eudaly.—

The proper preparation of the clay before it is formed into the shape intended for a brick, tile, sewer pipe or other clay wares is no longer considered by the manufacturer as a thing of little consequence. Only a few years ago the making of drain tile or brick was confined to but a very limited variety of clays. But to-day the clayworker finds his field unbounded, both as to the quantity and kinds of raw materials, to say nothing of an infinite variety of shapes and forms into which clay can be molded and burned for man's use. Much, in fact a large per cent., of the now possibilities have been brought about by the recent improvement in machinery of all kinds which is designed to aid in the better preparation of clays.

While great strides have of late been made in this direction, a constant demand for better wares is but one of the many considerations calling our attention to the fact that we have but started in the right direction.

Doubtless many of the best methods of preparing clays now in use will be supplanted by still better methods a dozen years hence. The inventive genius of the machine man is constantly at work, and year after year marks the era of some new improvement.

The manufacturer has only learned within the last decade something of the importance of this branch of the clayworking art.

In these days of close competition, when quality, as well as quantity, marks the success or failure attending any clayworking establishment, it becomes the craft to look well to every condition or circumstance which will tend to add to either. Many hesitate because of the first cost of machinery or appliances necessary to the proper preparation of the clay, not stopping to consider that in these days of close inspection a poor product will not only find a slow sale, but often no sale at all. Unless we are prepared to make as good if not better wares than our competitors, we had better go out of the business. But who is our competitor? Perhaps some "inferior No. 2" is to-day; but, rest assured, some "superior No. 1" may be to-morrow. Therefore, we cannot stop short of the best if we expect to keep abreast of the times.

I take it for granted that all are ready to accept these propositions. But some may ask, What is meant by a thorough preparation of a clay? To this I would answer, that preparation of a particular clay which will produce the best ware for which it is intended is the best and most thorough preparation of that particular clay. To illustrate, we now have a number of clayworking establishments making fire brick, pressed brick and paving brick from the same clays in different or the same mixtures. It will be readily seen that that preparation of the clay adapted to produce the best fire brick is not necessarily the best for a front or paving brick. Hence, in some instances the kind of ware being made has something to do with determining the best method of preparing the clay. Nevertheless, all must agree that when any method for any clay and ware has been decided to be the best, it is all-important to work that method to perfection.

In this discussion let us remember that the members of this Association represent a very great variety of clays, circumstances, kinds of machinery in use, as well as the kinds of ware being made. For this reason it will be impossible to lay down any rule in detail applicable to all these varied conditions.

What is necessary to a proper preparation of A's strong, tough plastic clay bank may not be at all suitable for B's bank of weak, dry, sandy clay, to say nothing of C's shale bank or D's surface clay, which has a large per cent. of loam and sand pebbles.

We have often heard it stoutly maintained on this floor that clay should be dug, weathered and soaked in a soak pit before being used, while, on the other hand, we have quite as often heard that the weathering and soak pit process did not add anything to the quality of the finished ware. No doubt in most instances both were right, the real difference being in the kind of clay or ware being made from each.

Let us be sure, in stating our propositions, that we state also the circumstances and conditions. I think all will agree that it is difficult to prepare any clay too well. But we are not ready to admit that some clays cannot be prepared too much. To illustrate, I have seen clays that when ground and pugged too much would not make a brick by the stiff clay process, yet the same clay, with a moderate amount of grinding and pugging, would make a first-class brick. Of course, it is useless to say that with such a clay a moderate amount of mixing is thorough preparation. The kind of clay here referred to is that having a large per cent. of quicksand. The reason such clays will not stand too much mixing or working is that the quicksand has a tendency to separate from the clay, leaving the clay and sand in separate strata or layers in the brick or tile. Especially is this so when the clay is being worked by the stiff clay process. Again, take a tough, plastic clay which is found wet in the bank and mix with it a moderate amount of clean, sharp sand, and you produce a mixture that will stand any amount of pugging.

Another example: Take a hard, dry shale direct from the bank to the soak pit, and you will find no amount of soaking will reduce it sufficiently to make a good, workable body. Such clays must always be reduced before entering the pug mill or machine. Most all clays are aided very much by being allowed to "air and sun" before being ground, soaked or pugged. Still I have seen clays which would not work so well by being first aired or sunned. I trust these illustrations are sufficient to indicate the importance of each one for himself thoroughly understanding the nature of his clay. And let me say here that no amount of chemical analysis will solve the mysteries of the average clay bank. Chemistry will aid, but not determine.

I take it that the preparation of clay is largely a mechanical operation, barring, of course, the chemistry of light and heat, which in many instances enters largely into this subject.

I have observed recently that many of our leading clayworking institutions are only partially preparing their clays. To illustrate, how often we see a piece of burned clay ware which, when broken, will expose a large number of fragments or pieces which, aside from the burning, had not undergone any change in their physical structure from the time the clay left the bank until it was set in the kiln. In other words, the clay may be all ground to a certain degree of fineness, while the physical properties of only a portion of the mass have been entirely changed. In other words, a large per cent. of the mass remains in the form of small, irregular fragments, ranging in size from that of a small shot to that of a large pea or bean. These small particles of unground clay pass through the pug mill or machine unchanged. While they may in this condition go to make up the body of the brick or tile, yet they do not enter into either as an element of strength. There are some clays in which, with hard firing, these unground particles can be made to partially melt and to some extent adhere to each other and to the surrounding particles of ground clay, but such firing is always attended with great risk of damaging the product.

W. A. EUDALY, Cincinnati.

To my mind the physical or natural condition of every particle of the clay should always be broken up or changed, whatever the method of grinding or pugging may be. Let it be understood that the clay should be thoroughly pulverized. If the arrangement of the plant will admit, or if the daily consumption of clay is not too great, this pulverizing may be left to the sun, air or rain. In other instances it may be found most practical to first grind the clay very fine, then place the ground materials in large bins or sheds to rot, cure or season. This latter method is very excellent where the clay is to be worked by the dry press process. Of course, a clay that is naturally very wet in the bank cannot be so easily ground. Neither will such clays, when ground and binned, readily pass through the rotting or mellowing process. Only the dry clays are suitable to this method of preparation.

Some clays are found so thoroughly saturated with water in the bank as not to admit of grinding by crushers or dry pan. Under these conditions, if the clay is not too wet, it will readily admit of being placed at once in the pug mill. If, however, the water is found not to be uniformly mixed with the clay in the bank, the pugging is difficult. That is to say, if there are streaks, lumps or strata of dryer clay mixed with a very wet clay (especially of a sandy nature), the former is liable to push through the softer portion of the latter in the ordinary pug mill. In this case it is necessary to grind the clay sufficiently to break up the lumps. Often a few hours' drying before pugging will overcome the above difficulty.

We take it that most all clays can be thoroughly prepared by some method, but by what process can it be done profitably is the important question. This question must be answered by each one for himself. The kind of clay, the kind of wares to be made and the process of manufacturing must all be considered before the question can be satisfactorily settled.

First in order, you must determine the kind of wares to be made. Is it to be drain tile, sewer pipe or brick? If brick, what kind — builders, pavers, pressed or ornamental? Suppose you decide to make drain tile. Then, as a matter of course, the clay must work well on a stiff mud machine. This determined, you must next consider the best method of preparing that particular clay for this stiff clay process or machine.

To make good tile two conditions must be had: The clay must be ground fine, and it must enter the machine at a proper stiffness. If the clay is coarse, to say nothing of small stones, dry lumps and the like, it will not make a good body for a drain tile. If it is too soft the tile will not keep its shape well in handling. It it is too dry it is liable to heat in the machine and perhaps crack after leaving the die. But if the clay is naturally too wet as it is found in the bank, it must be dried, either by the sun, artificial heat, or by the mixing of other drier clays. In drying by either of these methods great care must be taken in order to produce uniformity of moisture. Unless the clay is uniformly of the same moisture and well tempered the tile will not dry evenly, thus causing a slight variation in size, which is not satisfactory to many consumers.

Besides this, if a clay is too wet in the bank the bringing it to a proper consistency is always attended with more or less additional expense, unless you are thoroughly prepared to dry the clay economically. It is undoubtedly much more economical and much safer to grind a drier clay to a proper fineness and afterwards add sufficient water for proper pugging and tempering. This method will usually require more and stronger machinery, but in most cases a stronger and better tile is obtained. If you do not have a clay which works well by the stiff clay process, you had better not attempt to make drain tile. But you may and no doubt can make brick from many clays which are not at all adapted to the stiff clay process. Many of our finest building brick are made by the soft mud process, while a very large per cent. of the high-grade pressed or front brick are now being made by the dry clay process. Either the soft clay or dry clay method will handle many clays to a great advantage which will not work to any advantage by the stiff clay machine. But, notwithstanding these differences, we must understand that under any and all conditions the clay should be thoroughly prepared. Too much importance cannot be attached to this branch of any clayworking establishment.

A tile or brick which has been made from a thoroughly ground and pugged body is always more dense and stronger, consequently more durable. It is also much more easily burned to that degree of hardness and uniformity, qualities so much in demand in these days of progress. Not only this—a brick or tile made from a thoroughly ground clay is much more salable because of its superior strength and beauty. I have seen brick made from the same clay and burned in the same kiln at the same time and to the same degree of hardness that would not pass the same or a similar inspection.

Paving brick made from a coarsely ground clay will absorb much more water and have much less tensile and crushing strength. To get the very best results it is necessary to grind the clay very fine. Of course, the degree of fineness necessarily varies somewhat with the kind of clay being used. Clays containing a large per cent. of fluxes will stand less grinding and still produce fair results; still, it is safer to grind highly fusible clays very fine.

It has been maintained that clays containing a high per cent. of hydro-carbon make better ware not to be ground so fine. The advantage claimed for grinding such clays coarse is that the gases formed from the carbon in the clay will more easily pass out through a coarse or less dense body. I think, however, that experience has taught the reverse to be true. Besides, it must be borne in mind that if the clay is too coarse you cannot expect good brick or tile. But with properly ground clay you can expect, barring other difficulties, a number one product.

There is much to be said on this subject. There are many important considerations which I have not even mentioned, much less discussed. As stated above, every manufacturer must to some extent determine for himself the best method of handling his clay. Once he has made this discovery he should make the most of its advantages.

President McClure: Brother Eudaly has given us a most excellent paper on an important subject. He has covered the ground so fully that he has left nothing to discuss, so we will take up the next on the programme.

THE CLAYWORKER'S "TRIBULATIONS."

—By W. C. Wilson, Brice, O.—

Mr. President:

When solicited by our worthy Secretary to write something for this occasion I studied the matter for some days before I consented and notified him that I would make an effort on the above as my subject. Prior to beginning to write, however, I turned over in my mind many things I could say, but on putting those ideas on paper, for some cause or another they would continually run into politics or something apparently entirely foreign to the question. I concluded the cause of this was I had been reading and paying more attention to political matters than I had to the clay industry, and if I produced anything at all I would be compelled to let these subjects mix a little, notwithstanding my almost twenty-five years devoted to the study and practical working in clay.

We are all aware of the vexations and trials, of the afflictions and tribulations we have been called to endure at some time in our experience in our various manufactures. For instance, in the old soft-mud brick, molding either by hand or machine, with yard covered with many thousand especially well-molded brick, you had taken extra care to instruct the off-bearers to dump the molds very carefully, as this was a good sale; and when about dry enough to turn, or perhaps to set in the kiln, you experienced one of those heavy storms which we are likely to have during the warm months. Now, how did you feel at this time?

We will continue this idea in our stiff clay work a little further. We may understand our business well, but often the clay is not mixed to suit us; it is not making a good article of ware, and we get out of sorts about our machine, and we will condemn the manufacturer of it and wish we had a machine like our neighbor, or we had a building, or fixture, so we could do better with less work and expense. When we come to dry, set and burn our brick or tile, then we have more of this vexation. You start your fires, and possibly you do not have confidence in your own ability, nor in your burner's, and you stew and fret until the kiln is burned somehow—you do not know whether a good burn or a poor until you open it, and if all right you congratulate yourself. You guessed well that time, if you did miss it several kilns previous.

This kind of tribulation can be overcome very easily. If you are competent to run or manage this kind of work, and your experience has been worth anything to you, you have certainly gained sufficient knowledge to know better than to guess at any portion of this work. Guesswork in clay manufacture is not needed in this day and age. We have as good American make of clayworking machinery as need be produced. All you need is to know your clay and your machine and kiln, and perfect confidence in yourself and ability to accomplish just what you are doing, and your tribulations will disappear.

There is another class of clayworkers, however, a numerous and diversified class, with whom we, as brick and drain tile makers, are closely allied—the American farmer. While we are able to cure the trials and vexations of our own class of clayworkers, what can we do for him?

Since 1892 the trials and disappointments of this branch of our fraternity have been multiplied many fold. The people of this lump of clay, stone, iron, coal, gas, gold, silver, etc., designated as the United States of America, on the above date elected a new Superintendent of our affairs of state. I presume the majority of you are aware of this fact. At the same time of this election we furnished him a sufficient number of workmen, employes, or Senators and Representatives, if you please—law-makers—to carry on the business of our country at the old factory building in Washington. The new Superintendent's predecessor had, in his four years of stewardship, and with his immense body of employes, molded and burned successfully the usual number of kilns of business pertaining to good and true government—had worked with confidence on his part that he had the ability and knowledge of how and what to do, and, with the aid of his advisers and full sanction of the people, paid with the surplus fund he found in the treasury about two hundred and fifty millions of public debt before it was due.

Now, this is just about what we in our business, or a farmer in his line, would consider good and careful management—paying your debts when you have the money lying idle, rewarding us fellows who wear the G. A. R. button about once in three months, thereby causing us much happiness; and if it so with us, you should be also, for we share it liberally with all, and not a word of grumbling among the thousands.

Why did the people want a change? Echo answers, Why? While we are able to tell you how to overcome the trials of operative clayworking, no one has yet been able to fathom satisfactorily this question, which has affected the farming industry, along with hundreds of other industries of our country, and produced an utter stagnation and distrust. The machinery was well oiled by a system of protection that stood the test of years for revenue, but this spirit of unrest, engendered, as it were, like a hurricane or cyclone, is still among the mysteries. The new administration of affairs soon caused the soldier element to object to the heavy discounts meted out to them in their quarterly allowance, amounting in many cases to 100 per cent.

A namesake of mine secured the foremanship in a certain bill for the revision of the tariff, and in due time, with the approval of Superintendent Grover, became what is known as the "Tariff Law for Revenue Only."

W. C. Wilson, Brice.

The government steam boiler by this time was carrying an immense head of steam, and just what might have been the result had not the great steam gauge of our country, the United States Supreme Court, set loose the safety valve will never be determined.

One thing we are aware of: our government is in debt to-day several hundred millions of dollars more than a little over two short years ago. I venture the assertion that no brick or tilemaker in this room can show as much business in the same space of time. Neither do I believe one of you will pronounce this good executive ability, whether applied to our individual industry or to the great government of the United States.

Since the record made above was recorded in the archives of state at Washington the people of our country have discharged this body of employes, and this surely proves conclusively that their work was not appreciated. The brick and tile they molded and burned—although the material at hand could not have been better—was of such quality that no contractor would dare put them in his building or the farmer use in his underdrain.

The new employes have undertaken to remedy the former workmen's mistakes, and a new attraction on the show bills of state confronts us and tends to discourage those laborers in the majority by shouting "Free Silver," "Gold Standard," "Silver Coinage," "Plutocrats," "Money Kings," "Gold Bugs," "Greenbacks," "Government Debts," "Bonds," "Venezuelan Trouble," "War with England," and we know it is done to detract attention from the main issue in question—that of replenishing the treasury without the further issue of bonds by a sufficient protective tariff.

Under the circumstances, is it any wonder that you come here and report your sales less than one-half of former years? The utter American foolishness of buying foreign manufactures of every kind of goods and sending our gold out of the country to pay the bills is most unpatriotic and un-American. So long as we farmers, clayworkers and mechanics of every name allow such loose and uncalled-for business management, we must suffer. Will you show me a clayworker in Ohio that is doing business in this way and is prosperous? Is there a farmer, if he is in debt for his land, making a comfortable living and more?

Would it not be better to buy our goods at home and show to the world our true American independence? Ohio is said to be, according to statistics, the first and greatest clay-product producing State in the Union. I believe East Liverpool, Columbiana county, Ohio, can produce any kind of china or table ware, or ware for household use, good enough for any American citizen in the United States. There are other like potteries perhaps equal or better in our country, producing the same ware. Ohio can produce as good stoneware from her clay as any European country dare make. She can furnish as fine flower pots for greenhouse purposes and family ornament as is needed or demanded, and her terra cotta and all kinds of hollow ware is unsurpassed. Her flooring tiles are immense. She has her quota of drain tile and brick works, but I hesitate in the line of fine brick, for many thousands of dollars have been sent out of the State from this city within the last two years for building brick. This is not as it should be, but so long as we do not import from without the United States we need not complain. What is Ohio's loss is another State's gain.

I have thoroughly tested Ohio fire clay and brick in kilns, as against that from some other States, and have found it quite superior. In all these varied clay industries, whether they be in Ohio, Indiana, Illinois or Iowa, so far as the workmanship or management is concerned, we need offer no criticism. The tribulations are not in that line. The main point of issue is, How can our coworker the farmer's condition be bettered, thereby aiding our own industry? A state of affairs must be brought about that will conduce to this end before he (the farmer) can purchase material for his buildings or improve his soil satisfactorily.

I have hinted that a "national tariff" of pure, unadulterated "protection," such as we once had, and appreciated as it should be—and not abused—is the first great remedy for these "tribulations," in connection with greater loyalty and love for American institutions.

Mr. Fate: I would like to ask Mr. Wilson how protection such as he speaks of is going to benefit the farmer? The paper is political, and therefore out of place in this Convention; but if the gentleman can answer my question I would be glad to have him do so.

President McClure: This Association is distinctly non-political, so I think we had better not attempt to discuss the paper.

On motion of Mr. Billingsley it was agreed, inasmuch as Mr. Williams was unable to be present, that his paper be printed without reading.

PAVING COUNTRY HIGHWAYS.

—Capt. Wm. S. Williams, Canton, O.—

Mr. President and Gentlemen of the Convention:

The paving of public highways is a question of importance which must be solved in the near future. We have a young and growing country just starting in business, as it were, without many of the conveniences of some of the older progressive countries of Europe. These conveniences will be secured in the course of time and as rapidly as possible. We have this advantage, we can learn from their experience so that we may reject that which is not good. That our country highways must be paved is a fixed fact, and it is only a question of how soon it will be done. Therefore we must find which is the cheapest, the most lasting and the best.

If a country town or village would pave, say ten miles each way towards cardinal points of the compass, it would insure a regular wholesome trade the entire year to the town that has the pavements. And a farm situated at a distance of ten miles would be practically as valuable as one at two miles. A load of hay can be moved over a smooth paved roadway a distance of ten miles with much more convenience and much less expenditure of energy than a distance of two miles through the mud.

There seems to be two kinds of material in use for road pavements, both in this country and Europe, brick and stone.

—Broken Stone.—

The Western Reserve and Maumee Road, built by the government, starting at Fort Crogan, on the Sandusky river (near Fremont,O.), and extending to Fort Meigs, on the Maumee river, near Perrysburg, was afterwards continued from Fremont to Bellevue. This road has better gradients for its length perhaps than any in this or any other country. The roadbed proper was thrown up about three feet in height. A very thick coating of broken stone was then placed upon the road, excepting that part between Fremont and Bellevue, which was constructed mostly of gravel. Numerous toll gates were established as a means of revenue for repairs of the road. Having charge of this road for quite a number of years as State Engineer, the following facts were made manifest:

That it did not wear well.

That it would cut into numerous ruts when wet.

When dry the wheels would pulverize the stone and be blown away in the form of dust. When repaired the rough, broken stone were objectionable until worn smooth; and, further, that it was a very expensive road to keep in order, the revenues scarcely being sufficient for the purpose.

—Brick.—

The Netherlands seem to have the best and most lasting of paved highways, extending through their country in various directions, reaching from city to city without regard to distance. The paving has been done so long ago that there are very few of the present generation know when it was done. The material used was brick, known as the Dutch clinker. It is similar to our shale brick, but not as good as our best quality of shale. The repairs are very small, one man will keep several miles of this pavement in good order. It is apparent from experiments with different kinds of paved roadways that brick is the smoothest, most lasting, the cheapest and best.

—Foundation.—

In many parts of the country the alluvial formation of mixed gravel, sand and sandy loam is sufficient. Sometimes it may be necessary to add more sand or gravel, if convenient. Cinders, or anything which water can pass through readily, will do just as well as broken stone—anything that will drain and not hold water, such as clay or its equivalents.

It has never been found essential to put broken stone under a cobble-stone pavement, and a brick has certainly more square inches of bearing surface on the foundation than the average cobble stone. Neither is it necessary to fill the interstices between the brick with coal tar, as it is plainly evident that brick will shed water more rapidly than cobble stone, and coal tar is never used in a cobble pavement. The brick. with a plain sand filler, or its equivalent, will soon form a cement around and under the brick that will be impervious to water and will become tough and hard.

The roadbed should be thrown up with sufficient crown so as to shed water nicely and then rolled with a heavy roller, the heavier the better. The ramming and pounding should be done on the foundation and not on top of the brick.

A dirt or summer road adjacent to the paved way should always be maintained.

—Kind of Brick.—

The paving brick should contain a large percentage of iron well distributed throughout the brick, and where this condition exists the brick will be found to be a homogeneous fused mass of great strength. A light-colored brick shows the absence of iron. It is not necessary to have them repressed, or in the form of block repressed. As the repressing produces two different structures in the same brick, there will not be the same cohesive strength from center to exterior. The plain, ordinary standard-sized brick is the best.

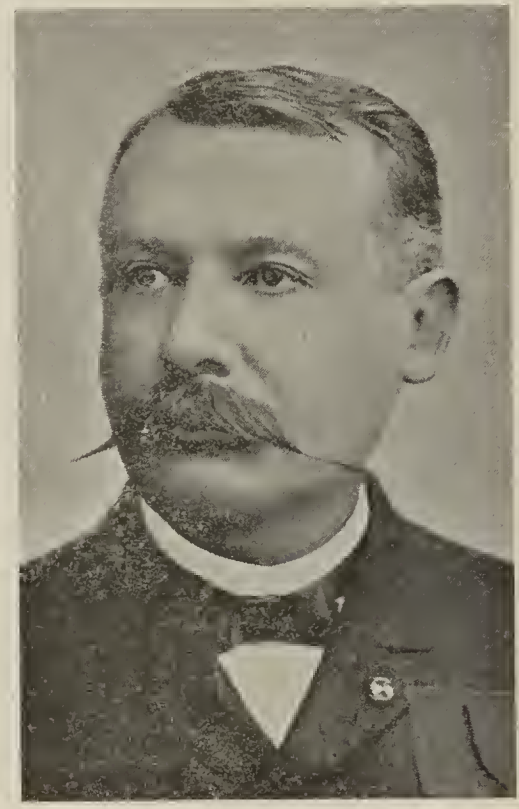
A gentleman from one of the back townships was standing on a street corner in Nashville, Tenn., taking observations of an electric street car, and gave vent to his feelings as follows: "Wall, now, I'll declarr, them ar Yanks come down heyarr and they freed all our niggers, heyarr they ar agin and dun freed all our meules. I wonder what they'r gwyne to free next?"

The day is not far distant when the motor will be brought into general use, driven by various forms of energy, propelling road wagons, farming appliances, etc. A large number of our horses can be relieved and the energy that was used to propel them in the shape of hay and grain can be put into roast beef or other places where it will do the most good.

Paved streets and highways indicate the work of an industrious, prosperous and intelligent people, immaterial whether we find it upon the Appian way to Rome, left as a mark of former greatness, or on highways leading down to and under the sea, submerged by earthquakes ages ago, extending from large ruined cities now overgrown by the deep tropical forest growth of Yucatan.

The paved highways remain as a lasting monument to the intelligence of an unknown people.

Prof. Orton stated that he and his class of clayworkers would be prepared to receive the members of the Association at Orton Hall promptly at 9 o'clock Thursday morning, and the Convention adjourned to meet at the University at that time.



Wm. S. Williams, Canton.

THE CLOSING SESSION.

The most notable event of the Convention, and one that marks an epoch in the history of the Association and the clay industries of Ohio, was the meeting in Orton Hall Thursday morning. The University is located several miles from the business center of Columbus, but electric cars convey visitors past the entrance to the grounds, which embrace many acres. Notwithstanding the bright winter sunshine of the previous day had given way to a disagreeable mixture of rain and sleet, nearly every member was on hand promptly at the appointed time and gathered in one of the comfortable class rooms in Orton Hall, where President McClure called them to order, and, without ceremony, announced the following paper:

IMPROVED METHODS OF DRYING BRICK.

—By W. D. Richardson.—

There has probably never been a Convention of this Association in which the subject of drying brick or tile has not been discussed, and yet there is no process of the clayworker's art to-day concerning which information is more frequently sought.

"How can I best dry my brick?" or "What is the best form of dryer for my use?" is a question that we have often asked ourselves, and one that we have been often asked by others. When overproduction has increased competition and reduced prices the most efficient and economical methods must be employed by those who are to thrive in the brick business, and the saving of even a few cents a thousands, which was not considered a few years ago, has now become an important factor that cannot be disregarded. Stop all the leaks and sometimes a saving can be effected that will make the difference between profit and loss at the end of the year.

A dryer that causes the loss of a few brick out of every thousand made, that costs a few cents too much per thousand to operate, that is often causing delay and expense for repairs, or that has a capacity a little too small for the machinery and kilns may of itself ruin the whole business. So that it behooves any man who is seeking better means of drying his brick to investigate the matter thoroughly and carefully that he may construct a dryer adapted to his clay and other conditions that may be a source of profit and satisfaction for years to come.

The best dryer is the one that will dry the most brick every day with the least expense and with the least injury to the brick. It is not within the scope of this paper to review the advantages and disadvantages of the various systems or forms of dryers now in use, but to point out a few of the latest and most approved methods, to suggest the lines along which further improvement is to be sought and to direct your investigation to that end. The experience of the past ten years in drying brick has established, in my mind, certain principles that must underlie all improvements in dryers. Have we not learned that the coming brick dryer for large plants must embody the following principles of construction?

First. It must be fireproof.

Second. It must be a tunnel dryer of the progressive type, that is, the brick set from the machine upon cars must be moved continuously through a tunnel which is constantly being filled with green ware at one end and emptied of dry ware at the other.

Third. The heated air should be supplied entirely at the discharge end and not throughout a large part of the tunnel, unless the clay is one not subject to checking.

Fourth. The draft should be artificial and under the control of the operator at all times—that is, the circulation should be produced by fan instead of by stack.

Fifth. The heat must be obtained economically from one of the following sources, and preferably in the order given: First, from the waste heat of cooling kilns; second, directly from the combustion of fuel in furnaces specially constructed for the purpose; third, from steam pipes supplied with exhaust or live steam from the boilers.

Let us briefly consider these points seriatim.

Fires which have swept away so many brick factories have so often had their origin in the dryer that it needs no argument to show the importance of having the dryers made fireproof. The additional cost of the fireproof dryer is so small that it is not worthy of consideration in comparison with the saving in insurance and the satisfaction of knowing "where you're at."

The saving in the handling of large quantities of brick has made the car and tunnel system very popular, and it has undoubtedly "come to stay." The advantage of the progressive over-the-chamber dryer is that most clays can be dried more rapidly in them, thus giving a greater capacity to a given space.

The hot air for drying, whether obtained directly from the products of combustion, or from the radiation of steam pipes, should enter the dryer at the discharge end of the tunnel. The first car at the end should be the hottest car in the tunnel. In many tunnels the hottest part is several feet up from the discharge end and hot air is admitted one-half or two-thirds the way up the tunnel. This is a frequent cause of the checking of the brick and can only be obviated in such a dryer by lowering the temperature or checking the draft, thus reducing the capacity of the dryer. Moreover, if a steam dryer, by the placing of the pipes in a compact coil at the front end of the dryer the amount of heating surface may be greatly reduced. But these advantages are obtained in connection with the artificial or forced draft.

The advantages of the fan or blower over the stack for producing a circulation in the dryer are that the action of a fan is positive and always under control of the operator, and not dependent upon the condition of the atmosphere, the variations of which influence the draft of stacks so considerably. Moreover, with a fan one is always prepared to make use of any waste heat from boilers or kilns.

The most essential feature of a good dryer, such as a man ought to build today, is that it dry the maximum amount of brick with the minimum amount of expense. Few people who are using dryers, especially steam dryers, seem to have any definite idea of the cost of drying their brick. They know that their fuel bills are enormous, and that the business is not as profitable as it ought to be, but they may not know that the loss is largely due to the excessive cost of drying.

The two most approved methods of heating tunnel dryers now in use are by steam and by hot air, the heat being circulated through the dryer and the moisture removed by fan or stack, preferably the fan. The heating by hot air, that is, by the combustion of fuel and the direct use of the heated gases as the means of drying, has the advantage over steam on the score of economy and hence should receive the attention of brickmakers and drying engineers, and be so modified as to overcome the inherent faults of inequality of temperature and discomfort and uncleanliness caused by sulphurous gases and smoke.

Great improvement may be looked for in this class of dryers either in the direction of automatic stokers and smokeless furnaces, or by the use of coke or producer gas as fuel. If it is possible to obtain a smokeless furnace for bituminous coal, such furnace could be placed under the steam boilers and the hot gases of combustion taken by a fan direct to the dryer after having passed through the boilers, instead of being allowed to go to waste out of a stack.

For large plants, especially where the clay will stand rapid drying, the steam dryer is too expensive in operation and maintenance, and must, and will, be superseded by something more economical. But we do not have to go far in our line of manufacture to obtain a cheap and perfect heat for drying purposes. Any intelligent and observing man need not be long on a brick yard, even though he have no practical knowledge of the business, without noticing that more heat is being wasted than will dry ten times the output. This great waste of heat is peculiar to American brick yards (you will see no such waste on European yards). That this waste heat has not been utilized in this country is doubtless because, up to the present time, the profits of the business have been sufficient without it, and that all the manufacturers have been working on the same basis in this respect. But the time is at hand when to insure success every advantage must be secured, every saving be effected.

We will only concern ourselves in this paper with the waste heat from cooling kilns, as this waste is most obvious and easiest to utilize for drying purposes. In paving-brick plants, especially where closed or down-draft kilns are employed, sufficient heat can easily be obtained to dry all of the brick with only a small consumption of steam to operate fans to exhaust the heat from the cooling kiln and blow it through the dryers. No heat could be better adapted for this purpose, and it can be drawn from the kiln without damaging the cooling brick in the least, and can be so tempered in mixing chambers as not to check the most tender clay. It is along this line that the most marked improvement can be made at the present time.

Along this line my investigations have been chiefly directed. I have this system in successful operation upon the yard of which I have charge. The details of construction and operation under various conditions I cannot enter upon here. To any one who is desirious of using the system I will gladly give such advice and information as I may be able.

Though the general principles of drying clay products are pretty well established, yet there cannot be entire uniformity of methods employed, since different clays vary so greatly in their behavior when exposed to hot air. There are some clays so easily checked by exposure to the open air, or to the drafts of a progressive dryer, that a special system of closed-chamber drying must be employed; but happily such tender clays are so rare that we need not consider them in this paper. Moreover, many manufacturers are so limited in the amount of their capital and in the demand for their product that many systems of drying would not be practicable for them.

As to the cause and remedy of some of the troubles encountered by many in the drying of their product, I can only repeat what I have said recently in other conventions of claymakers.

First, as to the checking or cracking of the brick in the dryer, the reason usually assigned for this is that it is due to too much draft or circulation in the dryer rather than to the high temperature or dryness of the air. Hence the remedy prescribed in such cases is generally to shut off the draft and check the circulation. Now, I do not care to combat this idea to the extent of declaring that it is not a remedy in some instances, but I do believe that there is, in most cases, a better remedy. My experience has convinced me that the cause of checking is not generally due so much to the draft, per se, as to the air being too hot and too dry for the particular clay—that the circulation might be just as strong and rapid and the drying of the brick be completed in much less time, provided that the air so circulated be not of too high a temperature, nor too dry when it comes in contact with the green brick. In other words, in a progressive tunnel dryer properly constructed the circulation can, and should be, strong and active without checking the brick.

W. D. Richardson, Cleveland.

Another trouble closely related to the checking is the "whitewashing" or "scumming" of the brick in the drying. A thorough discussion of this subject, and examination of the real nature and cause of this deposit called "scum," would of itself consume all of the time alloted to this paper, and might lead me into too deep water. Suffice it to say here that the trouble can often be remedied by a stronger draft, by removing the moisture from the brick as soon as it has been brought to the surface. If you want brick well whitewashed, let them dry slowly in a room without much ventilation. If you want to prevent scumming as well as checking, try the effect of a stronger draft. If it does not produce the desired result in your case, it may be the fault of the dryer and not of the advice. Make the dryer about 120 feet long, admit the heated air wholly at the discharge end and you need not fear too strong a draft.

I did not realize until I began to prepare this paper that the subject is too large, too broad to admit of thorough treatment for such an occasion as this. There are several topics mentioned in this paper, each of which might have been taken as a subject by itself. And I believe that this is a common defect, that the subjects assigned for discussion at our Conventions are too general, cover too much ground, and hence we are apt to get many of the old, general, time-worn statements of no special value to an experienced brickmaker, though of interest to the beginner, or to the general reader. Let us relieve the monotony of our discussions by limiting the subjects to some special operation, to some particular part of a process, and aim to secure papers from men who have made, or will make, special investigation of the matter, and give them ample time to prepare and treat the subject thoroughly in detail. We all get enough general knowledge from our daily contact with the brick yard and from the reading of our trade journals—what we want and must have in order to advance is specific, technical knowledge of every detail of our business.

Now, I realize that I have myself given no definite information upon the subject of "Imporved Methods of Drying Brick," but if any suggestion I have made shall bring forth fruitful discussion in this Convention, or shall lead any brickmaker to investigate more thoroughly these important questions, and thereby develop a more efficient and more economical system of drying his product, my effort will be amply rewarded and one of the aims of our organization be attained.

DISCUSSION.

Mr. Eudaly: I am very much pleased with Mr. Richardson's paper. We all recognize that drying is one of the most important departments of brick or tile making. With your permission and the use of the blackboard, which we now have the good fortune to have before us, I will try to illustrate some experiments I made a few years ago with fans and tunnel dryers. If I understand Mr. Richardson's paper correctly, he suggests that a fan be placed at the lower end of the tunnel, in order to drive the cold or hot air through the tunnel. My experiments led me to believe that the fan was much more effective if placed at the upper end of the tunnel. (Here Mr. Eudaly drew a rough sketch of a tunnel dryer on the board, and indicated the position of the fan at either end of the tunnel.) I always found that there was a great difference for effectiveness in the way the fan was set. If the fan is set perpendicular to the tunnel in the stack, only the lower portion of the fan operates to draw the moisture from the brick (indicating). If the fan is placed horizontal, thus (indicating), the entire surface of the fan operates upon the hot or moist air which is being drawn from the tunnel. I always found that a short stack served the purpose better than a tall stack when the fan was being used. Of course, without the fan a stack of a reasonable height is much better when it is expected to remove the moisture from the tunnel. With a fan it is important to dispose of the moisture as soon as it has passed from the fan. If you have a tall stack above the fan, the fan is compelled to lift the entire column of moist air to the top of the stack; hence the lower the stack the better.

After all, I believe we are laboring under a great misapprehension on the conditions necessary to dry clay ware thoroughly by the use of tunnel dryers. To my mind a brick or piece of clay which we propose to dry should first be heated thoroughly through and through. I mean that it should be heated enough in the center to drive out the moisture before the outside surface begins to dry.

We must understand that, generally speaking, all clays shrink more or less in drying. If, therefore, we heat the tunnel filled with green brick sufficiently and rapidly enough to cause the surface of the brick to begin to dry before the core or center of the brick is warm enough to start the moisture, the outside or surface will shrink more rapidly than the inside portion; consequently, the outside must crack, or check. If we can arrange our tunnels to receive the applied heat so as to thoroughly heat the brick through and through before allowing the moisture to escape from the tunnel, I believe we should have better success in drying all these clays which have a tendency to surface checks in drying.

Another great mistake I have seen in many tunnels is the overhead space (indicating). I have seen quite a number of tunnel dryers with several feet of space above the cars or wares set on top of the cars. The heat of the lower or exit end of the tunnel has a tendency to rise to the ceiling and pass out above the cars. There must always be more or less space along the sides of the cars next the sides of the tunnels, which sides are always warmer than the brick on the cars; consequently, the warmer air seeks the sides of the tunnel and passes up on each side of the cars through this space. In other words, when there is too much space on the sides and above the cars, the heated air passes out around the cars, instead of passing through the brick. I have seen burlap hung to the ceiling above the cars in this manner (here indicating), long enough so that the lower edge of the burlap would strike the top of the cars. In this way the course of the heated air, which would otherwise pass out over the top of the cars, is somewhat broken up. This will help the tunnel which is too large considerably.

There is another class of tunnels which have a number of small openings along the top, with short stacks, for the purpose of taking out the moisture at several points. This works fairly well with long tunnels. By this method great care must be taken to avoid the loss of heat. I think a tunnel with a double wall having openings along the sides near the bottom should work excellently, the idea being that the moist air in the tunnel is heavier than the hot or dryer air, and consequently settles to the bottom of the tunnel, and would be taken out at the openings in the bottom and be conveyed up through small stacks in the side walls. This, I think, is a very excellent plan.

Referring again to the position of the fan, I believe that it is better to place the fan at the upper end of the tunnel. I mean by upper end the receiving end (here indicating). The receiving end of the tunnel is always, or at least should be, nearest the machine room. It is very easy to transmit the power necessary to run the fan from one of the line shafts in the building, whereas, if the fan is put at the lower or discharging end of the tunnel, it is much more difficult to transmit the power to run it. Besides, I maintain that a greater amount of air can be displaced with the fan by drawing the air from the tunnel than is possible by forcing the air into the tunnel. Of course, in taking the heated air from a cooling kiln, there must be some advantage in placing the fan between the kilns and the tunnels. This would necessitate the forcing of the air into the tunnel. We must remember, however, that we cannot take the air directly from a cooling kiln, at least when the kiln is very hot, without mixing cold air.

To my mind the tunnel dryers built with a view of using heated air from cooling kilns for drying should be so arranged as to take the air from the kiln to the tunnel by natural draft. I see no reason why this cannot be done successfully. Neither do I see any reason to prevent mixing cold air with hot air escaping from the kiln by means of natural draft.

There are many points yet to be brought out in connection with the drying of clay wares.

Mr. Pike: I don't understand how the heat can be introduced at the discharge end of the dryer. I wish Mr. Richardson would tell how it is done.

Mr. Richardson: I use a large fan and speed it to about 600 or 800 revolutions a minute. Some use a blower at each end of tunnel, but it is not necessary with us. We admit hot air about ten feet from the discharge end. I think that checking is caused many times by the green brick being heated too rapidly. We must have both heat and circulation to dry brick successfully. I would like to hear from Prof. Orton.

Prof. Orton: I think Mr. Eudaly gave the clearest and best explanation of why brick crack in drying that I have heard. I believe he is right when he says that brick should be heated through and through before the drying process begins. I was working with a clay some years ago that cracked badly if exposed to any circulation of air. If the green brick were left exposed they would literally crack all to pieces while the men went to dinner. We had an ordinary tunnel dryer, and found that the only way we could prevent the brick from cracking was to fill a tunnel and close it up tight, then raise the heat slowly till the brick were quite warm. If by any carelessness air was admitted, the brick would be spoiled. As Mr. Eudaly has said, the trouble is caused by the moisture escaping too quickly from the outside of the brick, causing the surface to contract and break.

Mr. Richardson: You will notice, in reading my paper, that I have left loopholes for escape from these exceptional cases. If my subject had been the drying of tender clays I should have treated it differently. That is a subject worthy of a paper in itself.

GEO. B DRENNAN, Plymouth; Chairman Committee on Resolutions.

President McClure: We will now hear the reports of the Secretary and Treasurer.

Secretary Justice: Our reports cannot be submitted just now, as there are some unpaid bills that ought to be included. I will say, though, that after all debts are paid there will be a balance in the treasury of about $40.

President McClure: The Secretary will be authorized to pay all outstanding bills. We will now hear the

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. Chairman and Gentlemen of the Convention:

Your Committee on Resolutions beg leave to report as follows:

The motion to appoint a committee to devise some method of raising and maintaining prices that will insure a living profit to the manufacturers of drain tile, which was referred to us, we deem inexpedient. The character of the tile business is such that we believe any effort to control or regulate prices through this organization would prove futile and result detrimental to the Association.

We therefore recommend that in the future, as in the past, this Association refrain from participation in any scheme or effort to interfere with the business or trade of its individual members.

However, we recognize that a fair, living profit is essential to the life of every industry, and as a means to that end we earnestly recommend the formation of local or neighborhood clubs for the consideration of all matters of interest to tile and brickmakers, and believe that much good might result from such organization if used for no other purpose than to cultivate pleasant social relations among neighboring clayworkers, and the dissemination of information relating to the advantages resulting to the masses from the use of tile, hollow blocks and all clay products.

The development of the great clay deposits of Ohio, which rank among the most valuable in the entire country and constitutes one of the chief sources of the State's natural wealth, is a matter of prime importance to every citizen.

We therefore commend the efforts of the trustees of the Ohio State University to establish and conduct a department of ceramics, which, under the able direction of Prof. Edward Orton, Jr., is doing splendid work that will prove of inestimable value. Therefore, be it

Resolved, That we, as an organization, appeal to the Legislature for continued and increased support of this great work, which will do more than anything else to develop the State's great clay resources.

Resolved, That the sincere thanks of the Association is due to the city authorities for their kind hospitality in gratuitously providing the Council Chamber for our meetings, and that we also tender to the faculty of the Ohio State University our earnest thanks for their efforts in our behalf, and assure them of the active support of every member of this Association.

GEORGE B. DRENNAN,
J. D. RUMSEY,
F. M. GARDNER.
Committee.

President McClure: If there are no objections the report will be accepted as read. We will next hear from the Committee on Nomination of Officers.

Mr. Wilson, chairman of the committee, submitted a report which included the name of Secretary Justice and recommended his re-election.

Mr. Justice: I thank the committee heartily for the honor of a re-nomination, and the members of the Association for all the favors they have shown me, but must positively decline a re-election. Circumstances are such that I cannot serve another year.

On motion of Mr. Randall a vote of thanks was tendered Mr. Justice and the other retiring officers for their faithful service.

Mr. Eudaly moved that Prof. Orton's name be substituted for Mr. Justice's, which was duly seconded, and the unanimous ballot of the Association was cast for the officers named, as follows:

OFFICERS ELECTED.

President—E. Biglow, West View.

Vice President—Ed F. Darnell, Grove City.

Secretary—Prof. Edward Orton, Jr., Columbus.

Treasurer—S. E. Hagy, Aetna, O.

The newly elected officers were installed, with the assistance of Mr. Eudaly, after which Prof. Orton introduced Dr. Canfield, President of the University of Ohio, who welcomed the Association in the following masterly address:

ADDRESS OF WELCOME.

—By J. H. Canfield, President Ohio State University.—

Gentlemen of the Convention:

I am very glad that this Convention decided to hold its meeting at the University, and I am very glad that I can find a few moments in the midst of a very busy morning in which to give you a most hearty welcome. I welcome you to the University because this is just the place where you ought to be and ought to meet, not only to-day, but always hereafter. Each recurring year ought to see you in these rooms, with these facilities for a successful and interesting meeting at your service. The University is yours in a sense that possibly has not occurred to some of you. As an institution giving instruction, thorough and expert instruction, it is of course yours and your children's. But there is another side to the University that is not always thought about. The institution brings to this State and maintains upon this beautiful campus, a large body of highly trained, specially trained, experts, who are here to say to you the last, the best and the most helpful word in the line of your immediate interests. These men cannot be bought, they cannot be intimidated, they are truthful and unprejudiced, and they are constantly investigating—they know the exact status of the affairs in which they are specially interested, in their respective departments, and they are more than ready and willing to report this to you. If you feel that the judgments or reports or conclusions of other men may be warped by self-interest, or by their connection with some form of production, these men of ours are to be your wise and honest and able and fair-minded counsellors. That is one part of their business here, and a large part. I wish you to bear this in mind. You will then understand what I mean when I say that every productive industry in this State ought to be represented here, and every association in this State ought to hold its annual meetings here, with the feeling that at this University is its natural center, and that here it can always find not only teachers, but men well versed in practical affairs, and men among men in the best sense of the words.

There is another reason why I am glad to see you here this morning. This institution honors labor, and honors all labor. It believes that it is not possible for one part of a community to be permanently benefited at the expense of another part. A people must advance, in a general way, all together, or the advance is not wholesome and cannot have permanent results. The interests of the whole people must be cared for, or there is nothing stable in its civilization—really, it is not civilized. There must be an equitable distribution of the fruits of labor, or there is injustice and suffering and wrong. This does not mean that every man is to have as much as every other man—because there is, and doubtless always will be, a difference in men and in the service each may render the community. But in honorable recognition there must be equality, and in right of way there must be equality, and in the distribution of profits there must be justice. From each according to his ability, and to each according to his deserts—this is the maxim. And in all this the University believes, and in this spirit it leads, and in this spirit it offers its service. So I am glad to see the representatives of every form of productive industry on these grounds, and I believe that we can and will help them, while they help us in bringing in something of the fresh outer air that we need. We need to be in touch with you to know what you desire and deserve; and you need to be in touch with us to learn what we may know in science and in every department of intellectual life and mental activity. We desire your co-operation that we may be the better able to serve you, and because we believe that we can serve you.

I welcome you here to-day, gentlemen, and I hope to be able to welcome you again. Now that your Secretary is one of our corps of workers, we hope to see you often. Come again, singly or in a body; come often; come at least every year, and in the language of the old-time signs in the country stores, "If you don't see what you want, ask for it."

Dr. Canfield was applauded to the echo, and it was evident from the enthusiasm aroused that the members approved the idea of holding future Conventions at the University and appreciated the advantages the new home would afford.

MEASUREMENTS OF HIGH TEMPERATURES FOR CLAYWORKERS.

—Prof. Ed. Orton, Jr., Columbus.—

There is hardly any subject connected with the manufacture of clay wares around which there hovers so great an interest, and, I may add, so dense a cloud of misapprehension, as that of temperature. The engrossing importance of the burning of any clay ware, or any wares in which clay is a component part, can only be understood and felt by a clayworker. To any one who has sat up by night, weary with the labor of the day, and almost drunk with sleep, yet afraid to close his eyes for a moment, lest the insatiable maw of his fires should remain unfilled for a time, and the regular rise of his temperature should be broken for a little, these thoughts and feelings are in no way strangers. To many and many a man has come the time when one last kiln has meant success and fortune or failure and bankruptcy. To all men who follow the fictile art, constant and never-ending care and scrutiny are the price of good and profitable burns. Is it any wonder, then, that men have devoted to any and all phases of this "burning" question their best thoughts and most anxious attention?

There are really in the proper conduct of the burning of a kiln of clay ware of any kind many points whose importance must be accorded a position nearly equal to that of final temperature. These are all known to you with more or less exactitude. I need hardly even mention them—the drying off, the raising of the heat, the expulsion of the combined water, the loss of the sulphur and carbonic acid of the clay, the oxydizing or reducing quality of the kiln atmosphere, the annealing or cooling of the ware—all these and other factors require due time and thought from him who will make a successful burn; but even if all else is done, and well done, and the burner fails to expose his wares to the proper temperature, for the proper time, the results will surely be a disappointment.

F. M. GARDNER, New California.

What this proper temperature is, which must neither be exceeded nor scanted, is something which every clayworker must determine for himself. In the long range of centuries, during which mankind has followed this most interesting and useful calling, no way has ever been found by which this knowledge can be obtained except by the most unremitting attention and a keenly discriminating eye. And I may add that no matter with what safeguards and helps science may surround the clayburner of the future, there will never come a time when these same qualities of mind and eye will be less needed than they are now.

The successful termination of a burn, then, requires two things: First, that the burner shall know by eye, or by some other means, when the proper temperature for finishing has arrived. Second, that he shall maintain this temperature until the contents of the kiln shall have been duly brought under its influence.

What means have all the researches of science brought forward to aid the clayworker in this delicate task? Or, rather, perhaps I had best ask first what have clayworkers themselves done during all these centuries of experimenting? To this last inquiry I can give only one reply. To clayworkers themselves no important device for measuring temperatures can be credited; to high temperatures as such they have devoted but comparatively little attention. But to determining the effects of temperature, each one of all the myriads has devoted no little time. The method in well-nigh universal use to-day is the so-called trial piece plan. I refer, of course, to the custom of drawing from the burning kiln samples of the ware, whose progress in hardness, color or size is made the subject of examination as soon as the ware has cooled sufficiently to handle.

The cheapness, the simplicity, and, if well managed, the high degree of accuracy of the forecast obtained from this kind of a test is a sufficient explanation of the fact that so few additions to accurate thermometry have come from clayworkers. This plan, while it does not pretend to be a direct measure of temperature, nevertheless has advantages which cannot be lost sight of. It is a measure of the effects of temperature only, and, as such, it is of the very greatest importance. And yet if intelligence and care are not used in this simple test, the results may mislead us, and hence we are prone, especially while still beginners in the business, to bitterly complain that if we had only some accurate means of measuring the heat that our troubles would be over.

And now to my subject proper. What are the means of accurately measuring high temperatures now extant? And are they, any or all of them, capable of giving us, as clayworkers, any real help in the control of our work?

Of the known ways of measuring heat at present, the following crude classification may be made:

1. Methods depending on expansion of solid liquids or gases by heat.
2. Methods depending on calorimetric processes.
3. Methods depending on optical phenomena.
4. Methods depending on electrical resistance.
5. Methods depending on viscosity of gases.
6. Methods depending on the fusion of metallic alloys or chemicals.

Of this rather formidable array I shall take only time to the principal and best known forms in use to-day.

I. The first method, involving the expansion of matter by heat, is the oldest and the most generally used at this time of any method in the list. Our first thermometer was a bulb of glass filled with air, from which a long tube of glass extended, in which a small globule of mercury played back and forth, as the air expanded or contracted, with every passing breath of wind. This method is represented now by three types of instruments: 1st. The air pyrometers, in which a porcelain bulb containing air is heated by exposure to a gradually increasing temperature, and the readings are taken by noting the increasing pressure of the imprisoned air, caused by its expansion. That process has been perfected by Prof. Wiborgh, of the School of Mines, at Stockholm, Sweden. It is now conceded that the modern instruments of this description are among the most accurate of any known, and unite the virtue of being very easily portable and not requiring wires or connections. Their cost is about $125, imported in this country.

2d. By the liquid pyrometers, or thermometers, such as the ordinary mercurial varieties in common use. The limits of temperature possible to this plan are very small, as the range of temperatures between boiling and freezing of liquids is small at best, and no liquid can be found whose boiling point approximates the lowest red heat.

3d. By the expansion-bar pyrometers, such as those made by Brown, of Philadelphia, and the Crosby Gauge Company. In this instrument the method of measurement is by placing a bar of metal in a furnace in which it will become heated from end to end evenly. The outer end is fastened to a strong rod, and the other end is attached to the needle of the dial by means of a connecting lever. As the bar expands the loose end moves out, and its motion throws the needle around the face of the dial. It works with a great regularity as long as the temperature is not allowed to get above 700 degrees C., but if higher heats are attained the metals oxidize or bend, and the machine is ruined. For temperatures up to this point this instrument is a very satisfactory one, and has the merit of being reasonable in cost (about $25).

II. The second method, that of calorimetry, has done for the science of pyrometry a very great deal of service, mainly in the way of establishing certain fixed points, without which we would often have but little confidence in the results of the other forms of apparatus. The machine is simple, consisting of a metallic ball or mass, which is heated in the fire to be measured until it has the temperature of the fire; it is then plunged into a weighed quantity of water, whose temperature is carefully tested before and after the entrance of the ball. The increase of the heat of the mass of water affords the means of calculating the temperature which the ball must have had. This method, in the hands of an expert experimenter, has given us standard data for all temperatures, but as a practical method for busy men it is entirely out of the question.

III. The third method, that of measuring heat by means of the quality of the light reflected by objects exposed to it, is represented by two processes. Only one of these has been adopted to any extent, and it is not now generally considered as a working success. The one to which I refer is the pyrometric telescope of Mesure & Nouel. It is composed of two nicol prisms and a quartz plate. One of these prisms is attached to a head piece capable of rotation on its axis, and by first placing both prisms in line a part of the spectrum of any heated object is visible. By rotation of the outer prism the colors of the spectrum are cut off in regular order, but the brighter the light the more rotation will be required to accomplish this purpose.

The trouble with this instrument lies in the fact that we must carry in mind a vivid recollection of the shade of the transition color, and this is impossible to most people and difficult to all. Hence, the instrument is capable of only very ordinary accuracy, and seems to have but little prospect of a future of usefulness. Its cost is about $60.

The fourth method, depending on the measurement of electric currents, sounds very formidable, but is nevertheless one of the most satisfactory of all means so far devised. Various plans are adopted. Two only will be discussed.

1st. The method of Siemens, in which the measured resistance which a platinum wire offers to the passage of an electric current when it is heated is used as a basis. The accuracy attainable by this plan, if it is properly carried out, is truly wonderful. It is reported that variations of one-tenth of one degree are perceptible, and can be measured at temperatures up to whiteness.

2d. The method of Le Chatelier is the most important of all now in use. He uses the electric current which is generated by a little thermo-electric couple, composed of platinum pure and platinum alloyed, with 10 per cent. of iridium. This couple generates a current corresponding to its temperature, and by the use of a sensitive galvonmeter these little accessions of current are easily translated into degrees. It is to be noted, however, that this instrument does not give any data by direct determination. We are only able to recognize the temperature by first standardizing the instrument against some other accepted determination, such as melting of alloys and the air pyrometer determinations. But when it is standardized its use is simple and easy. It has always heretofore taken two men to make an observation from it, one reading the galvanometer and the other tending the exposure.

One great advantage has lately been added, which shows that progress is being made. The instrument has been made self-recording under certain conditions. The temperature is now automatically indicated on a measured sheet, so that we have but to look at the paper to see how the heat of a burn has been raised. The cost of the latest forms of this instrument is about $125, and the parts subjected to heat are very small and light, and can be easily replaced if destroyed. The rest of the apparatus is not likely to suffer deterioration.

The fifth method is the most interesting one, and, though new, it offers indications of becoming the most valuable of all. The principal is explained in a few words. If air under certain pressure is being sucked into a tube of small bore, the quantity which can pass the tube in a given time and temperature is constant. But if the tube is heated, the same volume of air will pass through as before, but this volume consists of air, rarified by heat, and the same air, when cooled, will occupy much less space, and will support a much lower column in a water or mercury gauge.

This method was devised first by Barus, but is now represented by the Steinbart & Euhling pyrometer, which is newly added to the list of instruments on the market. The work of this instrument is said to be fine. It is connected to a time clock, and a continuous temperature curve can be readily obtained, showing every deflection, up or down, in temperature, accurately and clearly. The higher the temperature rises the less motion will be produced on the gauge, and for very high temperatures this instrument becomes less valuable; but, for this matter, what will not? All methods of measurement are greatly decreased in accuracy as the temperature rises toward the melting point of platinum.

This instrument costs about $500 for a complete plant, but when once in use it will allow a complete and faithful record of every furnace, kiln or crucible to be kept in figures plainly visible to the most ordinary observer.

The last method is that of pyrometric alloys. It is a very useful means of getting our bearings. It is, as a fact, a branch of the calorimetric method, for after we know that one metal melts at 1,050 degrees and another at 1,775 degrees centigrade, it is an easy matter to make a set of mixtures or alloys which will melt at any interval between these two temperatures. These alloys are composed of silver and gold and gold and platinum. Only costly metals can be used, but as the metals can be used as many times as is needed, the expense is only that of the first cost of the crude metals. For many purposes, when it is only desired to get an idea of the practical heat of working, nothing better for measurement than the alloys are needed.

What, then, is the result of this hasty review of methods? What are the first facts to keep in mind?

Prof. Ed. Orton, Jr , Columbus.

1st. That temperatures from boiling of water up to the melting point of platinum can be accurately and readily measured by three or four different methods, down even as low as one degree centigrade.

2d. That these methods have been made to agree with very great precision on the measurement of high temperatures, where absolute accuracy of conditions were possible.

3d. That at least two machines are able not only to measure heat, but to make an automatic record of its fluctuation from hour to hour, and from day to day, and which record does not require any especial skill or judgment to read and to understand.

So far, then, as our original question is concerned, the matter is solved. If we want to know what temperature exists in a kiln or furnace we can find it out. All that is needed is to pay the price and the facts are at our disposal. But does not this fact leave us very much in the same shape as we were before? Is it a matter of degrees centigrade which decides the quality of a burn? I most heartily wish that it were, for then we would all be good burners very soon.

But, as I said early in this paper, it is not only the question of getting this temperature, but of the time occupied in doing so as well. You all of you know, as well as I, that if you could burn a kiln of clay ware to a finishing heat in one day instead of three, that your ware would not be burned in that time, and that the only result would be blown and bloated ware. For that reason I believe and feel safe in saying that with temperatures as such, measured in degrees, you and I have little to do. We do not need to know whether a kiln is fired off at 1,050 degrees C., or 1,250 degrees C., if we only have some convenient standard of comparison which will answer for each case.

One word, at this point, as to the temperatures used in clayworking. The most extravagant ideas prevail on this topic, not only in clayworking, but also in the iron, glass and all metallurgical industries. I have heard intelligent men, whose word would go for any amount on a bond, discuss the temperature at which they burnt their wares as way up in the thousands. Three thousand, 4,000, 5,000, even 6,000 degrees, is as nothing to them. As a matter of fact, the extreme range of temperature used will, I think, fall between the limits of 900 degrees Centigrade on the one hand and 1,400 degrees on the other, and I presume I am safe in saying that 95 per cent. of all clayworkers' kilns finish between 1,000 and 1,200 degrees. Recollect that platinum, the most infusible of all metals, melts at 1,775 degrees C., and that above this point we have no measures for any temperature, and that we have no means of attaining heats above this point, except by the oxhydrogen blowpipe and the electrict arc. Recollect also that in this scale that a bright white heat is only 1,250 degrees and that a dark red heat is about 750 degrees. Very few brick of any kind require over 1,100 degrees C., and many are done at 1,000 degrees C.

This great uncertainty of usage in describing kiln temperatures has arisen from the expense and impossibility of obtaining any satisfactory means of recording them on a common scale of comparison. I have already shown that this no longer exists, and that accurate determinations are now possible and can easily be obtained.

But I have still to describe what seems to me the greatest addition to pyrometry which has yet been made as far as clayworkers are concerned. This is the Seger cone. They are the invention of Dr. Henry Seger, of Berlin, the greatest and wisest of the men who have devoted their energies to the fictile art in this century. His recent death is a cause of regret to us all. The Seger cone is simply a mixture of clays, feldspar, quartz, lime and iron—the same ingredients which exist in the clays of any one of you. In compounding them, however, Dr. Seger started with the most fusible mixture which he could get from these ingredients, and which is very similar in composition and in color qualities to the celebrated Albany slip, of which you all have seen the product.

Taking this most fusible mixture as a basis, and taking the most refractory clay as the other extreme, he filled in a set or series of mixtures, each more refractory than the last, and so proportioning them that there is from 20 to 25 degrees between their fusing points. The series has now been in use in the clay works of Germany for a number of years, and is the most unqualified success. The little cones, in all the experience I have had with them, never have melted out of the proper order, and invariably show by their relative degree of vitrification just what heat they stand for in any fire trial.

But you will ask, What are the advantages of this system over the pyrometer? There are many, but the first and greatest is in the fact that the cones are clay mixtures, in fact they are virtually artificial clays, just like pottery bodies, and when they are heated they are affected by the temperatures in exactly similar ways to the clays with which they are burnt. They are susceptible to oxidizing and reducing atmospheres; so are your clays. They are affected by the ups and downs of the kiln fire; so are your clays. The common pyrometers show you a temperature at the time of observation, and only the best and most costly forms give you anything like a record. The Seger cone is affected by those ups and downs, and when it melts it means that its particles have had not only temperature, but time enough to cause chemical union, vitrification and fusion. The clays are being similarly affected by every wave of heat, and on their duration and intensity the progress of the burn will depend. Hence, you can always be sure that the cone indicates a corresponding degree of effect on the ware, while from the temperature alone you know nothing accurately on the subject.

For instance, recent experiments on this subject made at the Royal Porcelain Works at Berlin showed that one cone melted down as soon as the temperature of 1,180 degrees was attained, the second cone of the same composition was tried on another burn, but the fire was badly managed and the temperature, after running up to 1,180 degrees, fell back at once for one hour to 1,165 degrees, and then gradually ran up to 1,180 degrees again. The cone finally fused, one hour and a half after the melting point was first attained. Now, if a kiln man had stopped the kiln at once when 1,180 degrees was reached by the pyrometer, his ware would have been one and one-half hours short of proper exposure to heat.

I certainly do not need to say more on this point to clayworkers. I only want to make a few statements as to the value of the cones to our craftsmen.

1st. They afford the easiest, safest and most rational means of making comparisons of temperatures from kiln to kiln, and works to works, ever brought before the clayworking industry. To fuse a cone means temperature and time of a defined amount, and if the time be kept regular it means temperature of a defined amount.

2d. They are cheap and easily applied. The cost in Germany is about 90 cents per 100. None are now on sale in this country except by importation, but their manufacturing will certainly be begun very soon. It is the intention of this department to make and standardize a large quantity of these cones against the imported German ones, and I hope to be able, before the close of this year, to supply all clayworkers with sample sets at a nominal cost.

3d. In most cases their determinations of temperature are not accurate, but two men, both burning clay ware, having compared their heats by Seger cones, the reduction of the figures to degrees Centigrade is an unnecessary thing.

4th. The cones are simply a modification and improvement of the clayworkers' own plan—the trial-piece system. Like the trial pieces, they represent effect of heat instead of degree of heat. But, unlike the trial pieces, they give warning of their condition before it is too late. For instance, by using a set of two or three or four cones, one or two which fuse when the ware is still soft, and one of which fuses when the ware is properly burnt, and one of which fuses at a point above the proper temperature—by this means you can get a perfect knowledge of the condition of the kiln. The earlier numbers give you warning of the approaching crisis, the medium number gives you the stopping point, and the last one lets you know if, from any cause, you have gone too far.

5th. If these little cones are introduced and used in the clay works of this country, it will take out from our discussions one very important and constant source of misunderstanding and trouble. When one man says his clay vitrifies to a strong body at Cone No. 2, and another says his wares require Cone No. 5, then we all would know just what they were talking about. The cost of the cones ought not to exceed one cent apiece. For a kiln of ware the total number used ought not to exceed 10 or 15 cents. Surely this is not too much to pay for the direct knowledge which they would confer.

When Prof. Orton had concluded his paper a hearty vote of thanks was extended to him, and the Convention adjourned, subject to the call of the Executive Committee.

The entire assembly then accompanied Prof. Orton and the members of his class to the test kilns, where an object lesson in determining high temperatures by the use of the Seger cones was given. Afterwards the visitors were conducted through the laboratory and testing departments, and the various machines and appliances for educating the students in clay work were fully explained, and the importance and practical value of the work of Prof. Orton's school was demonstrated to the satisfaction of every member, each and every one of whom were enthusiastic in their praise for the Ohio School for Clayworkers.

LIST OF MEMBERS.

S. E. Hagy, Aetna.
Anderson Foundry and Machine Co., Anderson, Ind.
Wm. C. Wilson (Brice Clay Co.), Brice.
A. Garharetstein, Bellevue.
W. S. Hight (Frey-Sheckler Co.), Bucyrus.
W. D. L. Mentzer, Canton.
F. E. Frey (Bonnot Co.), Canton.
Arnold Manufacturing Co., Canal Dover.
Powell & Boyer, Canal Winchester.
John H. Pfirsch, Cardington.
W. W. Chadwick, Condit.
Fish Pressed Brick Co., Columbus.
C. L. Powell, Columbus.
Edward Orton, Jr., Columbus.
Thomas F. Hunt, Columbus.
I. M. Justice, Cleveland.
W. A. Eudaly, Cincinnati.
Geo. H. Hartwell, Clay Record, Chicago.
A. F. Barron, 358 Dearborn St., Chicago.
Geo. J. M. Ashby, associate editor Brick, Chicago.
E. M. Pike, Chenoa, Ill.
J. L. Hall & Son, Derby.
Ralph Spencer, Dresden.
F. Halbeisen, Erlin.
Evans & Stitt, Frazeysburg.
Ed F. Darnell, Grove City.
Joshua Oakes & Sons, Haverhill.

J. D. Rumsey, Stryker.

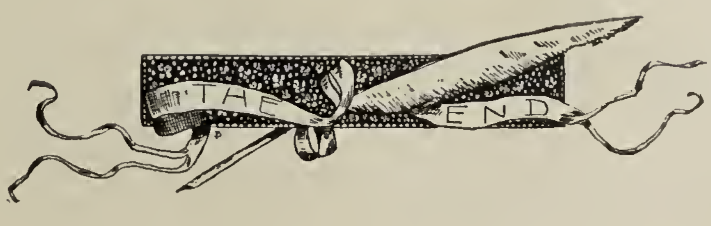
T. A. Randall, Clay-Worker, Indianapolis.
J. J. W. Billingsley, Drainage Journal, Indianapolis, Ind.
S. R. Snyder, Millersburg.
Brisson Brothers, Millersport.
B. B. McGowen, Mount Gilead.
D. J. C. Arnold, New London.
F. M. Gardner, New California.
M. A. Shuler, New Dover.
Charles Stailey, Ney.
J. M. Powell, Orestes, Ind.
J. Ed Landrum, Petersburg and Hebron.
J. D. Fate (Fate-Gunsaullus Co.), Plymouth.
George B. Drennan, Plymouth.
A. J. Darbyshire, Sabina.
J. D. Rumsey, Stryker.
W. M. Wise (Novelty Tile and Terra Cotta Co., Stoutsville.
H. D. Weaver, Sparta.
J. P. Kinkead, Upper Sandusky.
E. O. Biglow, West View.
E. Biglow, West View.
Andrew Braunstetter, Wooster.
John Wilson (Wooster Shale Brick and Clay Co.), Wooster.
Warsaw Brick and Tile Co., Warsaw.
A. C. Henkle, Washington Court House.

Pessimist or Optimist—Which?

Editors Clay-Worker,

Gents—Inclosed find two dollars for Clay-Worker. Excuse me for not being more prompt in remitting. The reason was because the other fellows were slow in remitting to me.

Things have become a little mixed here in Illinois in the past few years, and our figures have not panned out as we expected. In the first place, I was told that everything would be booming. Hay would bring ten dollars a ton, wheat one dollar per bushel, oats forty cents, hay fifty, and that there would be an abundance of everything, and all that was necessary would be to get the seed in the ground and then prepare for harvest. Horses, hogs and cattle would be high, there would be lots of work in the European countries and they would have to buy our products, as they had none of their own and could buy nowhere else. There would be lots of rain; farmers would want lots of tile to drain their land, lots of brick to build houses and barns; the prices of tile and brick would be away up, the demand so great it would be impossible to fill all orders; that my machinery was old and of small capacity, and that I would have to put in larger machinery to supply the demand. So on Jan. 1, 1895, I started out, bought machine, crusher, engine and boiler, built larger buildings, and by May 1 I was ready for the rush and to start the wheels of fortune. Then it stopped raining and I run out of water; next the hay crop failed, then the wheat and oats crop was a failure; next come the corn crop, it was good, but no one wanted it. Horses would not bring one cent per pound, but there was a few hogs left, so I sold some brick to the men that had hogs. They were to pay for the brick as soon as they sold their hogs and received the money for them, when along came the devil, or the hog cholera, I don't know which, and killed the hogs. Now I wish Brother Eudaly, Pike, Stoll, Hammerschmidt, Lay or some other brickmaker could tell me how to get that money. I am here and liable to stay as long as the sheriff don't come around. I have brick and tile to sell at the old prices, and am looking for the fellow that was here in 1892 telling me of the great future before me and the money I would make during the next four years. If those hogs had not died and things panned out as I was told I could have attended every brick and tile convention in the United States. As it was, I had to stay at home and tell my creditors that I would pay them in a few days. I have been in the brick and tile business eighteen years, and I am ready to sell out to some enterprising young man and invest in a silver mine, go into the free coinage business, make fifty-cent pieces and sell them for one dollar. I am told by a good friend that it will be the business in the future, and will beat the tile and brick business all to smash. Should any one wish to buy my interest in the works here I would say I will not be home next week, as I intend to go shooting ducks, providing some of my neighbors go away on a visit. GEO. GILLEN, JR.



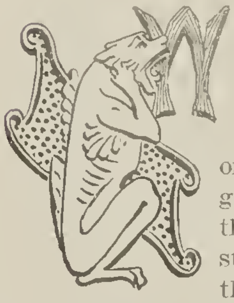
OBITUARY.

T. J. Routh Passes Away, After a Brief Illness.

It is with much regret that we chronicle the death of our able contributor, Thomas J. Routh, who has been identified with the brick and tile business for the past twenty years, having superintended the erection and management of many factories throughout the Central States. At one time he was connected with the Frey-Sheckler Co., but for some time has been located at London Mills, Ill., where he died Feb. 7 of pneumonia, in his forty-eighth year. He leaves a wife and two daughters. His death is a great loss to the entire clay-working fraternity, to whom his writings were of much value because of their practical character.

THE LATE T. J. ROUTH, London Mills, Ill.

A NOVELTY IN BRICK.



WE HAVE ALL HEARD of gold bricks, but they have always proved too costly for building purposes, excepting for Uncle Sam when he wishes to build up his credit, or for some sharper who tries to build some gigantic gold-mine scheme. But now comes the Yale Brick Co., of Berlin, Conn., with the startling and audacious announcement that they will shortly place on the market a brick whose front shall present, when laid in the wall, a surface of copper, brass, aluminum, rolled steel, or even gold—and this, too, at a reasonable price. For banks and trust companies they can furnish a lead-faced brick which will prevent the modern up-to-date twentieth-century burglar from getting in his fine work with the X rays.

Mr. E. P. Yale, the inventor of this new brick, claims this is the first brick of the kind ever produced, and brickmakers and architects who have examined it are very favorably-impressed with it.

The covering may be placed on any brick, plain or pressed, and is made to extend one-eighth of an inch all around, so that when the brick are laid with quarter-inch joints the facing will come tight together, presenting a solid, uniform front, and are guaranteed to be fire-proof, water-proof, weather-proof and vermin-proof. No joints are exposed to ravaging elements, which are always so prominent a factor in the destruction of modern brick work. Mr. Yale expects his brick will practically take the place of enameled brick for bath rooms, public halls and kitchens. While possessing all the good features of enameled brick, they overcome some of their faults, such as crazing and cracking, and can be sold for from thirty-five to seventy-five dollars per thousand, according to quality of brick and finish. For fireplaces these brick lay up very prettily, especially the brass-covered ones, and add, by their reflection, materially to the beauty of the surroundings. They will stand any amount of heat that they could possibly be exposed to. For kitchens this brick is especially adapted, notably on account of its cleanliness.

The secret of the Yale patent is in the manner of applying the cover to the brick, but is guaranteed, however, to stay as long as the brick lasts. Mr. Yale is now perfecting the machinery with which to manufacture these brick, and expects to be able to fill all orders by the first of April. Several architects from New York and Boston have been to Berlin to investigate the invention, and have given their full indorsement to the makers. Any style of ornament desired will be furnished with promptness by the concern. They will also make flat tile covered with metal, which would be desirable for floors in dining rooms, bath rooms, saloons, etc.

The Yale Brick Co. has a plant valued at $80,000, covering about fourteen acres of ground. R. N. BUELL.

THE INFLUENCE OF BOODLE.

Brick to Give Way to Stone in Chicago Sewers.

It is estimated by the brick men that the proposed sewer improvement in Chicago for this year will require a hundred millions of brick. That is, if the original plans were carried out. This may not be done, it seems, for the stone men look with horror upon this large use of brick, and, it is claimed, have raised a fund of a hundred thousand dollars to railroad an ordinance through the council at its meeting of March 16 which will require that hereafter Chicago sewers be built of broken stone and cement; that is, of concrete instead of brick, notwithstanding Chief Engineer Jackson estimates that it would cost twice as much to do this work with concrete as with brick. The Chicago Times-Herald states that the Brick Manufacturers' Association appointed D. V. Purington, W. H. Alsip, A. Prussing and Bernard Weber as a committee to quietly investigate the boodle scheme of the aldermen. These investigations were made so secretly that it was only on Thursday, March 12, that this matter came to be public knowledge. On Wednesday, the 11th of March, Mr. A. Prussing sent to some of his personal friends who are aldermen, and known to be free from the concrete combine, a letter from which we make extracts. He says: "About two months ago the Chicago Brickmakers' Association was informed by several of its members that a combination of all of the crushed stone dealers and all of the cement manufacturers had been formed for the purpose of obtaining the passage of an ordinance for the sole use of concrete made from crushed stone and cement in the building of Chicago's sewers. The matter has been carried on with the utmost secrecy, but sufficient information has been quietly secured to convince the committee that money, said to be in escrow to the amount of nearly $100,000, has been pledged to secure the votes necessary in the Council." Mr. Prussing continues at length, and presents the practical evils of building sewers of concrete. Alongside of the dangerous and fatal results from such sewer building he says murder would be a cardinal virtue. Mr. Prussing refers those interested to D. V. Purington for further information.

Mr. Purington said: "The committee has been working quietly and effectively for two months. They have secured a mass of evidence which convinces them that the ordinance will be rushed through the Council if money can accomplish the result."

This is a colossal scheme in a town where money talks. The brick men claim that they do not intend to use counteracting boodle influence.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

Improved Hollow Building Blocks.

Editor Clay-Worker:

In the February issue of the Clay-Worker we find editorial notice of the Illinois Clayworkers' Association that interests us, more especially that portion of the article which treats of the hollow block question, from which we quote:

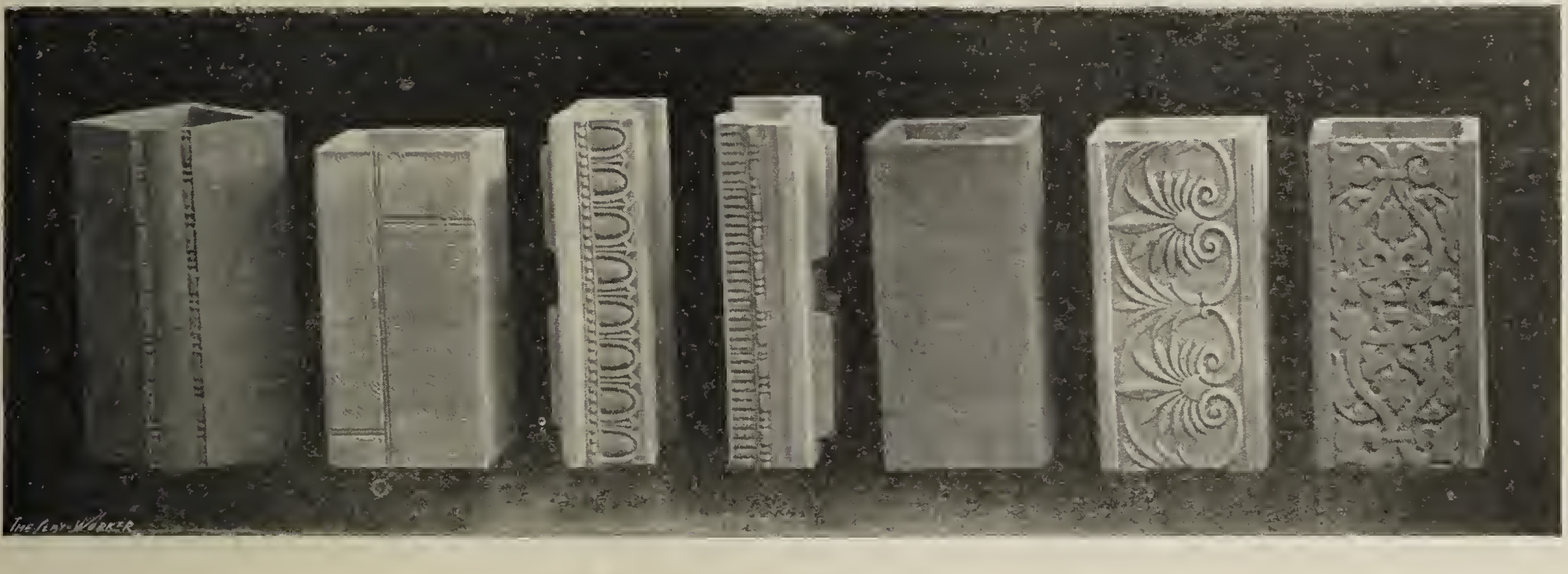
"Mr. Griffin's paper on hollow blocks before the Illinois Convention was of particular interest, because there is less general knowledge in regard to this material than some other branches of clayworking which were considered.

"Mr. Griffin touched the heart of the subject when he said: 'The artist in clayworking has been coming to the front of late,'" and you add, "It is the artistic possibilities of clay work which must form a great part of its development during the years to come."

And you further add: "The ordinary type of building block, which we see used in the smaller towns and cities, have a structural value merely, and, while they are of great commercial importance, their manufacture is not in the line of artistic results, and for the most part their use in the present manner will operate against their use for artistic purposes."

You then name instances of successful use of building blocks in prominent Chicago structures, and add:

"Nearly all building blocks have been failures because the buildings produced were ugly. We have seen many buildings constructed from the ordinary commercially made building blocks, but very few of them are in any great measure successful. The manufacture of a successful building block must have an artist associated with it."



SOME EXAMPLES OF MODERN ORNAMENTAL HOLLOW BLOCKS.

In the same article you say: "The manufacture of building blocks for better building purposes is in a measure the bringing together of the brick manufacturer and the terra cotta worker. Each has a good deal to learn, the one from the other; there are machine methods and other methods of economy in the brick plant which have not found their way into the terra cotta factory."

We heartily indorse every word of the above, and desire to make a text of it in further treating the subject. But first allow us to ask, Where has the usually wide-awake editor of the Clay-Worker been hibernating the past two months that he has not been able to state for the benefit of his many readers that just what he indicates must be done to bring before the building public hollow clay construction has been done? We back up our assertion by expressing a block, a fair average sample of one of the many styles of equal merit now being produced in the use of our special machinery for this purpose.

Not to be too hard upon the editor, however, we should admit that up to January of the present year every word of his article quoted was applicable to the situation, notwithstanding the two years or more which had elapsed since we began to produce ornamental hollow block machinery.

And here it may be proper to introduce a bit of history in answer to the reasonable question, "If a good thing, why so slow of introduction?" We might hide behind the old adage, "slow and sure," but this would hardly meet the case, and we must confess that we did not ourselves take in the possibilities of development covered by the principle of ornamentation, and commenced too low down, making our designs in imitation of broken rock, which became very popular for foundations above the grade level, and gradually found a place above the water table, so that eastern Ohio and western Pennsylvania are sprinkled with dwellings, business blocks, hotels and churches, all made from "rock-faced" blocks, which, while greatly superior to the plain block before in use, were only a step in advance. These blocks, like their predecessors, were mainly a salt-glazed product, ranging from brown to black, and having a brown-jug or sewer-pipe finish, fairly suited for foundations, but unfit for a good superstructure.

The artistic sense of the patentee rebelled against such treatment of the wares, but for about eighteen months his attention and means were occupied in prosecuting an infringement suit in the United States courts in maintenance of his rights, and while this suit was pending there was little encouragement in spending time and money in developing what might become public property. When a judgment was at last entered against the infringing parties, the work of improvement was taken in hand, and with what result the block sent you will indicate.

One of Chicago's well-known architectural designers was employed and months were given to the work of adapting the crude rectangular block produced up to that time to the requirements of the profession. Not content with this, experienced builders and contractors were brought in for frequent consultations over the best methods of reaching results alike satisfactory to the artist and the practical builder. The inventor was at hand to say what could and what could not be accomplished in the manipulation of clays by machinery.

As a test of the work, two dwellings were designed in all their details. These were intended to include and cover as nearly as possible the adaptation of the blocks to every demand of masonry, and were not considered complete until detail sheets and specifications were ready to place in the hands of masons who would be strangers to block construction, with the assurance of good work if the mason was a fair workman.

The color plates mailed you to-day will tell whether the article has been neglected, and whether the architect employed was anything less than a true artist.

As your editorial touched only upon the "artistic" need, we are not warranted, perhaps, in touching upon other features of the block, but we may say that there were other needs equally important which have been met, and to-day a complete system of building in the use of blocks is the result.

It may be well to notice that other parties than Mr. Griffin who took part in the Illinois Convention discussion had only in mind plain blocks of one form, made of brick clays, excepting Architect Richardson, who represented vitrified blocks, but without ornamentation.

We have been discussing only hollow terra cotta blocks, fit companions and competitors with the best pressed brick and hand-made terra cotta, but without the bold features of the latter, comparing favorably with the body of the wall in the notable Chicago buildings mentioned by you.

Very truly yours,
THE FREY-SHECKLER COMPANY.
By W. W. Reehl, Auditor.

The Best Foundation for Brick Pavements.

Editor Clay-Worker:

Will some one, through the Clay-Worker, say what the foundation should be for a good brick pavement, when laid on an originally sandy soil, such as makes a better road when wet than when dry?

Would the plat and edge course in sand be sufficient where traffic is not heavy?

From the best information obtainable it is impossible to tell what to do, as each city engineer recommends certain kinds of foundations, seemingly without any reference to the soil, climate or traffic. Is there not need of a standard for foundations as well as for brick?

Suppose the N. B. M. A. would take up the subject and send a practical man to specimen cities and towns, embracing all the conditions of soil, climate and traffic. Would it not hasten the time when correct information can be had by city engineers as to the proper way to lay brick pavements in their respective cities? Let there be a "nutshell" report, printed on slips, to be sent to cities and towns contemplating paving. It would seem that more confidence and less failures would soon follow. The cheapest foundation is the one that suits the conditions best. Costly foundations are a waste where cheap ones serve as good a purpose. So are cheap ones if they do not hold the brick firmly in place, producing a needless expense on the one hand and needless failure on the other.

The country's experience settles, no doubt, these important points. So let the N. B. M. A. collect and formulate and the paving brick manufacturer foot the bill. STANDARD FOUNDATIONS.

Prof. H. Bauerman and Aero Dynamics.

Editor Clay-Worker:

Just another word and I am done (farewell a la Patti.) How persistently Brother A. D. will clutch at straws! I do not know any George H. Bauerman. The extract I quoted was from Prof. H. Bauerman, F. G. S. It is pathetic in the extreme to notice the avidity with which my worthy brother has seized on this last straw, and I am truly sorry to take it from under him. Not knowing any George H. Bauerman, I could not very well introduce him here. What I wrote was Prof. H. Bauerman, and only another printer's error can account for this floating straw so eagerly grappled and utilized as the foundation for another virulent effusion. What a crime it is to waste so much valuable time, paper and patience on such a pusilanimous effort! Building on a straw. If my poor, misguided brother had noticed the quotations at the foot of my former letter he might have been saved this further humiliation. What a world of comfort is conveyed in that little word "young," especially after reading Aero's last effort. It means that life, with all its advantages, is still before us. It means that we are in the world and of it; that we are not so embedded in the dust of ages that we cannot see the advantages that science and research, aided by an improved system of practice, are daily and hourly offering for our acceptance and consequent benefit. It means that there is still a chance (possibly slim) of rectifying errors of judgment; that the structure of our lives has not proceeded too far to allow of a change in architectural details. It is yet "a very pretty phrase," my friend, and not at all "worn or seedy." There are to-day two especial classes of men—some are old-young, others are young-old; for the latter class there is very little hope; consequently, I am sorry for Brother A. D. This is genuine sorrow, and I hope it will stand on record in "black and white" with numerous other truths I have written. My parents and grandmother endeavored to teach me such conduct as is becoming a gentleman amongst gentlemen. They probably had no knowledge of Brother A. D. or they might have added a pointer or two. There are some things that some people do not understand.

Now, regarding my prodigality, I want to again assure Brother Aero that I am not giving anything—merely loaning for selfish purposes.

In conclusion, let me call the attention of Brother Aero to the closing passages in Brother Waplington's letter in last issue. I think it likely he can understand their significance. J. W. CARSON.

A Brief Review of the Atlanta Convention.

CONTINUED FROM FEBRUARY NUMBER.

Editor of Clay-Worker:

A very important matter, viz., drying brick in the kiln, was introduced by Mr. Ittner. Mr. Ittner's experience proves that by means of hot air from a cooling kiln he saves in time in drying off from nineteen to twenty-one days to three and a half to four days. This is immense: and if time is money, it amounts to a considerable sum saved.

The principle of taking the heat out of the top of a cooling kiln and introducing it into the top of a kiln of green brick has been used so far as it goes successfully by the Hydraulic-Press Brick Company, of St. Louis, at all of its thirteen plants located at different points between Omaha, Philadelphia and New York. Mr. Holman's experience is in the same line, and about the same results. These parties all favor drying off with the down draft, and this seems at war with common sense, because it carries the moisture eliminated from the top and intermediate brick down onto the bottom brick, and this softens them so that they mark or deface ono another by the weight of the brick above. We have given this matter of drying off and heating a kiln of green brick from the bottom and that with heat from a burning kiln careful thought. We have said, taking the heat from a cooling kiln was good so far as it goes, but it does not go far enough, as heat enough cannot be taken from a cooling kiln (without cooling it so fast as to injure the brick) to dry off thoroughly a kiln of green brick. And if the up draft is used, and all the moisture not expelled when you turn to the down draft, any moisture remaining in your top brick is carried on to the bricks that are dry, and this moisture on the dry brick will make them rotten and make them as we say "shaley." This is no doubt the reason why Ittner, Holman & Co. have had best results with down-draft drying. They did not continue the up-draft drying until their brick were perfectly dry, and they could not do this because the heat that a cooling kiln could spare without injury to itself did not furnish heat enough. Then in the case of paving brick no heat should be taken out of a cooling kiln. Paving brick need all the heat that is in them to anneal them; and even if a small amount be taken out it should be at the bottom, so as to draw the superabundance of heat at the top down onto the bottom brick. Taking the heat from the top of a hot kiln draws the heat from the bottom and middle on to the top brick, which have too much already. Mr. Sibley's experiments, already referred to, confirm this view.

The old way of drying off by up draft is no experiment, and if these gentlemen who have tried by heat from a cooling kiln have failed, it is evident that they have not complied with necessary conditions. To any one who has had experience with downdraft kilns it will be very evident that if a kiln is dried off and heated up by up-draft until the bottom and the bricks halfway up are red hot, and the top bricks almost a visible heat, when you turn to burn downwards the heat in the bottom will draw away the heat from the top and prevent the top brick from becoming overheated. On the other hand, when you dry off and burn by down draft the bottom is the coldest part and the top the hottest; and as heat attracts heat, the top yields up its heat very grudgingly to the cooler bottom.

The ordinary center flues in down-draft kilns is not well adapted to drying off with up draft. These flues are usually open on the top, and when one introduces heat into them from another kiln to be carried up through the brick by an exhaust at the top, the heat passes straight up through the center of the kiln, and this part will be dried, whilst the wings will be damp.

For successful up-draft drying and heating up in down-draft kilns, the center flue should be so constructed as to spray the heat right and left, and thus furnish uniform drying throughout the kiln. The system of drying described by Messrs. Ittner & Holman is good so far as it goes, but does not go far enough. It should not only use a little heat form a cooling kiln, when this can be done without injury to the brick in the cooling kiln, but it should take all the heat from a burning kiln to dry off and heat up another kiln of green brick, thus retaining the down-draft principle in burning, the up-draft principle in drying off and heating and the continuous principle as a fuel saver.

The system we refer to provides that the up and down drafts are both produced by the same stack, aided at times by a fan. In order to commence drying off gently a part of the heat from the burning kiln passes to the stack and a part to the green kiln; and this again may be diluted with air before it enters the green kiln. As the green kiln becomes able to stand more heat more is given it until the whole volume of heat from the burning kiln is passing through the second kiln. This will shorten the time of burning more than one half, and save nearly half of the amount of fuel usually used. In drying off brick, either by down draft or up draft, whichever of these is commenced, should be kept up until the kiln is thoroughly dry from top to bottom. A change from one to the other whilst part of the brick are damp will prove ruinous to those that are partly dried, and this accounts for the want of success in the cases above mentioned because the small amount of heat from the cooling kiln was not sufficient to dry off the kiln of green bricks.

In the matter of mixing sand with clay it was agreed that it made the brick more refractory and gave it a body, and hence aided in keeping its shape in burning. A remark made in this connection we are not able to indorse, viz., that "grit" and common clay mixed will make as good a brick as "shale." Common clay and grit will make no kind of a servicable paving brick, unless the common clay will fuse, and then it can hardly be said to be common clay. Another statement made in this connection was that whilst grit and common clay made a good paving brick, fine clay and common clay would not make such a brick.

The best method of building a stack so as to prevent cracking was discussed at some length, but quite a number of important points were omitted. It was properly stated that a stack should have an independent fire brick core, separated from the main walls of the stack by an air space of two or three inches. It is very evident that if the core expands, as it will more than the main walls, it were folly to tie it to the walls. At the four corners of the cone, if square stakes are used, and where a four-inch cone is used, each corner brick should project the width of the opening between cone and walls, care being taken that there is no projection or roughness on the inside of main walls to prevent the end of these projecting brick from slipping, as required by expansion. Small openings, about one by two inches, should be left in the main wall to admit air into the space between main walls and the core; these openings should be on each square of the stack, and about ten feet apart. Stacks usually crack first and most at the top. To prevent this four pieces of angle iron about eighteen to twenty feet long should be placed on the four corners, the angle iron extending from the top of stack downwards eighteen or twenty feet. This angle iron should be held in place by round iron rods, four of these being used in one place, and four set of these being used in the length of eighteen or twenty feet.

In regard to building a stack from the inside and so saving some lumber, we think the best job can be done from the outside. When the work is done from the inside the scaffolding must rest on or against the core, and this being only one brick thick must be jarred and the bond broken in places, and this is objectionable where air openings are left in the main wall. These air openings prevent the stack proper from becoming highly heated, but if the core is not air tight the air from the space between the core and stack is liable to check the draft a little: besides, working from the inside it is almost impossible to properly iron the top of stack as mentioned above.

The omissions in the discussion of the question by the Association were, first, the air vent mentioned; second, the irons on top of stack, and third, the difference in cost of building a round or square stack of the same height and inside area. And what should the inside area of a stack be for a kiln of a given number of furnaces, other things important must be considered, such as size of foundation for a stack of a given height, also the thickness of walls, and the batter, etc. All of these things must be carefully considered. I. K. CALDWELL.

Minneapolis, Minn., Feb. 1, 1896.

Brick Stacks Vibrating.

Editor Clay-Worker:

In reply to the letter of G. Ammon in the February Clay-Worker, I want to say that I never said that brick stacks do vibrate. Mr. Gammon seems to want me to say whether or not the motion of the earth is uniform or intermittent. Astronomers teach that it is uniform, and I have always so considered it. I have heard of its flying up and hitting men in the face, and have heard that some men accused the moon of staggering and sidewalks of swinging from side to side; so I infer that in some places and to some men it is not regular.

As to his question, "Upon what law of motion or force he founds a theory that makes a uniform motion or force, acting in one direction upon a body with a constant resistance, produce a vibratory or intermittent motion?" I will say that the forces acting upon the body are not uniform; they do not all constantly act in one direction; neither is the resistance constant.

Remember, I have not committed myself by saying that I believe all the man with the corncob pipe said; but I said that his statements suggested some new ideas to me, and I presented them. Now, I am ready to defend them until they are disproved. Some of the forces that act upon the stack are uniform, but others are not. The wind acts in different directions and with varying intensities. This may be enough to set the stack vibrating and disturb the equilibrium.

He don't believe in my theory. That is not strange. The world has always known such men. All great men have been confronted by slow-minded ones who could not grasp the vastness of their advanced conceptions. The leaders of thought in all ages and lands have been compelled to meet skeptics. Columbus wandered from place to place seeking minds advanced enough to sympathize with him, and yet the disbelief of the world did not detract one iota from the great truth which he advanced. Gallileo was persecuted by those who could not understand the principles that led him to promulgate his great theory of the earth's motion. "History repeats itself," and one who grovels in clay would detract from my greatness by saying that he cannot accept my theory relating to the influence of Gallileo's world-motion in causing the vibrations of smokestacks.

It is not enough for him to deny and scoff. Any ordinary man can do that, and may thus gain the sympathy of the masses. Denials do not disprove. He even fails to put himself on record that he has an opinion. I would like to ask him whether he believes that brick stacks vibrate, and if they do, from what cause or causes, and in what directions? I took another's statements and based my theory upon the supposition that the statements were true. Come, brother, be explicit and sign your real name, for fear people will call you Gammon. It is not fair to make a personal attack upon me and then hide behind a fictitious signature that is in itself calculated to convey the idea that my theory is all folly.

Mr. Gammon fails to rise to the greatness of the subject. His mercenary mind suggests that I get a patent for using the motion of the stack to grind mud. It would be worse than gammon for me to try to take out a patent on something that I do not know to exist. This and his contending for the wind's influence lead me to suspect that he lives in the grasping "Windy City" by the lake.

D. W. STOOKEY.

Wants to Know How to Color Brick.

Editor Clay-Worker:

In referring to the October, 1894, issue of the Clay-Worker we notice on page 340 an article clipped from the Washington Star wherein is stated: "A brick can be made that is as mottled as a sea gull's egg, or one that will show the varying tints of an autumn leaf. It is done by adding certain metallic ingredients to the clay after the latter has been ground to the finest powder," etc.

Now, we have here a perfectly pure bluish clay that burns a light creamy buff, but which is a decidedly lighter shade than is in demand. Our purpose in writing is to ascertain whether any of your readers or contributors can give us the information as to the formula, or of any article or formula that is for sale and used in obtaining the desired results as per quotation above from Washington Star, and also how to obtain the darker shades of buffs and of browns with our clay. We would like to buy the formula or the ingredients necessary to do the work.

We have been subscribers to Clay-Worker for six or seven years, and have obtained many valuable hints on brickmaking therefrom, and especially on burning. Respectfully yours,

A BALTIMORE BRICKMAKER.

Past the Formative Stage.

Editor Clay-Worker:

Enclosed find $2 to pay for Clay-Worker for ensuing year. Our plant is young, but it has seen a great deal of tribulation. We were unfortunate at the start in having men at the helm who knew little about the business practically. As a result considerable money was wasted in laying out plant and trying to make brick. We have now gotten rid of our experimenters, and as we have an unlimited quantity of most excellent clay, enough, I judge, to last one hundred years, think we are on a fair road to success. We have one large Flood kiln, with a capacity of about 200,000 brick, and three round kilns that hold about 74,000. We had considerable trouble with this part of the work, our burns being very indifferent, but I recently got rid of the alleged expert burners and am giving my personal attention to the work. As a result we are doing much better. Our last burn in the large kiln resulted in 80 per cent. face brick. We burn our fire brick, mottled brick, etc., in the round kilns, from which we get 90 to 95 per cent. first quality brick. We make by the dry press process, using Chisholm, Boyd & White's machinery. We make some fire brick, molding and repressing them by hand. We anticipate making some improvements for next season. We now have $75,000 invested, but will probably have to increase it. Wishing the Clay-Worker the best of success, I am LEE DUNN.

Stonington, Miss.

THE WORLD AT LARGE.

Not for many years have their been as many indications of national unrest as at present. There is no great war anywhere, such as that of a year ago, when little Japan was invading the great China, but there are hostilities on a small scale in Southern and Central Africa and in South and Central America, while Spain and Italy are having trouble with their respective dependents, Abyssinia and Cuba, each of which wishes to be dependent no longer, while there is a general sense of insecurity everywhere, such as one may be supposed to feel when standing near a crater which may become active at any moment and with little or no warning. This feeling is much more common among thinking Americans than is generally confessed.

We could not conceal, even if we wanted to, the universal sympathy of our people with the Cubans in their struggle for independence. The confessed barbarism of the Spanish methods of war intensify the feeling on this subject. But what can we do? The eitquette of nations will not allow us to interfere, while the etiquette of private life, not to say its humanities, allow, if they do not require, us to take the part of the weak against the strong, and stop hostilities, if nothing more. The code of nations bids us to keep hands off. Whether this is best in all cases is doubtful, and whether we will be able to observe it much longer is more than doubtful.

To the sentiment which sympathizes with any people in their struggle for freedom is added in this case the more sordid consideration of commercial interests. Cuba is not only at our door, but its products have become articles of necessity in every American family. Already sugar has been advanced in price, and the end is not yet if the war continues. The resolutions of sympathy so unanimously adopted by Congress voice the views of the people. That they should irritate Spain was to be expected. The prudent conservatism of the President may delay, but it is hardly possible to avert an issue. What that may be in kind or extent no one can foresee. Of course, we would hardly fear Spain alone, but who can tell how many complications may be involved in any action the President may take? The situation is, therefore, one of unrest everywhere. But meanwhile all brickmakers will use the best machinery in the market, and they will consult the Clay-Worker's advertising columns to learn where it can be found.

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THE CLAY-WORKER

Entered at the Indianapolis postoffice as second-class matter.

A Practical Illustrated Monthly Magazine, devoted to Brickmaking and allied Clayworking Arts and Industries.

THIRTEENTH YEAR OF PUBLICATION.

OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

TERMS OF SUBSCRIPTION:

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Six copies, " "	10.00
Ten copies, " "	15.00

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☞ Subscribers when ordering a change of address should give both the old and the new address.

ADVERTISING RATES

Furnished on application. The CLAY-WORKER is unquestionably the most effective medium in its field, and character and circulation considered it is the cheapest. To insure insertion in current issue, advertising matter should be sent to office of publication on, or before the first of the month.

Correspondence on all subjects of interest to Clayworkers solicited. All communications should be addressed to
5 Monument Place.] T. A. RANDALL & CO., Indianapolis.

VOL. XXV. MARCH 1896. No. 3.

CURRENT COMMENT.

We congratulate Prof. Orton and the Ohio State Association, both, on his election to the Secretaryship. He is the right man in the right place.

* * *

The address of welcome by President Canfield on page 261 is a masterpiece of terse, forceful English, and was delivered with a warmth of cordiality that won for him the open admiration of every listener. It is a rare treat to listen to one who, on the spur of the moment, can speak with such grace and power.

* * *

In this connection, we wish to remark the full text of President Canfield's address has appeared only in the Clay-Worker. The same can be said of Mr. Haine's amusing burlesque on page 245, entitled the "Rainmakers and the Allied Causes of Drought."

* * *

Our juvenile contemporary complains that the older magazines have made capital of their "bill-board" pages, and announces that it will soon enlarge to the Clay-Worker's size. This is a move in the right direction. The nearer they can come to copying the Clay-Worker the nearer they will be to the highest standard of excellence in trade journalism.

* * *

We publish in this number of the Clay-Worker the first of a series of articles on German methods of clayworking. We know that there are many of our patriotic friends who feel that we are in advance of Germany in clayworking methods. While this is true in many essential particulars, on the other hand we do not monopolize all of the knowledge on this subject. We do many of the practical things in connection with handling clay in a better and cheaper way than belongs to the Germans. On the other hand, they have gone further into certain details than we have. Generally speaking, they probably have a better chemical and technical knowledge of clayworking than we. On the other hand, we manufacture brick cheaper than they.

* * *

What we should do and what we will do as clayworkers is to take the best that is offered us—the best that the world offers from all sources. If a Frenchman, or a German, or a Scandinavian has an idea that may be "no larger than a man's hand," if it is a good one, we want it, and in considering the question we should leave all sentiment behind and cling to that which is good.

* * *

We commend to our readers the learned essay of Prof. Edward Orton, Jr., of Columbus, on the measurement of high temperatures for clayworkers. It is just the kind of effort—serious and exhaustive—that we might expect from this source. The best that we can say for it is that we think that every one should read it carefully.

* * *

The importance of local organization is appreciated more and more by the brickmaking craft generally as the era of low prices continues. The Hudson river brickmakers have, after many unsuccessful attempts, at last formed an alliance that it is thought will stand the ravages of time and bring a larger measure of prosperity to that great brick center than it has known of late years.

* * *

W. W. Parry, the well-known brickmaker of Rome, N. Y., looked in on us recently. He modestly disclaims any distinction in the craft, saying he is satisfied to fill a small niche. Physically, this would be an impossibility, for friend Parry is a spendid example of the genus homo. We surmise that while he is not ambitious to make all the brick in the universe, he sees to it that a goodly profit is realized on what he does make, and therein is much wisdom.

* * *

The American branch of the Salvation Army has dissolved all connection with the European branch, and is now an independent army, with the famous Ballington Booth at its head. Its efficiency will be increased, not impaired, by this step, and the sojourner in the larger cities, weary with the strife for gain, and homesick, mayhap, will still be cheered by the soul-inspiring music of the tambourine and bass drum, which the devil himself cannot drown. Down with tyranny!

* * *

In a sense, the drainage of public highways is a subject not distinctly connected with brickmaking or that department of clay work which is commonly handled by this journal. However, there is no man in any relation of life who is not affected by the good roads question, and there is no question more intimately associated with good roads than that of good drainage. We commend to our readers the paper of Mr. McGowen, which was read to the Ohio Convention.

* * *

Mr. G. S. Ettla, Clearfield, Pa., called at the Clay-Worker sanctum recently. He was returning home from a trip to St. Louis and other points, where he had been visiting brickyards for the purpose of inspecting machinery, etc. Business is fair in his bailiwick, he says, but prices are way below par. He is an ardent advocate of organization as a cure for trade demoralization, and will gladly co-operate with the brick and tilemakers of western Pennsylvania in any movement looking toward a local or State association.

* * *

Word comes over the wire that the celebrated inventor, Thomas A. Edison, is to devote the evening of his life in the honorable occupation of brickmaking at his home in New Jersey. He could not have chosen a more honorable occupation, nor one more congenial to his cultivated tastes. He will build a plant for the making of brick out of sand, which seems to be growing in favor, especially in the Dominion. He will receive a hearty welcome at our next meeting of the National Brick Manufacturers' Association, and we here and now invite him to read a paper on "What I Know About Making Brick." Should he speak on "What I Don't Know About Making Brick" the paper would be too long for a single sitting.

* * *

The British braggadocia has somewhat subsided. Saying they never would submit the question of boundary between their territory to arbitration, when they learned that the United States was investigating their claim with a view of applying the Monroe doctrine, if necessary, they at once proceeded to bring forward their proof that their contention is right. If they satisfy us that they have a just claim to the supposed gold mines, they will get them without war, but if not, not. It is a blessed thing to be a peacemaker.

* * *

Mr. Eudaly, in his address before the Ohio Convention, gave expression to one very taking sentence. He said: "Chemistry will aid, but it will not determine." This brings up the ever-present question as to the availability of mere technical knowledge. Men who are largely technical do not always have the patience with or the respect for those who are merely practical that is due them. And, on the other hand, it is true that technicians do not always have the high regard for practical acquirements that belongs to the large part of the world's workers. Mr. Eudaly did not use this expression in this sense. He appreciates the definite relation which exists between the technical and the practical clayworker.

* * *

President McClure keyed his address before the Ohio Convention to the tune of knowledge. He said: "One of the most encouraging aspects of clayworking is the desire of clayworkers generally to investigate all subjects pertaining to their vocation. Clays, their adaptability to being molded into any desired form, their partaking of any color when finished, has led the investigator to realize that 'Below each deep another deep opens.' " "One improvement is followed by another. The unrest that exists among clayworkers demonstrates very forcibly that we are not satisfied with our knowledge pertaining to clay and clay products." We commend his address to those who are interested in the higher development of clayworking. It is an unusual effort, full of strong facts and large principles.

* * *

The day before St. Patrick's arrival there appeared in our sanctum three most welcome visitors from the Windy City, Will H. Alsip, F. T. Melcher and F. W. Butterworth. The two latter are not real Chicagoans, but hail from Marion, Ind., a suburb of the Western Metropolis. The real object of their visit was obscured under the guise of a mere friendly call. The truth was they wanted to make a loan. They had been out on an excursion, but would give no details, except that they liked our city and was sorry they could not stay longer. All this we regard as a subterfuge. Mr. Alsip is too large for Chicago even. A year or more ago he branched out as far northwest as Milwaukee and has been shipping brick there right regular ever since, and we suppose he now has an eye on the Indianapolis market. "Will" is welcome to come often and stay long, but we don't want any of his brick.

* * *

Mr. Gorton's paper entitled "Why I Attended the Clayworkers' School," is not only good of itself, but is of interest because Mr. Gorton is a member of the first class in our pioneer school for clayworkers, and is a living demonstration of the value of combining theory and practice in technical education. Many of us remember that a few years ago the trade journals were full of articles headed "Theory vs. Practice," in which the writer held up a man of straw called theory, battered it to pieces, scattered the straws to the wind, and, with shoulders thrown well back, walked forth and called himself a practical man. All that has changed. There can be no such thing as theory versus practice. Anything which is good practice is good theory, and what is really good in theory must be good in practice. One can learn certain things in a brickyard which he cannot learn in a technical school, and he can learn many things in a technical school which he would not learn in a brickyard if he lived to be a thousand years old. A combination of these two schools of learning is what will lead to the acme of success.

THE BUSINESS OUTLOOK.

Our groundhog made no mistake. He provided for an occasional flurry of snow and some cold weather, all of which came according to schedule, but they are past now, and, barring a few March winds, we may expect milder weather from this on. The outlook for business continues favorable to those who are looking out for it. In nothing is it truer that a man usually finds what he is looking for than in business. The man who is looking for hard times usually finds them. They lie around loose near every man's door, and are to be found when search is made. In olden times the proverb said, "The sluggard will not plow by reason of the cold; he shall therefore beg in harvest and have nothing." But this is well enough, for if he had a big crop the probabilities are he would let it go to waste because of its being too hot to reap. Some people are born that way. It is too cold to plow in the spring and too hot to reap in summer, and it is always either too wet or too dry. Of course, such people always find hard times, while the man who always makes the best of every condition is not only happy, but he is prosperous. To such the outlook for this summer's business is good. He may not handle as much money as in some seasons, but it will be a year of reasonable prosperity if every opportunity is improved.

PROFIT IN ARTISTIC PRODUCTION.

It is true that a larger percentage of profit can be made on that which is artistic than on that which is mere material. The relative difference between the cost of pressed brick and common brick is not represented by the retail price. The question of hollow brick and decorative details connected therewith is one which now confronts the clayworking industry. The hollow brick and the decorative brick are destined to play a much greater part in the building world than most of us at this time realize. The progress may be a little slow in artistic lines, but it is sure to come. It is in the province of the clayworker to hinder or advance this progress.

* * *

People pay a great deal more attention to the appearance of a building than they themselves are disposed to acknowledge. They talk of "wanting something very plain and very simple, and not caring anything for the appearance," but when it comes to actual building there is a strong sentiment in the minds of all in favor of the artistic. This idea cannot be overlooked for a moment. We often see pictures of and references to hollow brick buildings wherein the attention of clayworkers, prospective builders and the public generally is called to them. Most of these buildings are plain and some are ugly, and as one looks at them he must feel some hesitancy in using that material on account of the appearance. People do not distinguish with any great discrimination. They say, "Here's an ugly building; it is hollow brick. I do not want hollow brick."

* * *

Now, if the buildings of this character be designed by artists, and if the details of molding and decorative features be worked out by those who have artistic training, the cause of hollow brick will be rapidly advanced. No one is going to put up any great amount of hollow brick work simply because it is cheap. It must appear well, and the only reason why it should not is because we fear that many who have engaged or will engage in this building will fail to appreciate the necessity for artistic excellence. We show some samples of decorative hollow brick work on a preceding page which controverts our theory as above expressed. They are far above the average of stock designs in artistic merit.

BRICK VERSUS ASPHALT PAVEMENTS.

In the Hoosier capital and several other cities, measures are being taken to prevent residents from burning leaves or other rubbish on the asphalt paved streets for the reason that it destroys the pavement and so releases the contractors from obligation to make necessary repairs, they claiming that the city alone is responsible for pavements so injured. This is an important phase of the street paving problem. The small boy will have to be suppressed, or his proclivity for bonfires repressed, if the tarred streets are to be kept in repair by the asphalt contractors for the time specified in their contracts. Asphalt is such an unstable material, that the cost of repairs is excessive under the most favorable conditions. If water stands in the gutters, it rots. If a bonfire is started on it, it burns. If it is sprinkled, it becomes so slippery that it is dangerous for man or beast. If it is not sprinkled, a short time after being swept it becomes so dusty that pedestrians are blinded and choked. In the course of human events, the municipal authorities will have an accession of information on this subject. Then we can hope to see our streets paved with brick—a material that the midsummer sun won't melt, that water won't rot and that can be both swept and sprinkled with impunity and when properly laid will wear as many years as asphalt will months. When in addition to these points it is considered that the first cost of a good brick pavement is less than asphalt it would seem that the continued use of asphalt is inexcusable when brick can be obtained.

HOLLOW BUILDING BLOCKS.

Mr. Darnell said at Columbus: "Every tilemaker in this Association should manufacture hollow building blocks." He said a little later: "A bricklayer will lay twice as many feet of wall with hollow bricks as with common bricks; and then the saving in mortar would be quite an item." Again: "A house can be built of hollow blocks that will not cost any more than one of frame, and then you have a dwelling that is fireproof, frost-proof, warm in winter, cool in summer, that you can have insured for twenty-five cents less on a hundred, that never has to be painted, and will last for generations to come." These are points that merit careful consideration, and, we think, will insure a much larger demand for this material.

* * *

The hollow block is relatively a new commercial development, for the reason that it is only within a few years that it has come to the attention of the building public. It is true, too, that for the most part these hollow brick, for ordinary building purposes—for garden walls, for dwelling-house walls, foundations, etc.—have been of a rather crude character when viewed from an artistic standpoint. Within a short time, however, there has been quite a change in this direction. Manufacturers are now seeking to produce something which is of an artistic nature. It must be known that the larger and better use of this material cannot be hoped for until it can be used in an artistic way. It is the artistic qualities of such products which give them high monetary value, and buildings which are really beautiful must be put up before these hollow blocks will command high prices and a large market.

W. A. Hancock, General Manager of South River Brick Co., Atlanta, who will ever be pleasantly remembered by those who attended the '95 Convention of the N. B. M. A., writes that business is good in that section. His company has already booked orders for over seven million brick, and he thinks the coming season will see more building in Atlanta than any previous year.

* * *

Mr. George H. Lacy, formerly of Perth Amboy, N. J., is now a Hoosier, having accepted the superintendency of the Indianapolis Terra Cotta Co., Mr. Joiner, who filled the position so successfully for many years, having been advanced to the general management of the company's business.

TRADE LITERATURE.

"SPEAKING ABOUT BRICK" is the catchy title of a new booklet issued by the American Blower Co., Detroit. Its mission is to enlighten those desiring information on improved methods of drying brick of the merits of their "A B C" system. The matter is new and interesting, and arranged in convenient form. The title page is particularly attractive. It is adorned with a heap of brick, red and buff, piled promiscuously, making a "fetching" combination. A copy will be sent free on application to any reader of the Clay-Worker.

THE BOSTON FIREPROOFING CO. has favored us with a copy of their new catalogue, a book of 50 pages, handsomely illustrated with views of their factory and a number of imposing buildings which have been constructed largely of porous terra cotta from their kilns, among them the famous Boston Public Library, which is considered by many the finest building of the kind on this continent. The book contains a deal of valuable information on fireproof construction, and clearly sets forth the value of porous terra cotta. Every architect and builder in New England should have a copy.

CLAYWORKING MACHINERY is the title of a handsome catalogue published by the old and well-known firm of Turner, Vaughn & Taylor Co., Cuyahoga Falls, O. In addition to the descriptions and illustrations of their extensive line of clayworking machinery, which includes potters' wheels and appliances, as well as sewer pipe presses, brick machines, clay grinding pans, etc., etc., the book contains a number of valuable tables and rules for determining the size and speed of pulleys, gears, shafting, etc., that every brickyard or pipe factory superintendent should have for ready reference. Write for a copy, mentioning the Clay-Worker.

CATALOGUE AND CALENDAR together form a good combination. The Horton Manufacturing Co., Painesville, O., is sending out a "yellow book," or, rather, a book between the yellow covers of which there is much interesting matter for brick and tile manufacturers. In it are illustrated all manner of brickyard supplies, from a ponderous steam power soft mud brick machine to a brick mold. If you want anything at all in the way of tempered clay brick machinery or appliances, get a copy of this catalogue. It can be had for the asking.

FIRE BRICK AND SEWER PIPE of various sorts, shapes and sizes are illustrated in a neat little hand book received from Evens & Howard, St. Louis, Mo., who are pioneers in this field and operate one of the largest manufactories in the United States. They make a specialty of fire brick and blocks for lining brick kilns, and will be pleased to mail this little book and their price list to any reader of the Clay-Worker who will drop them a postal card.

THE STARS AND STRIPES wave gloriously over the great factory of the Link Belt Machinery Co., Chicago, as depicted on the title page of their new catalogue, a book of seventy odd pages describing and illustrating all manner of conveying machinery. If you want a conveyor or elevator of any sort, write them for their catalogue, prices, etc.

"THE IRONCLAD DRY HOUSE," in words of gold, appear on the cover page of a large and profusely illustrated catalogue issued by the Wolff Dryer Co., Chicago. We take it that the Ironclad is well known to all the clayworkers of this country, for it has been advertised continuously in this magazine for many years, and is now in successful operation in every section, from the Atlantic to the Pacific, and from the Gulf to the Windy City, its home. If the reader has a desire for more information in regard to it, write the Wolff Dryer Co. and they will do the rest.

THE J. C. WOODCOCK CO., Upper Sandusky, O., have out an eight-page pamphlet addressed to "The craft throughout the world, especially the 20,000 clayworkers of the United States," whom they invite to investigate their "Kinkead" brick machine, for which they claim unsurpassed strength and capacity. They also manufacture an improved form of brick mold, brick barrows, etc., as may be seen in their ad. on another page.

THE GREEN-BRICK-MAKER'S LAMENT.

Said Jones: Perhaps I'm peculiar,
And my clay and my brain somewhat mixed,
But be that as it may, I am certain
There is something quite wrong with my bricks.
To be sure, I'm not long in the business,
But began it all right, I'll allow,
And if you are all ready to listen
I am ready to tell you just how.

My father, you see, was a merchant;
Was self-made and never at school;
But for me he decided quite different,
And said I should not be a fool.
So he sent me away to a college
Which his money had gone to endow,
And told them to make me most learned,
And to do it he told them just how.

I've designed him, said he, for a lawyer—
For a judge; so make him most wise;
Teach him books from Virgil to Blackstone,
The difference 'twixt truth and 'twixt lies.
To do this they tried, I'll endeavor
To place to their credit e'en now;
But one thing, I'm sure, is quite certain—
That they failed, but I can't see just how.

For instead of my owning a Blackstone,
And knowing a fact from a trick,
I own—less the mortgage—a clay bank,
And scarce know a good and bad brick.
That I am not a lawyer is certain,
Nor a judge will I be, for I swow
I am joined to another profession,
Which I cannot get rid of just now.

The fact of it is I insisted
At college to have a good time,
So the faculty had me suspended
And dropped me out of the nine.
Then dad, who owned this old clay bank,
Some timbers, a tug and a scow,
Said although I would not be a lawyer,
I should be a brickmaker, somehow.

And it came about in short order,
After letting the clayworkers know
That we thought of entering the business
And try to make it a go.
That there wended their way a great army
Of machine men and kiln men, I vow,
And each had "just what we wanted,"
But we're fast learning different now.

For, you see, I put in a dry pan,
When the clay which we have is half sand;
And the kiln which I built is continuous,
And continues to fill a demand
For brick which the cussed contractors
Desire when seeking a row;
And I'm sure they're seeking it often,
And to do it know very well how.

When pressed my brick are just beauties;
When burned—well, what is the use?
The devil must surely be in them,
For with fire he raises the deuce.
At first, when entering the business,
No shadow crossed over my brow,
But now they have settled upon me
And staying right with me just now.

They say that away in the future,
Far beyond our vision and ken,
There's a land of rest for the weary,
A peace for the troubles of men.
But why must that day be so distant
When troubles shall cease? For I vow
No mortal was ever so weary
As I of my business just now.

Perhaps, as I said in the beginning,
My clay and my brains may be mixed,
But be that as it may, it is certain
Between them they'll soon have me fixed.
I've been long enough in the business
To part with my money, but how
To get it once more in my pocket
Is what I am after just now.

—J. A. S.

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"VITRIFIED PAVING BRICK."—H. A. Wheeler, E. M........................ 1.00

Mailed, postage free, on receipt of price. All of them to one address for $6.00. Address

T. A. RANDALL & CO., Indianapolis, Ind.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville, Ill.
ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, ST. LOUIS, MO.

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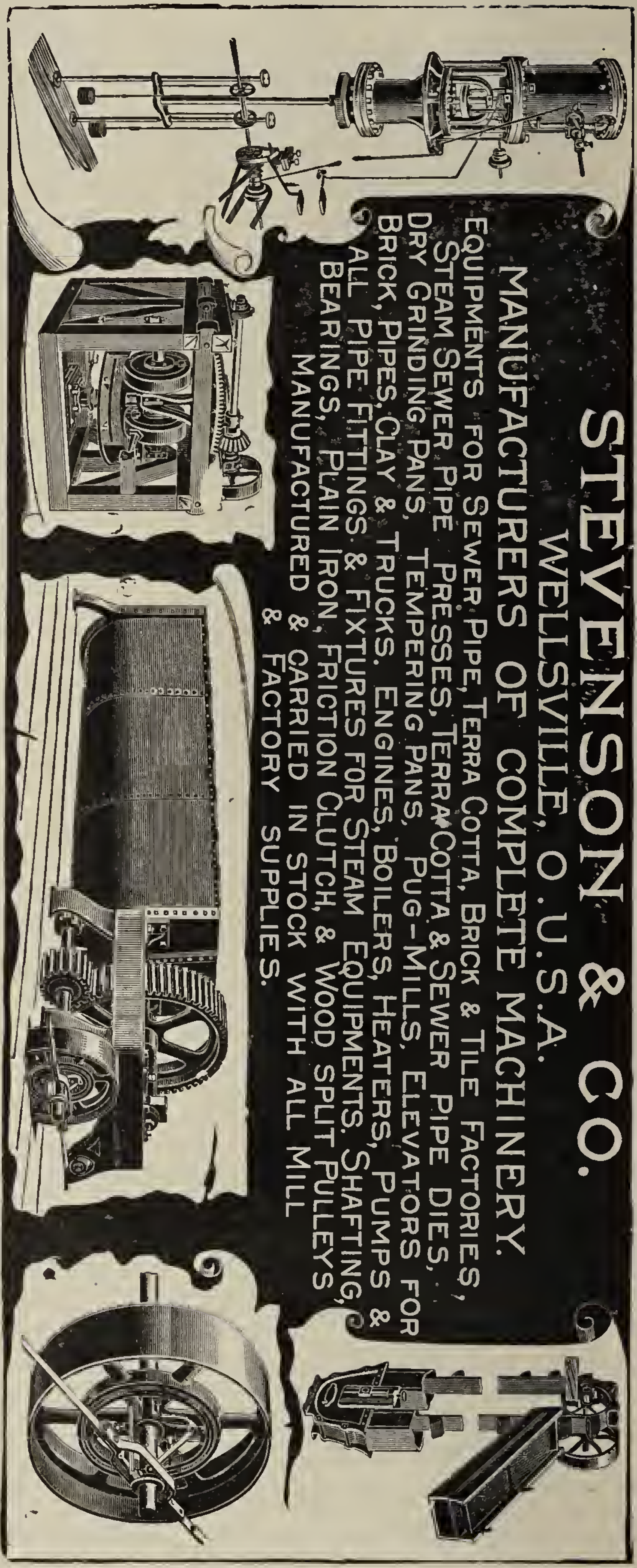
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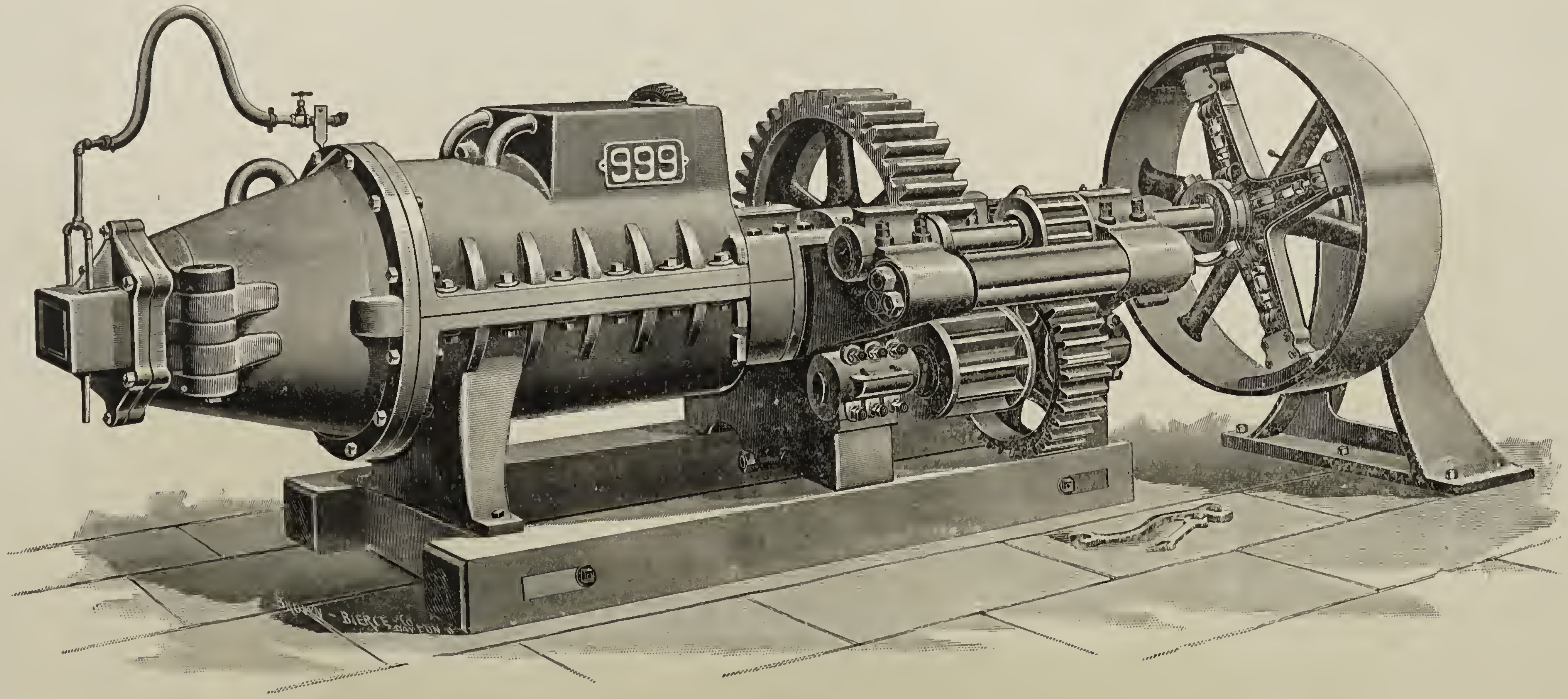

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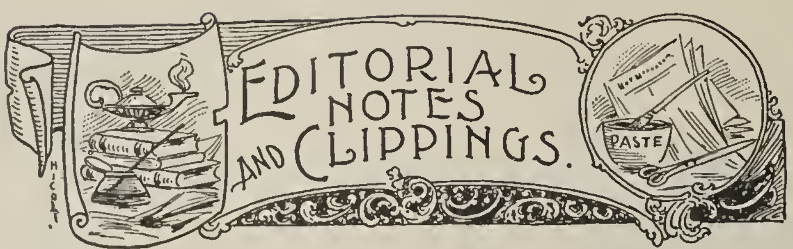


EDITORIAL NOTES AND CLIPPINGS.

Keep your eye on our "For Sale" column.

Silverwood, Mich., is to have a new brickyard.

Weedsport, Ky., is to have a new brick plant.

W. B. Owen will start a brickyard at Liberty, N. C.

A new brickyard is to be started at Troy, Mo., this spring.

D. A. Ballew will open up a new brickyard at Silsbee, Tex.

J. K. Brodie, England, Ark., is in the market for some brickmaking machinery.

The Wallace Brick Co., of Baden, Cal., will increase the capacity of their plant.

F. N. Egerton contemplates the establishment of a brick plant at Louisburg, N. C.

A company has been organized at Princeton, Ind., for the manufacture of pressed brick.

If you want anything in the way of second-hand machinery, look over our "For Sale" columns.

Frank Martin expects to erect a plant for the manufacture of pressed brick at Providence, Ky.

The Collins Brick Co. has been incorporated at Grand Rapids, Mich., with a capital stock of $30,000.

Fergusou Brothers, Crawfordsville, Ind., are in the market for a complete second-hand brickyard outfit.

A new and attractive "ad." of the well-known Columbia Brick Press appears on page 300 of this issue.

M. Warner and Joseph Carder are making preparations to manufacture brick at Cottam, North Gosfield, Ontario.

Good second-hand machinery can always be disposed of advantageously through an "ad" in our "For Sale" columns.

H. H. Thurman, of Atlanta, Ga., has purchased a tract of clay land at Douglas, Ga., on which he will erect a large brick plant.

Zarfos & Mate, of Red Lion, Pa., will manufacture brick at that place as soon as the necessary machinery, etc., can be put in place.

John M. Arbuckle, of the firm of Arbuckle, Ryan & Co., brick manufacturers, of Toledo, O., died at his home in that city Feb. 8.

C. L. Searcy and Dennis Little, both of Waco, Ky., will build a large plant at Moberly, Ky., for the manufacture of brick, tiling and pottery.

V. H. Ward, who is the prime mover of a new brick plant at New Britain, Conn., writes that he desires to purchase an entire brickyard equipment.

J. Parker is at the head of a new company that will manufacture brick at Pottery Valley, Cal. The plant will have a daily capacity of 8,000

Theide & Co. have succeeded Theide & Heilman, proprietors of the Fort Dodge (Ia.) Brick and Tile Works, Mr. Hielmau having retired from the firm.

N. C. Baldridge & Son, Mt. Pulaski, Ill., advise us that they will put in a soft mud machine this spring, and would like to receive catalogues, prices, etc.

C. W. Burckhalter writes that he has twenty acres of clay suitable for fireproof brick, and a kaolin mine, at Aiken, S. C., that he would like to dispose of.

Thomas Brothers will greatly increase the capacity of their brick plant at Montague City, Mass. They expect to turn out 8,000,000 brick the coming season.

Shepherd Thayer has purchased the brick manufacturing plant at North Adams, Mass., formerly owned by Ruther & Co., and will operate same the coming season.

Brick manufacturers looking for experienced help can get in communication with responsible parties by corresponding with those advertising in our "Wanted" columns.

We are indebted to W. B. Mershon & Co., East Saginaw, Mich., manufacturers of brick pallets, for a neat little souvenir in the form of a morocco pocket postage stamp carrier.

The citizens of Ligonier, Pa., are sanguine of having a large fire brick plant erected at that point this summer. Messrs. Weller and College are the gentlemen most interested in the enterprise.

The Eldora (Ia.) Clay Manufacturing Co. was sold recently to Z. McGregor, of Wellsville, O. It is the understanding that he will at once improve the plant, with a view of operating same this spring.

The Empire Pressed Brick Co. has been incorporated to manufacture brick at Denton, Tex. The directors are J. W. Ripy, I. B. Walker and Albert Wirtz, of Denton. They have a capital stock of $20,000.

On page 223 of this issue the reader may find a very pretty cut of Wilford's patent kilns and some strong testimonials which will interest those who are investigating improved methods of burning brick.

H. B. Harmon, formerly of Kokomo, Ind., has removed to Galesburg, Ill., where he will take charge of the Galesburg Paving Brick Company as superintendent, the situation previously filled by Hervey Haigh.

The work of rebuilding the steam brick works at Frederick, Md., which was recently destroyed by fire, is being pushed as rapidly as possible, and an improved modern plant will soon rise from the ashes of the old one.

Mortou Leeds, of Paris Crossing, Ind., writes for a sample copy of the Clay-Worker and adds that they are organizing a company for the manufacture of brick, and therefore will want to take a good paper devoted to the industry.

The Huntiugton brick plant, located at Huntington, W. Va., is about to resume business, and has equipped with two of the Ajax brick machines, manufactured by the Ohio Machine Co., of Middleport, O. (See cut of machine, page 291.)

J. Fortin, of Minneapolis, Minn., in a recent letter enclosing subscription, says: "The Clay-Worker interests me very much, and the more I read it the more I like it. Do not see how anyone interested in the clay industry can afford to do without same."

The Sidney Pipe and Terra Cotta Works, at Sidney, Wash., were entirely destroyed by fire the 25th ult. The works, which was owned by Mackintosh & Melcher, was running to its full capacity, and there had lately been talk of enlarging the plant. The loss is estimated in the neighborhood of $40,000.

The Windom (Minn.) Brick and Tile Co. have added some improvements to their plant, which last year had a capacity of one million brick, and this year they expect to turn out twice that number, the demand being good. They say that they expect to dispose of the entire product.

C. and A. Potts & Co., Indianapolis, report a slight improvement in trade, the demand for disintegrators being fairly good. March 7 they sold a complete outfit to Mr. W. W. Parry, of Rome, N. Y., including an all-iron stock brick machine, mold sander, disintegrator, etc.

The Carbondale Coal Co. has recently developed its property east of Des Moines, Ia., and will erect a large brick plant to make use of the valuable clay found thereon. It is their purpose to produce fine building and ornamental brick at first, and possibly later on take up paving brick.

The Oak Hill Brick and Coal Co., of Oak Hill, O., report that their business for the year 1895 was a large increase over any previous year since the organization of the company in 1873, the largest notable increase being for furnishing their "A" brand of brick for the building of kilns.

The West Side Shale Brick Co. is the name of a new firm at Bloomington, Ill., organized to manufacture brick from shale from the shaft of a large coal mine. Machinery sufficient to equip the plant has been ordered from E. M. Freese & Co., Galion, O. Mr. T. J. Bunn is the principal stockholder.

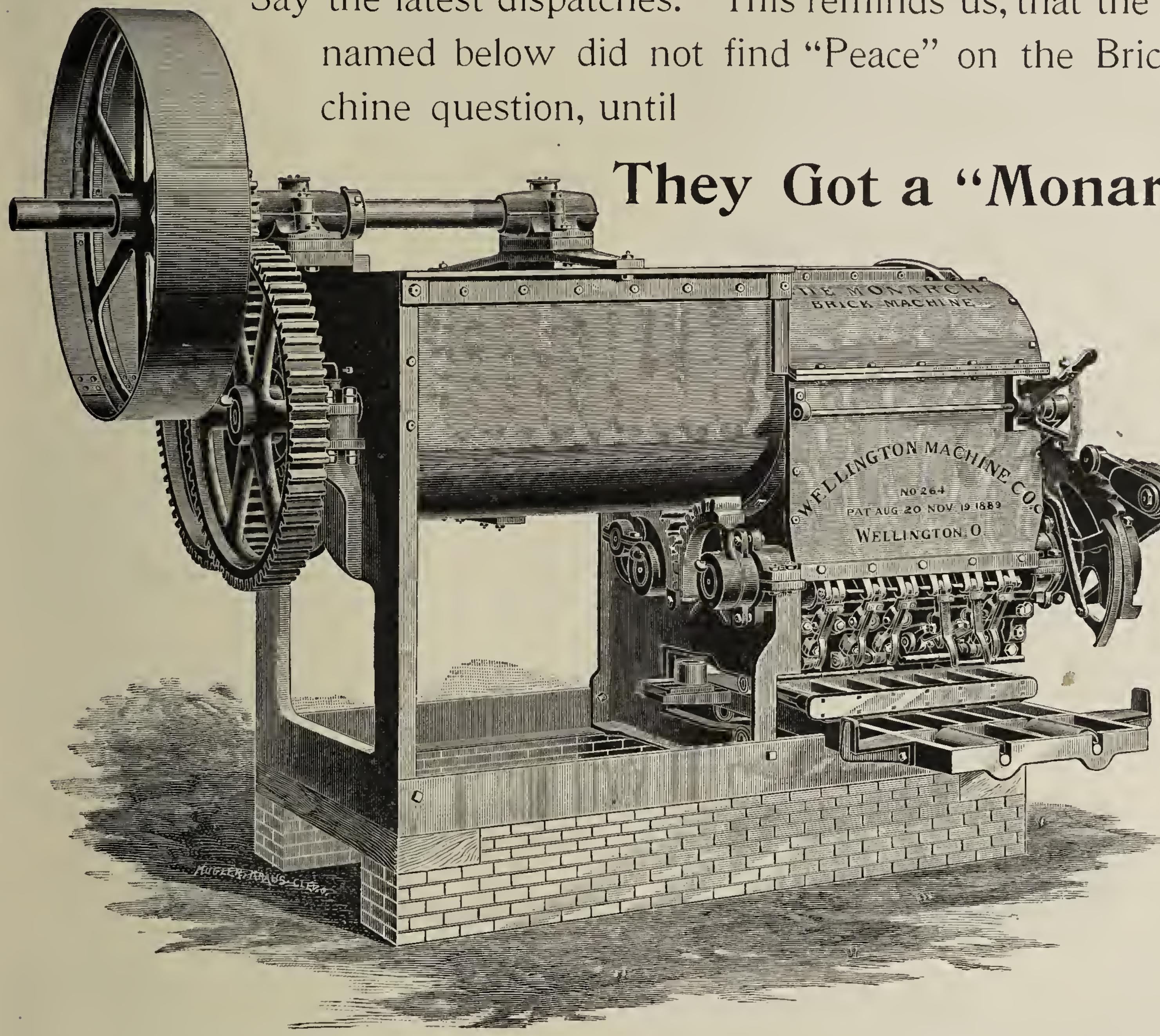
Our Perth Amboy, N. J., correspondent advises us that the clayworking plants in that section are running light at the present, but are busy putting in improvements, preparing for a full start in the spring. Especially is this true of the Standard Hollow Brick Company's plant, where they have erected an immense four-story building over their continuous kiln, which they are using to dry their brick, the heat for same being furnished by the continuous kiln. A new 140-horse-power engine has been put in place, and they are con-

[CONTINUED ON PAGE 280.]

NO WAR, BUT PEACE,

Say the latest dispatches. This reminds us, that the parties named below did not find "Peace" on the Brick Machine question, until

They Got a "Monarch."



YOU WANT THE BEST? These parties know something about it. Write them. Send addressed envelope for reply. Several have written us since we commenced publishing this list saying they are glad to reply, but postage is getting to be "an item."

The Akron Fire Brick Company	Akron,	Ohio.
McCausland Bros	Akron,	"
Edward Reid & Sons	Ashtabula,	"
William Harrison	Cleveland,	"
The Eaton Brick Company	Eaton,	"
John A. Hoesman	Walnut Hills, Cincinnati,	"
Rowland, Mulcahy & Co	Mansfield,	"
Belmont Brick and Tile Company	Martin's Ferry,	"
Thompson Bros	Painesville,	"
D. B. Chambers	Sandusky,	"
Pilloid Lumber Company	Swanton,	"
A. E. Macomber	Toledo,	"
Frank E. Tracy	Toledo,	"
Joseph Gates	Toledo,	"
John T. Chambers & Co	Blair Station,	Penn.
C. M. C. Harper & Co	Boston,	"
A. A. Thompson	Carlisle,	"
H. C. & W. G. Price, Jr	Chester,	"
Pfeffer & Co	Gettysburg,	"
Tobias Bros. & Co	Hamburg,	"
E. H. Snyder	Hanover,	"
Joseph Hart	Hollidaysburg,	"
Joseph E. Rapp	Norristown,	"
Simon Kline	Reading,	"
John Sullivan, Fifty-second and Market Sts	Philadelphia,	"
W. and J. Francis & Co	Pittsburg,	"
Diehl & Schantz	Spring City,	"
Brownfield & Boyle	Uniontown,	"
Brush Bros	Buffalo,	N. Y.

J. F. Stengel	Buffalo,	N. Y.
Jewett & Reynolds	Buffalo,	"
Thompkins & Smith	La Salle,	"
Niagara Brick Company	Niagara Falls,	"
Callahan & Doyle	Utica,	"
Kilkenny & Davis	Utica,	"
George F. Weaver's Sons	Utica,	"
A. L. Hatch	Central City,	Iowa.
J. M Crabill	Clarinda,	"
Wickham Bros	Council Bluffs,	"
Newman Bros	Des Moines,	"
The Franklin Brick Company	Marion,	Ind.
B. W. Bennett	Muncie,	"
F. Lehman & Co	Chicago,	Ill.
Citizens' Coal Mining Company	Lincoln,	"
C. A. Peck	Woodhull,	"
Wisconsin Red Pressed Brick Co	Menominee,	Wis.
Cook & Brown Lime Company	Oshkosh.	"
Missouri Reform School	Boonville.	Mo.
Skoog & Johnson	Springfield,	"
Monarch Brick Company	Los Angeles,	Cal.
Sacramento Transportation Company (two)	Sacramento,	"
C. B. Oldfield	Norfolk,	Va.
Wallace House	Hanson,	Mass.
Hart Bros	Northfield.	Minn.
Dalton Bros	Hopkinsville,	Ky.
Monroe Brick Co	Monroe,	La.
M. Butler	Houston,	Tex.

The WELLINGTON MACHINE CO., - Wellington, Ohio.

(Also See Page 308.)

EDITORIAL NOTES AND CLIPPINGS.—Continued.

templating putting in a fire protection apparatus. Mr. Osborne also says the building prospects in that city are better than for a year past.

Do you want a competent superintendent, foreman, setter, burner, sorter, or a man for any department? If so, put an "ad" in the "Wanted" columns. It will bring you the desired results.

A new company has been organized at Blacklick, Pa., that will take charge of the old brickmaking plant at that place, put in new machinery and appliances, and prepare for the manufacture of brick on a large scale. Ed Kline, Harvey Mahan and Mrs. E. J. Meldren, of Blacklick, constitute the company.

Messrs. Wells & Brigham, of Binghamton, N. Y., are putting in one of the Henry Martin Brick Machine Manufacturing Co.'s latest improved outfits, including a forty-thousand capacity letter "A" steam power brick machine, in connection with pug mill, sander, coal grinder and other supplies, comprising a complete outfit.

J. A. Buck, Crescent, N. Y., manufacturer of the Champion Brick Mold Sander, writes that his trade is improving, and there is every prospect of a large business the coming season. He has arranged with Messrs. Whitehead Bros. & Co., of 517 West Fifteen street, New York city, to act as general agents for the Champion.

Messrs. Weaver & Harman, of Baltimore, Md., are putting in a complete Martin plant, including one of the latest improved style "A" brick machines of 40,000 capacity, with other attachments and supplies. This makes the seventh outfit that this well-known firm of brick machine manufacturers have put in operation in Baltimore recently.

The foundry business, including all the foundry property, of the late William Fisher, Pittsburg, Pa., has been purchased by Messrs. Phillips & McLaren, both of whom were formerly connected with Mr. Fisher, and are therefore thoroughly acquainted with the business, Mr. McLaren being at the head of the mechanical department and Mr. Phillips the general business manager. They expect to maintain the popularity of the celebrated Fisher Standard Grinding and Crushing Pans, which are illustrated on page 303 and will be pleased to quote prices to any of our readers desiring anything in their line.

A large plant for the manufacture of architectural terra cotta will be established at Burlington, N. J., by Philadelphia parties. The gentlemen interested are P. D. and Edwin Buchanan, T. A. Macon, L. M. Onderdouk and H. M. Drinan, all of the Quaker City. They have had a large experience in the production of this ware, and are very sanguine as to the success of the new venture.

A new firm, to be known as the New Castle Brick Co., of which J. N. Wortman is President and J. V. Stewart Secretary and Treasurer, is erecting a brickmaking plant just outside of New Castle Junction, Pa., which, when completed, will have a daily capacity of 20,000 brick. At the start only building brick will be turned out, but later on the company expect to take up the manufacture of fire brick.

H. T. Healy & Sons, Homestead, Pa., sends in subscription and requests that we advise the machine men through our columns that there is but one brickmaking firm in Homestead, and add, in explanation, that they get catalogues addressed to Henry Bly, Homestead Brick Co. and H. T. Healy & Son, and as these catalogues are expensive and one is sufficient for their use, they want to save the machinery manufacturers that expense.

Mrs. William J. Konold, daughter of George W. Ives, the brick manufacturer of North Haven, Conn., died of typhoid fever at Antwerp, Belgium, Feb. 28, while on her wedding tour. Mr. Ives received a cablegram a few days before announcing her dangerous illness, and he and Mrs. Ives sailed Tuesday, the 25th, on the steamer Havel for Southampton, going thence to Antwerp. We bespeak for Mr. and Mrs. Ives the sincerest sympathy of the entire brickmaking fraternity, and especially the members of the N. B. M. A., with which they have been identified for several years.

Mention the Clay-Worker.
When writing to advertisers,
Mention the Clay-Worker.

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Zinc-Etchings. Send for an estimate to the
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INDIANAPOLIS, IND.

THE HAIGH-PENFIELD CONTINUOUS KILN.

The Haigh continuous kiln patents are now controlled by Messrs. J. W. Penfield & Son, of Willoughby, O., who will handle this celebrated kiln in connection with their extensive line of clayworking and brickmaking machinery. From the fact that this kiln is well suited to burning such a wide variety of clay products, including not only common building brick, but also paving brick, pressed brick, fire brick, etc., it will hereafter be known as the "Universal Continuous Kiln." The Haigh system is tho only continuous kiln system that has been used successfully for burning paving brick, a kiln of the Haigh typo having been successfully used for a number of years by the Galesburg (Ill.) Paving Brick Co., who last season burned over 7,000,000 paving brick in it, producing a tougher, more thoroughly annealed and stronger product than they were able to produce before using this system of burning. The Haigh system of burning possesses a number of other valuable improvements, one of the most important being that no coal is fired amongst the brick, but the firing is done from the sides in much the same way as in the ordinary up or down-draft kilns. Consequently, there is no trouble from discoloration of brick, which is so common with other continuous systems of burning where the coal is fed in at the top of the kiln and thrown among the brick. The distribution of the heat is under perfect control, the surplus heat being utilized for drying the brick before they aro brought in contact with the fire. The cost of construction of a kiln of this kind is very moderate, and it is by far the most economical and profitable type of kiln for use in burning clay products of any kind, as the actual cost of the fuel is not to exceed one-third to one-fourth of that required in ordinary up or down-draft kilns. Mr. H. Haigh, the well-known inventor of this system, has entered into an engagement with Messrs. Penfield & Son, so that the introduction of this system of burning will still be under his supervision. All correspondence with reference to this system of burning should be addressed to Messrs. J. W. Penfield & Son, Willoughby, O., who will be glad to furnish any further details that may be required.

A SMALL HAND YARD.

Publishers Clay-Worker:

We are making brick in a small way. Our yard would be a curiosity to most of your readers. It is the old English way of making brick. We have a pug mill, with a table fixed at the bottom. The one brick mold is nailed to the table. The brick, made one at a time, are placed on a pallet, eleven by five, and then put on a barrow, six feet long and two feet wide. The offbearer wheels them out and backs them under a shed, which is 150 feet long and four feet wide. We make about four hundred an hour, with my son feeding the mill and offbearing the brick. Our output this season has been 150,000 building, paving and circle brick. We have burned one kiln and will put fire in another next week. These are the first brick I have made for twenty years. I always followed burning. When I was in England I used to make nine thousand per day, one at a time. I had a temper boy to carry the clay on the table, one to make the walk to put in the mold, a boy to load barrow, one offbearer and a boy to wheel them out to the offbearer, and the molder, myself. My son and I have made and burned two kilns and raised four hundred bushels of corn this season. The building brick are six dollars and well-made brick are seven. A number of brickmakers have been to see me, and they say they have never seen brick made this way before.

Inclose herewith two dollars for the Clay-Worker. Yours truly,

Ingraham, Ill. M. KILROY.

P. S.—I would like to get a second-hand Martin machine.

John Beard of Danville, Ill., is thinking of going into the brick business.

The Fairfield (Iowa) Brick and Tile Works, has been purchased by H. C. and Loomis Raney, Mr. Messenger retiring.

Do you want a competent superintendent, foreman, setter, burner, sorter, or a man for any department? If so, put an "ad" in the Wanted columns. It will bring you the desired results.

Jos. Fortin, connected with Hennepin County Savings Bank, Minneapolis, Minn., writes that he is thinking of starting a small brick and tile factory and is desirous of purchasing a horse power machine, a second hand Penfield No. 2 E, preferred.

IT WILL PAY YOU to examine the

THE STANDARD BRICK MACHINE
MFD. BY
Horton Mfg Co.
Painesville, O.
The Horton Moulded Sander
Painesville, O.

Standard Brick Machine,

Horse and Steam Power.

Has been in use more than 10 years and is perfectly reliable in every way.

PUG MILLS, DISINTEGRATORS,
REPRESSES and SANDERS.
TRUCKS, BARROWS and MOLDS,
ENGINES, BOILERS and FRICTION
CLUTCH PULLEYS.

First-class supplies of all kinds.

Catalogue. The Horton Mfg. Co., Painesville, Ohio.

Written for the CLAY-WORKER.

THE NEW YORK MARKET.

BEFORE THESE LINES appear in the Clay-Worker winter will have passed away, at least I hope so. The snow crop has been short. If the brick crop was as short in proportion there would be prices received for old stock that would warm the hearts of all manufacturers.

The Ice king did his share to keep stock under shed at primal points during January, but his Lordship relented in the beginning of February and freed all water communications with New York city.

It was hurrah, boys, ship them in, from Haverstraw, South Jersey and Long Island. Hackensack was not in it. Why? Because the State of New Jersey gives all railroads which cross the Hackensack river from the 20th of January to the 21st of February to repair their bridges, and makes it a shut season; nothing can go through the bridges during that time.

The first tow of empty barges from New York to Haverstraw contained thirty boats and one schooner, and on its return trip brought thirteen loaded boats from Haverstraw to a market that did not want them, but made the buyer as independent as a wood-sawyer with plenty to do. He had plenty of stock piled out which he wanted to dispose of, bought at low rates in the fall, and he was now assured that he would not be short of stock, as the river was open and would not close again. If the brickmaker was not in a happy frame of mind the buyer was, for he knew that low prices were not far off.

The Hackensack men were waiting with all patience for the time to come when they could contribute their share to the New York market, when along comes a record breaker of 6 below zero, and on the day that the bridges were to open the river was frozen over with ice five inches thick. At present writing, Feb. 25, weather mild, the ground as free of snow as in July, ice boats sailing on the river, bicyclists are out in force on the hard-frozen roads. In less than a week, unless another cold snap sets in, navigation from all points will be open, and a free-for-all will be in order. The consensus of opinion among the manufacturers is that 1896 will be no better than its predecessor, 1895. Not a manufacturer is drawing in seasoned wood; the small quantity they are drawing is green, to be used next fall if dry enough.

One, at least, of our brick manufacturers will be rich in experience if not in money when he strikes a balance after all his stock of 1895 has been marketed. He has sold some hundred thousand brick at a price, as given by his superintendent, of four dollars under the shed. The parties who bought say they paid three dollars and seven shillings per thousand for them. Either rate is out of sight. When loaded on wagons it cost ten cents per thousand; when loaded on boats to be moved across the river the cost per thousand is twenty cents. On all the other yards the price is four dollars and fifty cents per thousand under shed for the run of the kiln, except light or pale; we make a few of them. The 92 and 95 per cent. hard that some of your correspondents say they turn out in a little arch of twenty-five thousand, with arches from forty-eight, fifty and fifty-two feet wide and fifty or more high under the platting, they do appear, but am in the hope that the class of men who will succeed those now doing good work in burning will still further reduce the small per cent. of pale now found on a large number of yards in this section of the country, unless a class of manufacturers should engage in the business similar to one in Haverstraw, but now dead. His New York agent wrote him to ship, if he had them, some thousand lammies. He went to the foreman and asked him if he had any on the yard. When told that there were none, he said: "You must make some; we must have all kinds for our customers."

—Setting Brick.—

Friend Morrison, in the last Clay-Worker, makes mention of how many brick a man should set in the kiln, and also that he has heard of a quantity far in excess of what he thinks good, reliable work can be done in that branch of the trade. If he could get the opinion of all the foremen in this section he would find that they would sanction what he says. Mr. Morrison must take this as meant—a case of placing the method as practical here and along the Hudson, of what number a man shall set per day. No criticism whatever on the statements in the February number, which I was told I should not have tried to answer. Quixote went out to fight the windmills. In the present case it is one of the use of a rusty pen to try to jab holes in facts. On yards which run one or more machines a day of twenty-three thousand to a machine, one setter and three wheelers put in a pit a day. Where thirty thousand are run out, two setters, with two wheelers to a setter, is the complement to a pit, and they work from the hour of going to work—half past 4 a. m. to 6 p. m.

As before mentioned, twenty-three thousand to the pit is a day's work, to be set in whatever shape the kiln is in. The top may have to be put on; if so, the double coal on flat; the pale for platting must also be put on. If it requires the starting of an arch, and here there is a four course of pale set on the kilns, ground first, and about eighty pale in the head, with all double coal needed to close the arch. In Haverstraw all heading courses, or double coal, must be set as they go along. In Hackensack they leave off the heading course and mold a pit of double coal, set it off the yard, not hack it, so that it is all of one dryness, then wall it, so that they will not dry out. It makes no difference how close or far distant the hack may be from the kiln, only the three wheelers are allowed. The thirty-thousand yard will work all day; on the other 2 o'clock will see the setter and wheelers all done, the pit of brick in, and many a time have I seen the setter and wheelers not stop when the whistle blew for dinner, but before the quarter to 1 whistle blew to go to work they were all through, having set from half past 4 in the morning, with half an hour for breakfast, all done in about eight hours, brick tossed two at a time. If that is doing the work in too short a time to do it well, it is nothing to be compared with the time made on a yard not far from Rumstick Point. It was told me by the foreman, and the work was sanctioned by the superintendent, who was a thorough brickmaker. Both the foreman and superintendent are personally known to your scribe.

The arches contained twenty-five thousand each. One setter and three wheelers was the number of men who set them for a day's work. They started at 4 a. m., in the long days of summer, and had the twenty-five thousand set in not later than 10 a. m., and often at 8. Echo says "How?" The wheelers tossed four at a time, and when in the bottom, or where they could reach, they set off their own barrow. The result of such work is sure to be disastrous, and the record through the many changes of ownership could be traced to just such management,

—Coal Dust.—

The discussion at the Convention given to the use of dust may lead to some trying it. There is dust and dust. Anthracite and bituminous. One might go to a dealer and buy tons of coal dust and be the most surprised man in his section when he opened his kiln. If you want anthracite, specify for that grade, and that alone.

A few years ago, in Haverstraw, one of the oldest manufacturers went to New York city and purchased a cargo of dust. In due time it came. When the foreman was burning his first kiln in which the dust was used he reported to the proprietor that the kiln was heating so in spots that he could not go slow enough with the fires, and naturally thought that it was the new dust, which was good and clean and free from mother earth. When the kiln was opened the brick were too hard. One or two more kilns were burned, with like result. They then examined the pile of dust, and found a large percentage of bituminous dust mixed with it. As it had been dumped in the canal boat and then shoveled into the carts, then dumped in a pile and again shoveled in a cart drawn to the pit, then spread on, it had become thoroughly mixed through. The proprietor went to the shipper and asked him if he had put in any bituminous dust. He said yes; he didn't suppose it made any difference, as dust was dust. Well, it made just two thousand dollars difference to him in the amount of damages the court awarded the brickmaker on loss on swelled brick, and he did not come out whole at that figure. A word to the wise; may it be a saving.

—Consolidation—

Of the brick manufacturers on tide water is now the programme for the season. The last number of the Clay-Worker gives the names of some of them. Mr. Washburn is a brickmaker from A to Z. Many times have I watched him as a boy straddle the rows and turn up each brick with his hands. He is one of the substantial men of the trade. Of Mr. H. N. Wood I will say that he is and always has been since he joined the brickmaking fraternity a consistent and active advocate of any movement that will help the trade. I do not think that a meeting has been called that his name was not signed to it.

One of the other gentlemen whose name appears, when asked to join the movement last year, is quoted as replying that he could make brick a dollar per thousand less than any one else in the trade and had no use for such a movement. What has happened in a year that he should be ready to join with the others in such a movement?

The present plan is that each yard take stock at the rate of twenty-five dollars per million capacity, having all brick pass through one office and charge twelve cents commission on each thousand brick. There were signers that represented an output of five hundred million, which would produce sixty thousand dollars per year. They estimate that it will require twenty thousand dollars to pay all expense of help and office, leaving a balance of forty thousand to pay bad debts, whatever that may mean, and I have failed to find any one who could explain it, as each has his own idea.

One would say it was a case of leading a horse to water, but could not make him drink, as a statement in last month's Clay-Worker showed that one thousand million were made last year. As the combine represents only half of the output, with a demand that is not near the supply, how could they expect to force prices up? Time will tell.

—The Market.—

There is no shortage of stock. To sum it up in a few words, no stock is coming on the market other than those barges which have been covered and the few which arrived when the river opened. They supply all that is needed. The asking price and selling price is regulated by pressure from manufacturers to their agents to sell and realize, so that their barges will be ready to return to the yard as soon as navigation opens. Top quotation, $6.25; lowest, $5.25, with both rates shaded to suit purchaser. A. N. OLDTIMER.

Unbiased Testimony.

BRICKMAKERS:—We are well aware that the majority of you do not take kindly to letters of reference that are usually published in clay magazines and catalogues, feeling that many times they do not express the exact opinions of the writer, whose judgement is influenced by friendship or other motives. Therefore, unsolicited endorsement from Mr. D. V. Purington, the largest brickmaker in the United States, who is not using our machinery, should have weight. In a recent letter to a friend, he expresses his views of the **Wonder Machine** as follows.

> "While I do not use any other machine but the Chambers, I keep tab on the others. It has seemed to me that the Wallace **"Wonder" Machine** has some merit not possessed in the others, notably in the preparation of the clay. * * At Galesburg I have been closely watching the **Big Wonder** operated by the Galesburg Paving Brick Co., and I have come to the conclusion that they make as good a brick, and so far as the brick machine goes, make them as profitably as we do with the Chambers, or the Galesburg Brick and Terra Cotta Co., do on the Frey-Sheckler. Indeed, I am about certain that the **Big Wonder** makes a brick with less lamination than any other auger machine. [Signed] D. V. PURINGTON.
>
> Chicago, November 7, 1895.

This expression coming unsolicited and unbiased should have its weight, and should prove conslusively that we are not misrepresenting the merits of the **Wonder Machines.**

For further particulars, address

The Wallace Mfg. Co.,

FRANKFORT, INDIANA.

CATALOGUE FREE.
See back Inside Cover Page

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE—One 40-inch Steadman pulverizer. One 36-inch as good as new of another make.
3 1 d SAINT, care Clay-Worker.

WANTED—One or two clay gatherers, wooden wheels, and in good order. State lowest price. Address,
3 1 d MEN, care Clay-Worker.

WANTED—Brick setter, familiar with up-draft kilns, also a burner. Address, with references,
3 1 d C. H., Care Clay-Worker.

FOR SALE—One Miller hand press, in good order and cheap. 5,000 good pressed brick can be made daily. Address
W. B. HARRIS & BROS.,
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FOR SALE—One Edinburg soft mud brick Machine, 2 trucks, 16 molds, all good as new; made about 40 M brick; only $50. Address
3 3 c "HOLD," care Clay-Worker.

FOR SALE—Two Haverstraw soft mud brick machines, with shafting, etc. Can be seen set up in running order at Rome, N. Y. Address
3 1 d W. W. P., care Clay-Worker.

WANTED—A situation as superintendent by a man of 12 years' experience in one of the best known pressed brick companies in the United States. Address
3 1 c "J. H. A.," care Clay-Worker.

WANTED—Situation as foreman or burner in brick, tile or terra cotta works. Have had 25 years' practical experience. Address
3 1 c PUSH, care Clay-Worker.

WANTED—Position as superintendent of brick works. Understands all kind of machinery and kilns; can remodel a yard. Good references. Address
3 1 c GOOD MAN, care Clay-Worker.

FOR SALE—At $450 on board cars, one Chisholm, Boyd & White Co. dry pan, seven feet in diameter, repaired by us and in good order.
CHAMBERS BROTHERS CO.,
3 tf l Philadelphia.

FOR SALE—One No. 8 Brewer brick machine, one Brewer clay crusher, one Brewer pug mill, three Raymond side-dump cars, one Raymond hoisting drum; used only 30 days; good as new; at low prices for cash.
3 1 d V. C. B., care Clay-Worker.

FOR SALE—A controlling interest in a very desirable brickyard property in Houston, Tex., equipped for manufacture of dry press front brick and stiff mud common brick, and produces a fine article of both. Location as to local market and railroad facilities unexcelled. Houston is a rapidly growing city and best distributing point in the South. Good business reasons for selling. Will take other property in part payment.
C. J. BROWN, Topeka, Kan.,
Or E. A. McMATH, 1009½ Congress st.,
2 3 d Houston, Tex.

FOR SALE—DENVER GOLD MINE—Controlling interest in The Denver Terra Cotta Lumber Co., at Denver, Colo., at about half cost. These works are located near the heart of the city, with best of shipping facilities and everything necessary for a large business. Has done a business of nearly half a million dollars in the past five years, and will do as well in the next five. Above interest is owned by New York and Chicago parties who have all the business they can attend to at home. Terms to suit. Address
R. A. YOUNG, Sec., 601 Equitable Bldg.,
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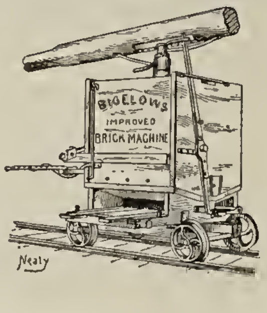
FIRE Dover Fire Brick Co., **BRICK**
INCORPORATED 1870. MANUFACTURERS OF
Dover and Buckeye Fire Brick,
Unexcelled for Kiln Purposes
44 Mercantile Bank Bldg., Cleveland, Ohio.

BRICK MACHINERY.



One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

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Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years. Write for prices.

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ESTABLISHED NINE YEARS.

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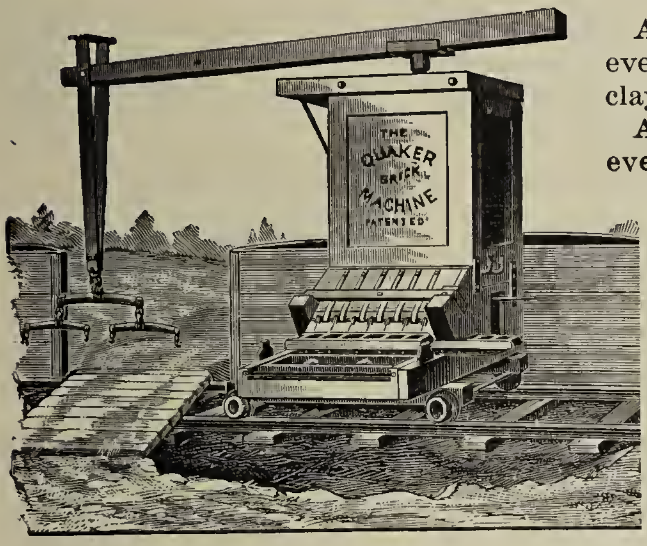
The New Model Quaker and Monarch Brick Machines



Also supplies and machinery of every character pertaining to the clayworking business.

A simple, practical, reliable every day, all round Brick Machine, either steam or horse power, at a reasonable living price to suit the times. We have it. No experiment. Over 1,000 in use all over the country.

We cannot give testimonials and particulars in a small advertisement, we simply ask you to write us for catalogue, prices, facts, etc. It will cost you nothing.

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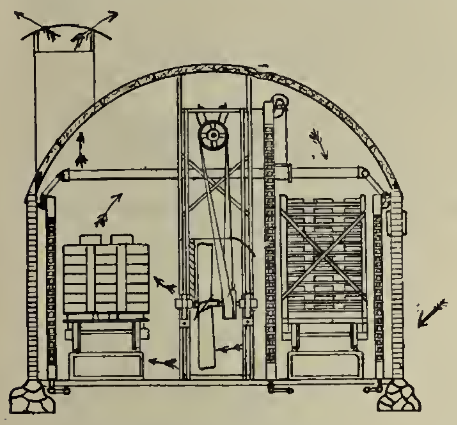
The Safety Dryer,

Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection.

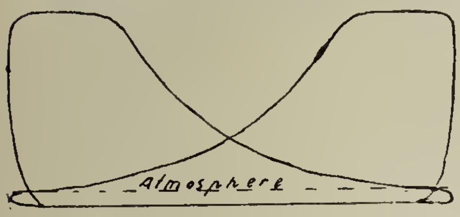
Much air at low temperature. Two tracks produce about as many **thoroughly** dried and "solid" brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.

U. S. Pat. Aug. 16, 1881. No. 245,742.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No. 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.
MR. S. G. PHILLIPS, Woodbridge, N. J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformily without cracks.

Yours respectfully,
CHAMBERS BROTHERS CO.,
J. H. Chambers, Gen'l Mgr.

SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr.

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WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

WASHINGTON, D. C., June 7th, 1895.
S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our —— You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

FORDS, N. J., April 9th, 1894.
MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

S. G. PHILLIPS.

Agent and Patentee,

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WANTED—Situation as superintendent or burner, paving brick works. Good references.
3 1 d M., care Clay-Worker.

WANTED—By practical brickmaker of many years' experience, position as superintendent and burner. Can furnish references if required. Address L. M. F.,
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WANTED—Situation as continuous kiln burner. Have had considerable experience with Hoffmann and other types in both clays and shales. Am open to superintend construction of kilns. Address
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FOR SALE—Cheap, one No. 5 Nolan Madden brick and tile machine, one twenty-horse-power engine and boiler, two carts, three trucks in good order. Also wants situation as foreman or engineer. Can give good references. Twenty years' experience.
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FOR SALE—Cheap, one Penfield auger machine No. 15, with automatic end-cut; one 120-inch Boston blower or fan, with heater, engine and pumps, including 28,000 feet of 1-inch pipe; 300 iron cars; 30-inch elevator; two 90-horse-power boilers, pulleys, shafting, belting, iron rails, etc.; in first-class order. Address
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FOR SALE—$7,000 buys the only brick and tile plant in town of 2,000, with machinery, dry houses and buildings complete to make 30,000 brick per day. Three Eudaly kilns, two round kilns, about four acres best quality paving brick clay, an abundance of water. If not sold in 60 days, will lease. Address
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FOR SALE—One Sword machine; one upright Hilton sand brick machine, an excellent No. 1 machine, all of iron and very little used; molds, good engine and boiler, shafting, pulleys, wheelbarrows, trucks, pallets, racks, lumber, two good carts and harness, two Yankee endless chain hoists with hods, one Daso double platform elevator with horse power. Address
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FOR SALE—One Penfield all-iron stock brick machine, with horizontal pug mill attached, used one year, but thoroughly overhauled. One Penfield 10 S plunger machine, with one board delivery cutting table arranged to cut Roman and front brick. Two Carnell hand represses, 13¼x4⅜ inches. Two ditto, 8⅞x4¼ inches. Two Kueny hand represses, 8⅞x4¼ inches. Two Tapline & Rice chaser mills, very little used. All above will be put in thorough good order and delivered on car. Write for prices.
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Advertiser who is accustomed to the management of large fire-brick works and is thoroughly experienced in every detail of the business is open to re-engagement, either at the present time or in the spring, as manager or superintendent. The best of testimonials as to character, ability and successful management. Address
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In matters relating to the manufacture of Gas Retorts, Fire Brick, Terra Cotta Building Brick, Faience and other clay products.

Plans furnished for kilns and complete manufacturing plants, also system of bookkeeping to ascertain daily cost of manufacture.

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WANTED—Situation as superintendent of dry press brick plant by a practical clayworker. Thorough knowledge of burning, setting, making and mixing for colors. Can make any now on the market. Also of terra cotta. Can construct or remodel yard, kilns, dryers, etc. References if required. Address

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BRICKYARD FOR SALE OR LEASE—The plant of the Chicago Brick Co., located at Thirty-ninth street and Western avenue. will be sold or leased on reasonable terms for a term of five to ten years to responsible parties. This plant consists of three Chambers machines, with steam shovel, oil plant for burning, and all machinery of the latest and most approved pattern for manufacturing brick in the most economical way. The clay bank is one of the best in the city. Kiln shed has railroad connection with all roads entering Chicago. A rare chance for the right party. Apply for thirty days to

P. J. SEXTON,
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OWING to the death of our Mr. Blaffer, Jr., we offer our well-located plant in the city of New Orleans, and known as the Riverside Brick Works, either for sale or rent. The property is located on the Mississippi river in the growing and fast improving portion of the city, and is completely equipped with an E. M. Freese & Co., Galion, O., stiff mud outfit, a ten-track Wolff's Chicago Steam Dryer, with necessary cars, etc., together with sufficient steam and engine capacity, kilns, tools, appurtenances and supply of clay. Communications from parties with necessary references as to their responsibility entertained by

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Fire-brick manufacturers desirous of taking up this important branch of the business are requested to communicate with advertiser, who has had charge of the largest silica brick works in England. Address,

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Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address

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Tests of the Strength of Materials

Of all kinds made by experienced and competent experts. . . . . .

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All the United States Timber Tests made at this Laboratory.

Tests of Paving Brick a Specialty.

J. B. JOHNSON, Director.

MAKES THE FINEST BRICK in the WORLD.

THE

Improved Lion Brick Press.

New Catalogue on application.

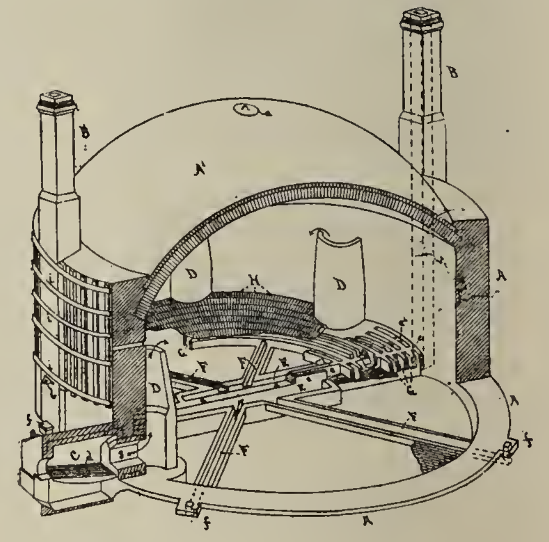
Complete Brickyard Machinery.

St. Louis Iron & Machine Works,

Main St., and Chauteau Ave., ST. LOUIS, MO.

BURNING
MADE EASY
BY USING

Holman's Down Draft Kiln.



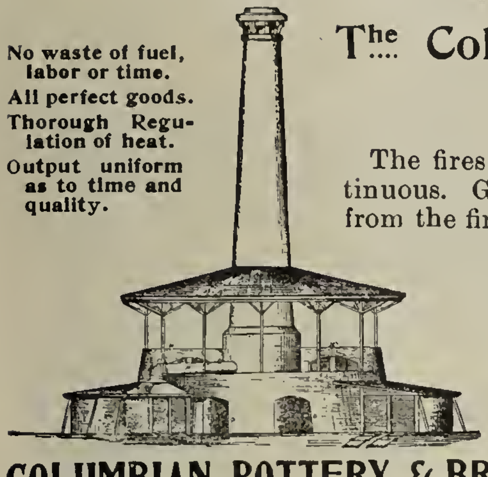
Cheaply and easily built, and Fully demonstrated to be one of the most perfect kilns on the market.

. . . . All Parts of the Kiln Fully Under Control.

SEND FOR ILLUSTRATED CIRCULAR.

C. J. HOLMAN, Sargeant's Bluff, Iowa.

NEW AND NOVEL,



No waste of fuel, labor or time.
All perfect goods.
Thorough Regulation of heat.
Output uniform as to time and quality.

The Columbian Pottery and Brick Kiln.

The fires remain in one division ONLY and are continuous. Goods move on a ROTATING FLOOR to and from the fires. Radiating heat and spare heat are used for drying andheating air for combustion.

A perfect and reliable factory Winter and Summer. Kiln and dryer combined. The best kiln for vitrifying Paving brick and glazing

Full information on application.

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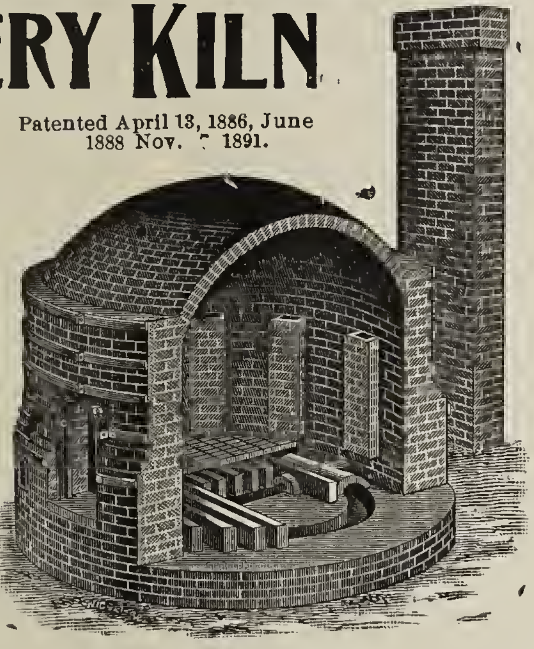
NEW DISCOVERY KILN

Patented April 13, 1886, June 1888 Nov. 7 1891.

More Than 1,000 Now Stand as Monuments of Fame to its Inventor



It is neat, compact, durable, easy to handle, constructed on scientific principles. Has been improved and now burning almost everything made from clay, such as Sewer Pipe, Vitrified Pavers, Etc., to Pottery and finer wares. Built any size up to 100,000. In short it leads the way.

Reward For Information of Infringements.

To know more and what they say of it, ddress,

E. M. PIKE, Patentee

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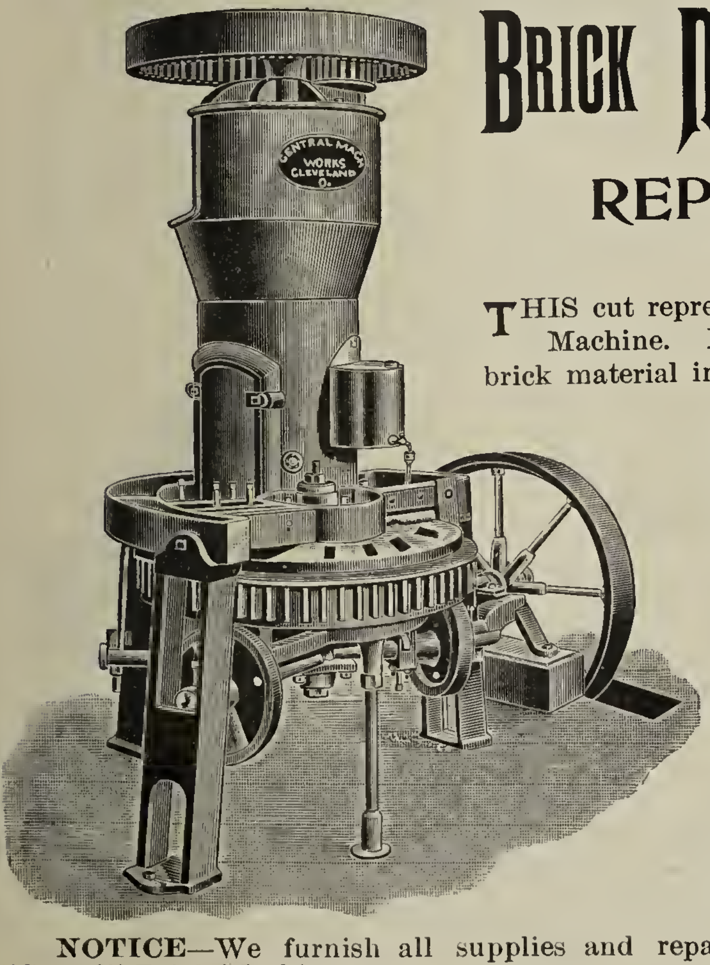
CENTRAL MACH. WORKS CLEVELAND O.

BRICK MACHINES AND REPRESSES.

THIS cut represents our Stiff Mud Brick Machine. It will work any kind of brick material including fire clay, shale or common clay right from bank without the use of a pug mill. Each brick is pressed separately and can be haked 7 or 8 high, or repressed right from machine.

Over 500 in operation.

Send for price and circulars

Manufactured by

CENTRAL MACHINE WORKS,
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Cleveland, Ohio.

NOTICE—We furnish all supplies and repairs for any make of the "Sword" Brick Machine.

FOR SALE—One Chambers end-cut brick machine (capacity 50,000 daily), one Potts disintegrator, one extension table, two new improved Frey-Sheckler represses; one 12x24 balanced valve engine, with pulleys and belting to run above machinery; also 128 double-decked iron cars and pallets, three transfer cars, and lot of iron rail. This is complete plant in first-class condition; to be sold to wind up the estate of John Cubbins. Address

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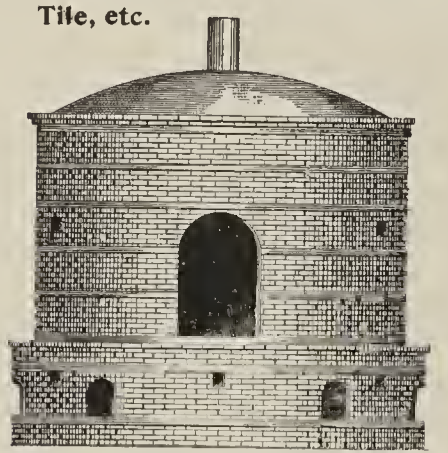

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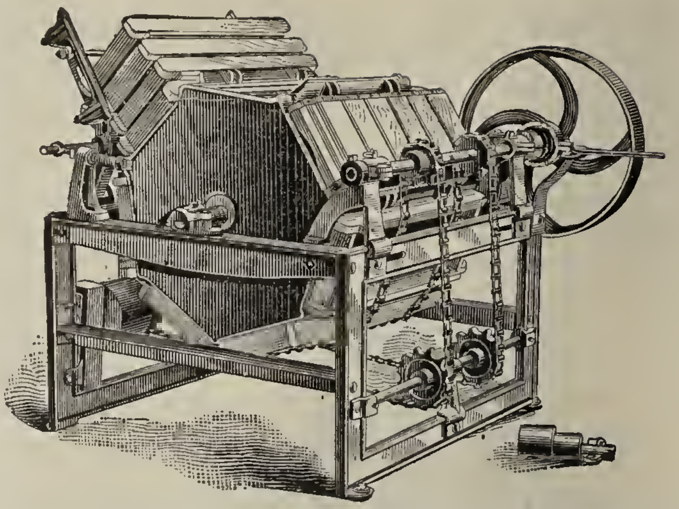

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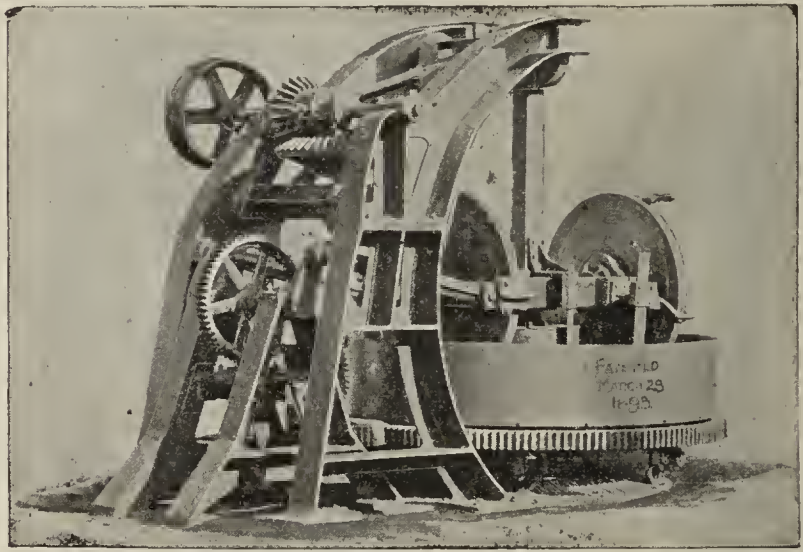

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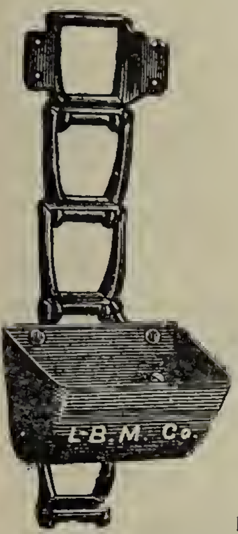

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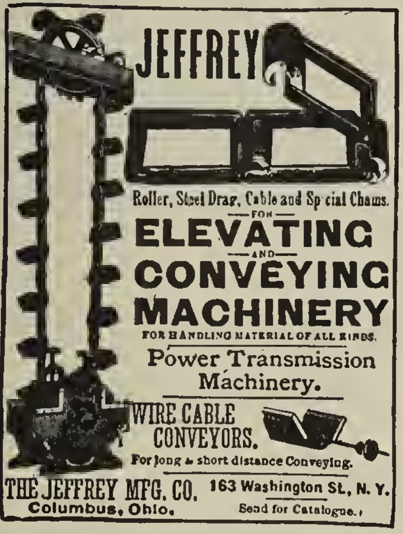
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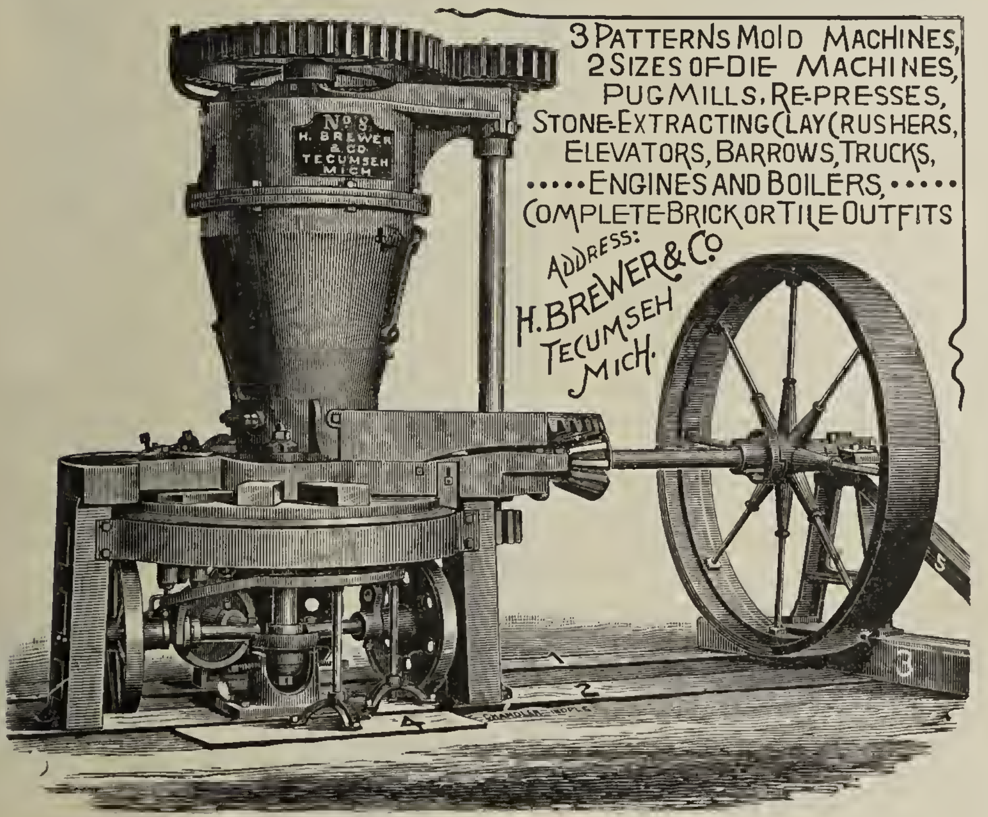

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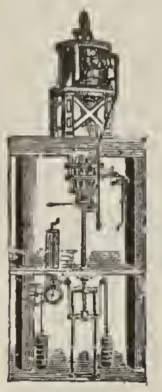

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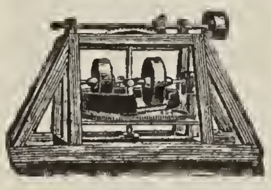

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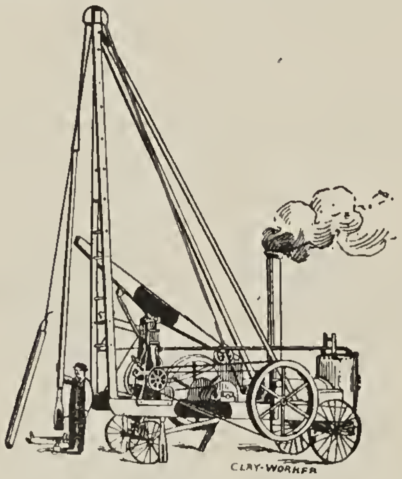

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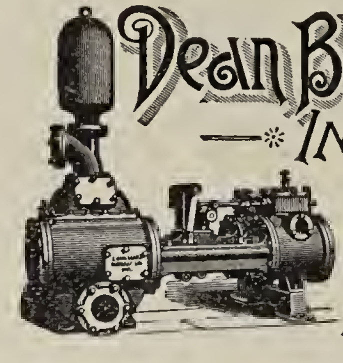

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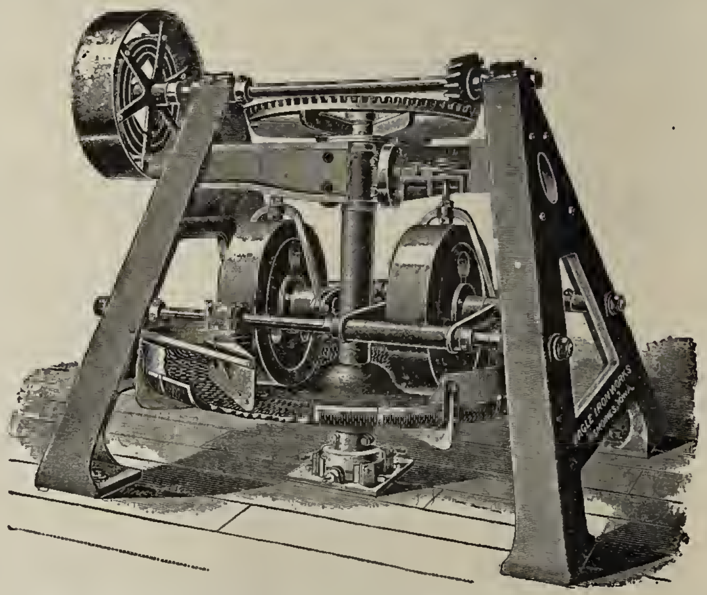

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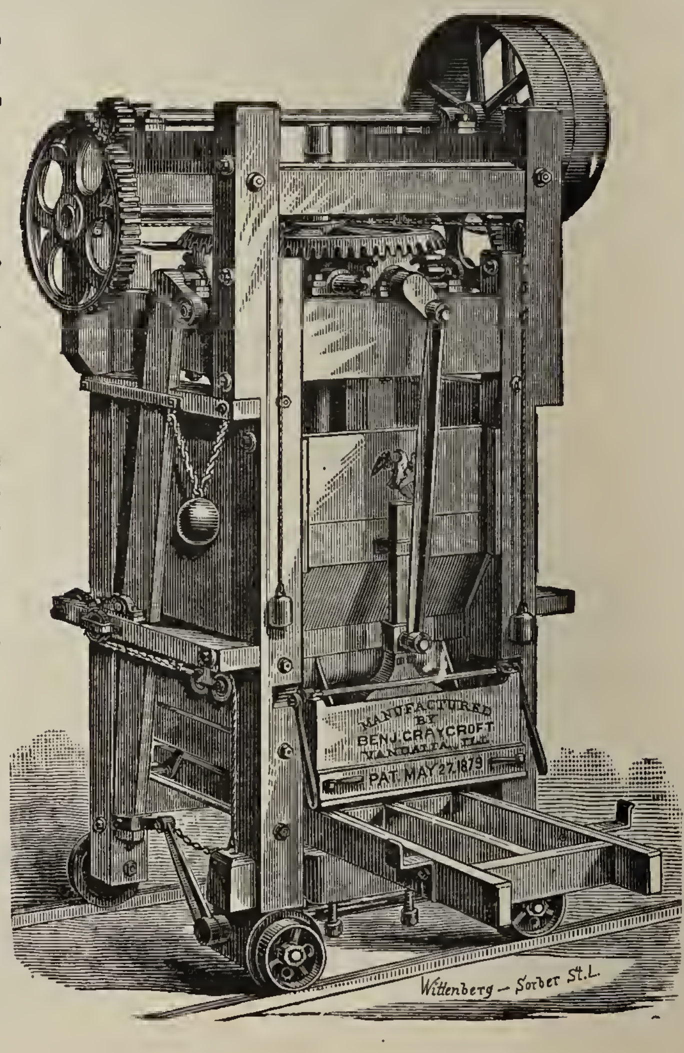
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PAT. MAY 27, 1879
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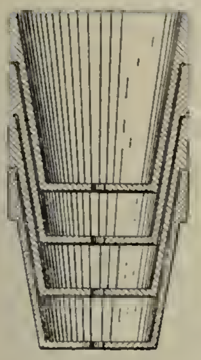

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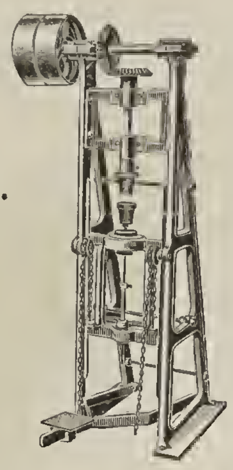

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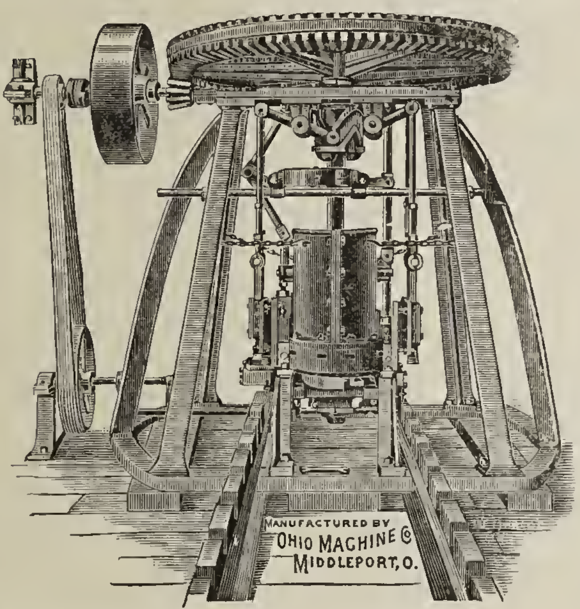

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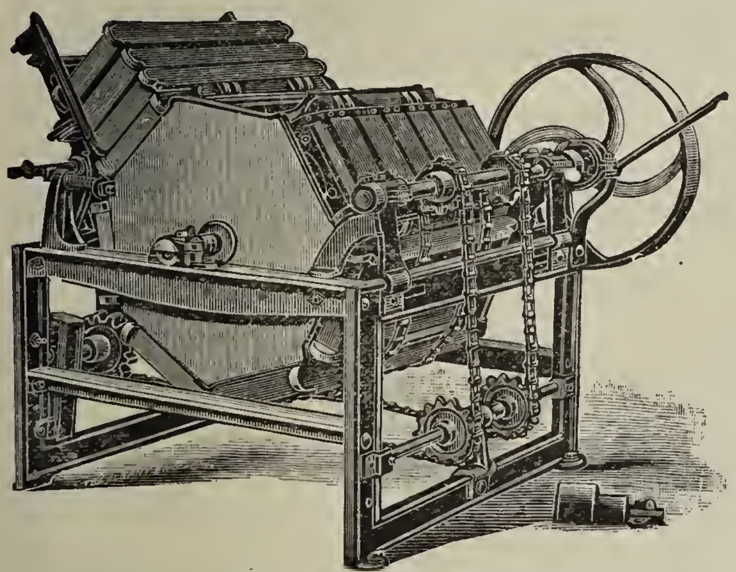

Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

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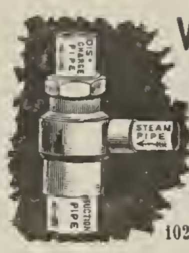

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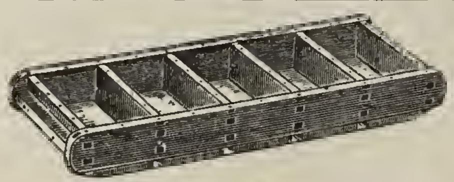

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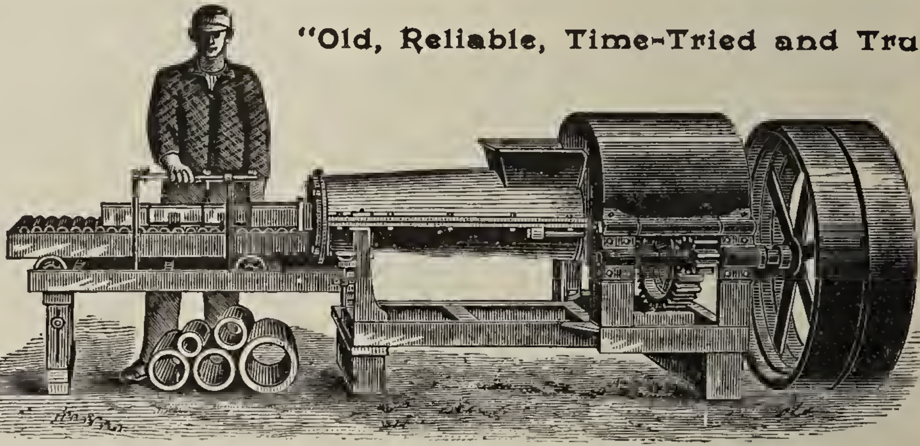


P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,

PARKHILL, ONTARIO,

Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.

Price, $85.

Outing
BICYCLES.

Price, $85.

NONE BETTER AT ANY PRICE.

We refer by permission to the entire staff of the "CLAY-WORKER" they all ride Outing BICYCLES.

In elegance of finish and fine workmanship Outing BICYCLES easily distance all others.

Good Agents Wanted. Send for Catalogue.

HAY & WILLITS M'F'G. CO.

76 North Pennsylvania St., - - - INDIANAPOLIS, IND.

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

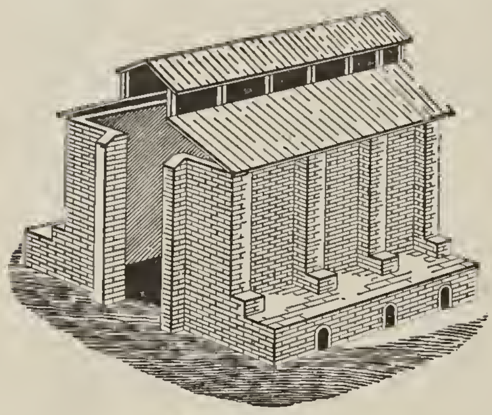
All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

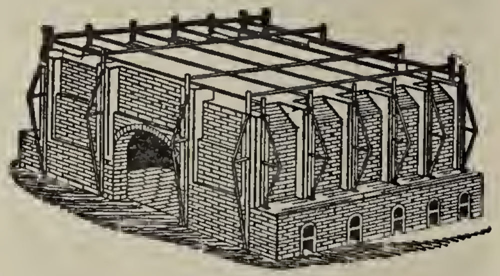
J. K. CALDWELL, 319 Hennepin Ave., *Minneapolis, Minn.*


Up-Draft Kiln.

LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.

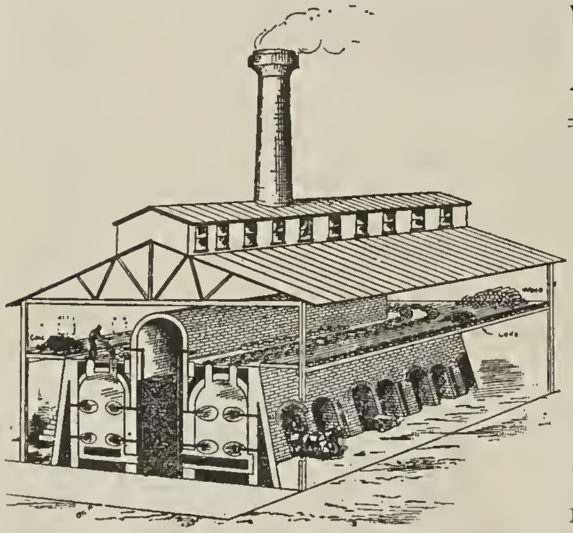

Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,913 Indiana Ave., *Kansas City, Mo.*



Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.
No soft or Salmon brick.
No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

Vitrified Paving Brick

Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Wheeler. Mailed free on receipt of price, $1.00.

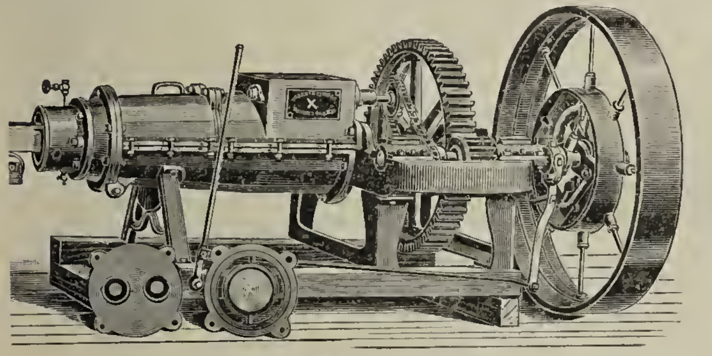
T. A. RANDALL & CO., Publishers,
INDIANAPOLIS, INDIANA.

The New South Brick Machinery

Southern Clay Eaters. Veni, Vidi, Vici.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion or constipation.** No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.



Our X Brick and Tile Machine.

• • • •

SIDNEY, IOWA, November 4th, 1895.

J. C. STEELE & SON, Statesville, N. C.

GENTLEMEN:—I thought I would let you know that I am well pleased with the New South X Machine. It is the cheapest, runs the lightest and makes the nicest brick of any machine in southwest Iowa. We have a 12 H. P engine and can make 20,000 bricks in ten hours, and there is not a hand-cutting table in this part of the country that can compete with yours for cutting square on the ends. I consider it the most complete outfit that a man can buy for the money. It surprises old brickmakers. They say your truck is a Yankee trick. We have a club-footed boy, 16 years old, who trucks 15,000 to 18,000 per day with one of them. We wish you success with your enterprise.

Yours, etc.,
S. O. CARTER.

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Strictly modern machinery at the lowest price.
We have just completed a new machine "X-tra."

Send for catalogue.

J. C. STEELE & SON, Statesville, N. C.

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15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

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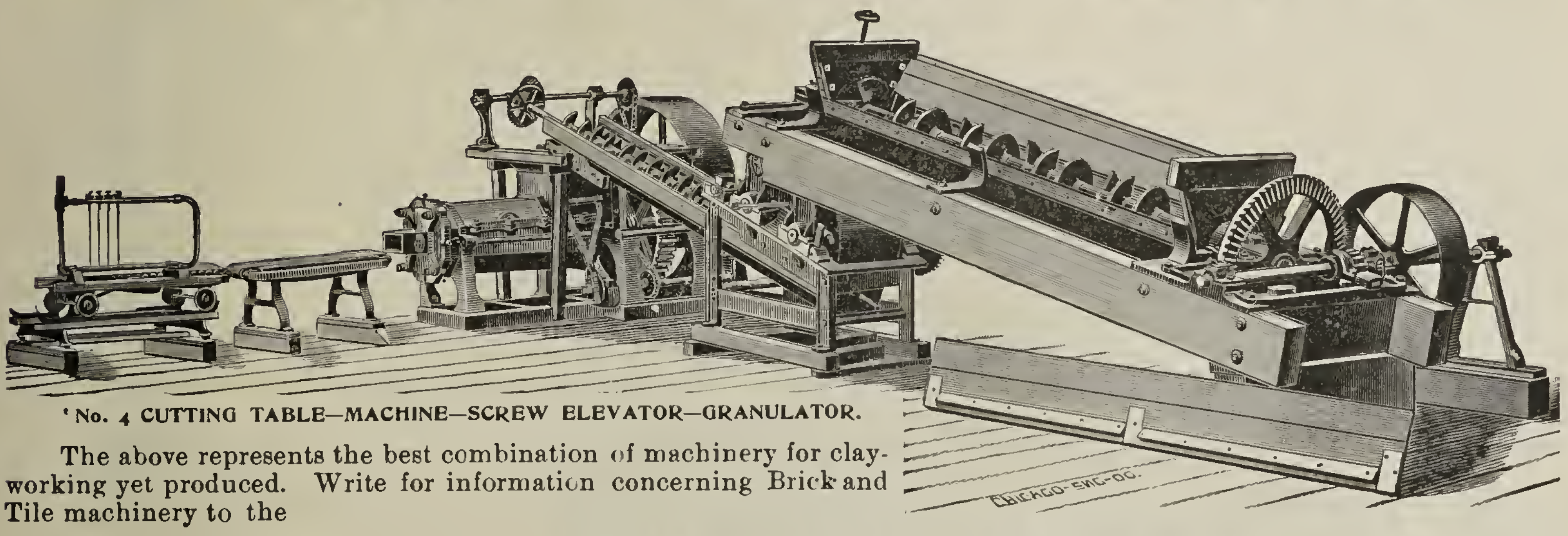
12 Second Hand Machines.

Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER
MANUFACTURING CO
DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.

SEND FOR PRINTED MATTER.

ADRIAN BRICK AND TILE MACHINE CO.


CHICAGO-ENG-CO.

'No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

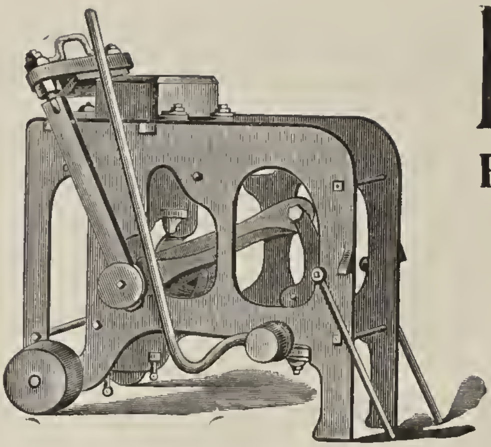
ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

····Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

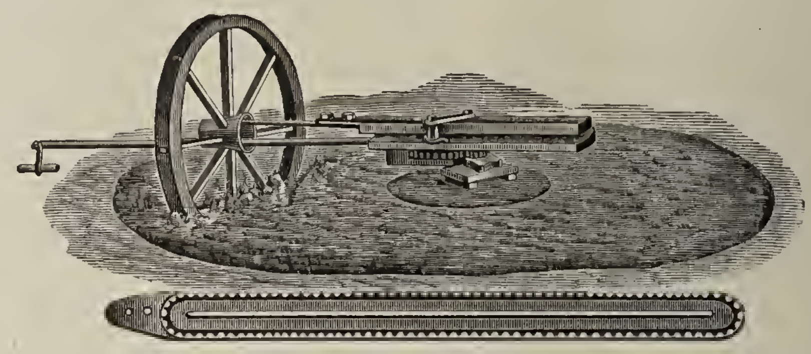


RED BRICK PRESS.

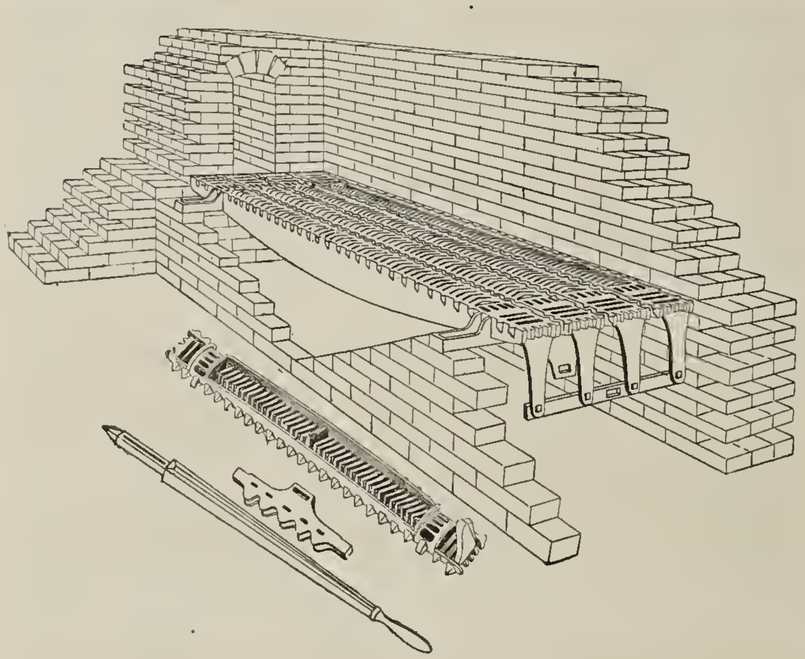
GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.



A Rocking Grate for the Clayworker.

Our Grates give greatest economy of fuel. Cold drafts through furnace are greatly reduced. Why not make cheaper brick?

A good thing: Our Art Catalogue.

Write us.

The Fuller Engineering Co.,

New York,
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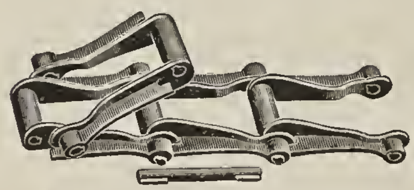
New Orleans,
Charolett, N. C.

Engineers, Founders and Mechanics,
Builders of Oil Mills, Gin and Brick Machinery,
CALVERT, TEXAS.



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

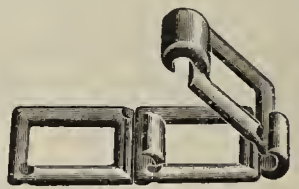
F. H. C. MEY,

Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.

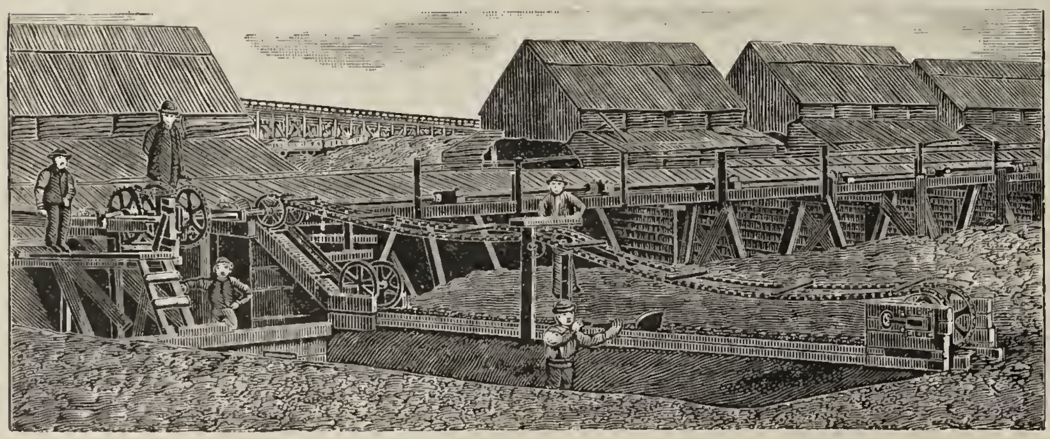


THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

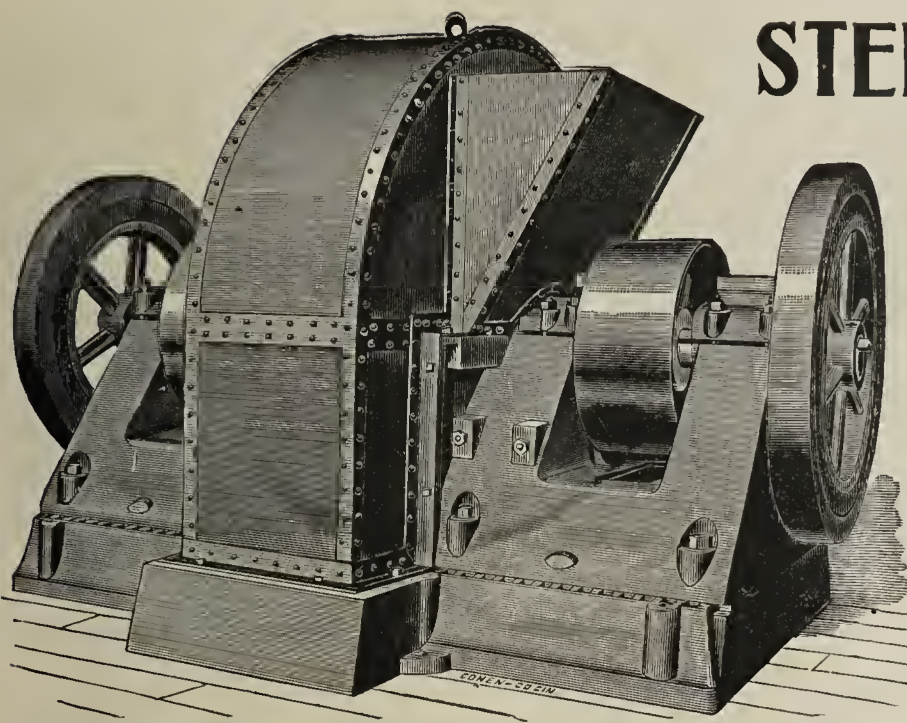
Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.

SEND FOR CATALOGUE.



MEY PATENT CLAY ELEVATOR.



STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it will not clog in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

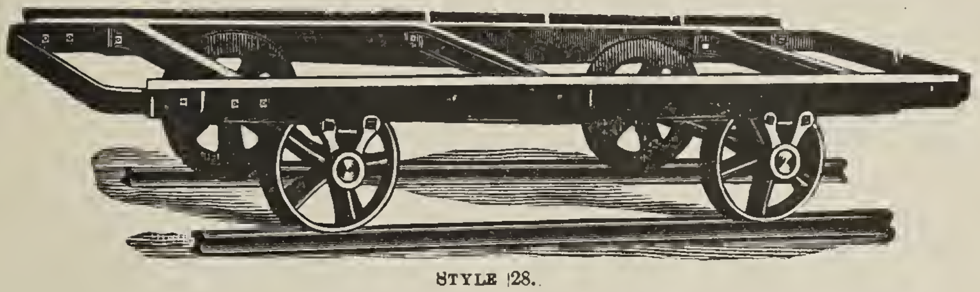
Aurora, Ind.

BRICK CARS.

THE BEST!

For carrying all kinds of brick. Over 15,000 in use. It will pay you to inform yourself fully.

Write Us.
Visit Us.



STYLE 128.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

BRICK MACHINERY.
OFFICE & SALES ROOM.
298 & 300 JACKSON BOULD.
FACTORY 7 & 9 GARDEN ST.
TELEPHONE W. 778
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C.T. DRAKE.
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DRAKE'S STANDARD MACHINE WORKS
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BRICK MACHINERY
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298 & 300 JACKSON BOULD.
FACTORY 7 & 9 GARDEN ST.
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DRAKE'S STANDARD MACHINE WORKS
7 & 9 GARDEN ST.

OUR NEW PERCUSSION SCREEN **Is the Latest and Best Device for Screen Clay, Lime, Cement, Etc.**

Prof. Dr. H. Seger and E. Cramer,

6 Krupp Street, BERLIN, GERMANY,

CHEMICAL LABORATORY FOR THE CLAY INDUSTRY.

Raw materials and products of the Brick, Stoneware, China, Lime and Cement industries examined and advice given.

Flaws in the methods of manufacture corrected.

Many years experience.

Laboratory for the German Association of Refractory Clay Ware Manufacturers.

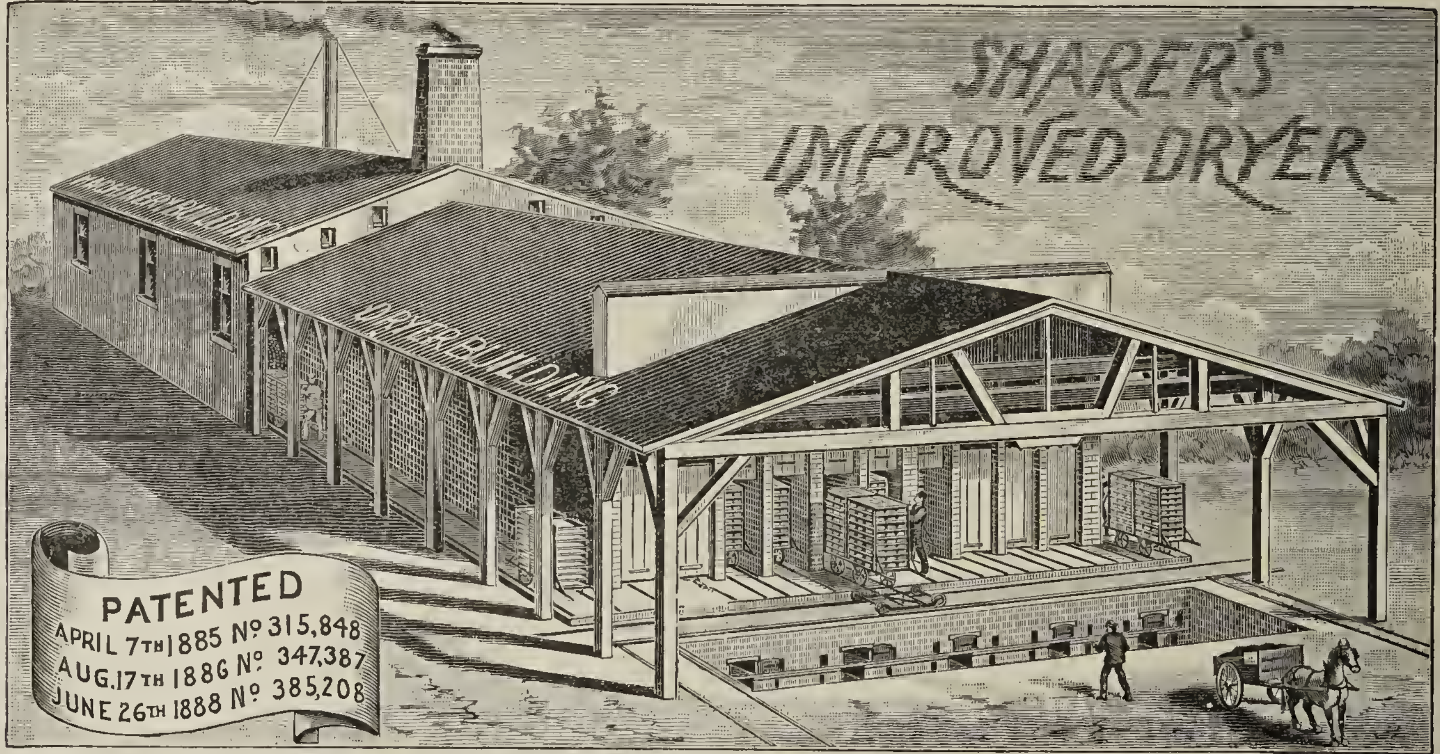
Manufacturers of the Seger pyrometrical cones.

Publishers of **Die Thonindustrie Zeitung**, the leading Ceramic weekly of Germany.

Organ of the German Association of Brick, Clay Ware, Lime and Cement Manufacturers; of the German Association of Refractory Clay Ware Manufacturers; of the Association of German Portland Cement Manufacturers, and of the Brick Trade Assembly.

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.


SHARER'S IMPROVED DRYER
MACHINERY BUILDING
DRYER BUILDING
PATENTED
APRIL 7TH 1885 Nº 315,848
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COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address GEO. W. SHARER, 2224 Tioga St., Philadelphia, Pa.

ALSIP'S

LATEST IMPROVED DOWN AND UP DRAFT KILN

It Has Been Thoroughly Tested, and Every Kiln is Giving Perfect Satisfaction.

Why take any chances when you can buy a kiln that will burn the ware uniform from top to bottom, from side to side, and from end to end? This is just what the Alsip Kiln does.

It will save **time, labor** and **money,** if you will thoroughly investigate our Latest Improved Kiln before deciding on any kiln.

For descriptive circular and further information, address

Wm. & S. H. Alsip,

MENARD, ILL.

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CONLEY AND WOLFE IMPROVED KILN COMPANY, of TARKIO, MO.

OFFICERS:

DAVID RANKIN, PRESIDENT, TARKIO, MO.

JOSEPH CONLEY, VICE-PRESIDENT, MOUND CITY, MO.

W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.

J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

PATENTS:

Nº 477,993, JUNE 28, 1892.
Nº 477,994, JUNE 28, 1892.
Nº 487,174, NOV. 29, 1892.
Nº 491,037, JAN. 31, 1893.
Nº 491,038, JAN. 31, 1893.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

Some Reasons Why You Should Use a "Columbia" Press.

All working parts are made of Steel.

The pressure is direct.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

All cumbrous toggles and levers dispensed with.

The pressure is absolutely equal on top and bottom of brick, also on all parts of the brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

All cog bearings and gearings are out of the way of clay dust.

Any part of the gearing can be removed without taking machine apart.

The mould box can be taken out in a few minutes, without disturbing the other parts of machine.

Every adjustment on the machine is easily and quickly made.

The "COLUMBIA" will work any kind of material whereof a pressed brick can be made, either dry or semi-dry.

The "COLUMBIA" presses clay or shale as dry as a hydraulic press, or so damp as to approximate a stiff mud brick, so that the range of products is from building brick to pavers. No other press does such a variety of work.

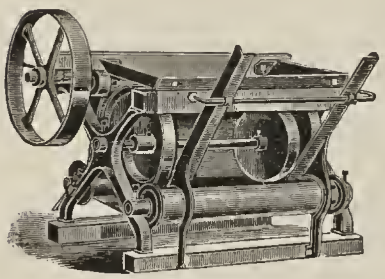
The "COLUMBIA" is the only brick press on the market that meets ALL the needs of a brick plant.

Another Reason Might be Added—That of Price. As the "COLUMBIA" is the Simplest Press made, so ought it to be the Easiest to Build, Hence the Cheapest. . . . .

Investigate all, Understand the Merits of all, and You will Buy a "COLUMBIA."

COLUMBIA MANUFACTURING CO.,
Room 34, De Menil Building, 7th and Pine Sts., - - - St. Louis, Mo.

The Potts Mould Sander

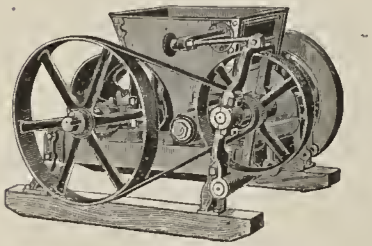


(Patented.)

HAS no sprocket wheels, chains nor gear to wear and break. There is less wear on moulds than when the work is done by hand. The work is better done, they are

Simple in Construction, Strong and Durable.

The Potts Disintegrators



(Patented.)

6 Sizes. Capacity 25,000 M to 150,000 M.

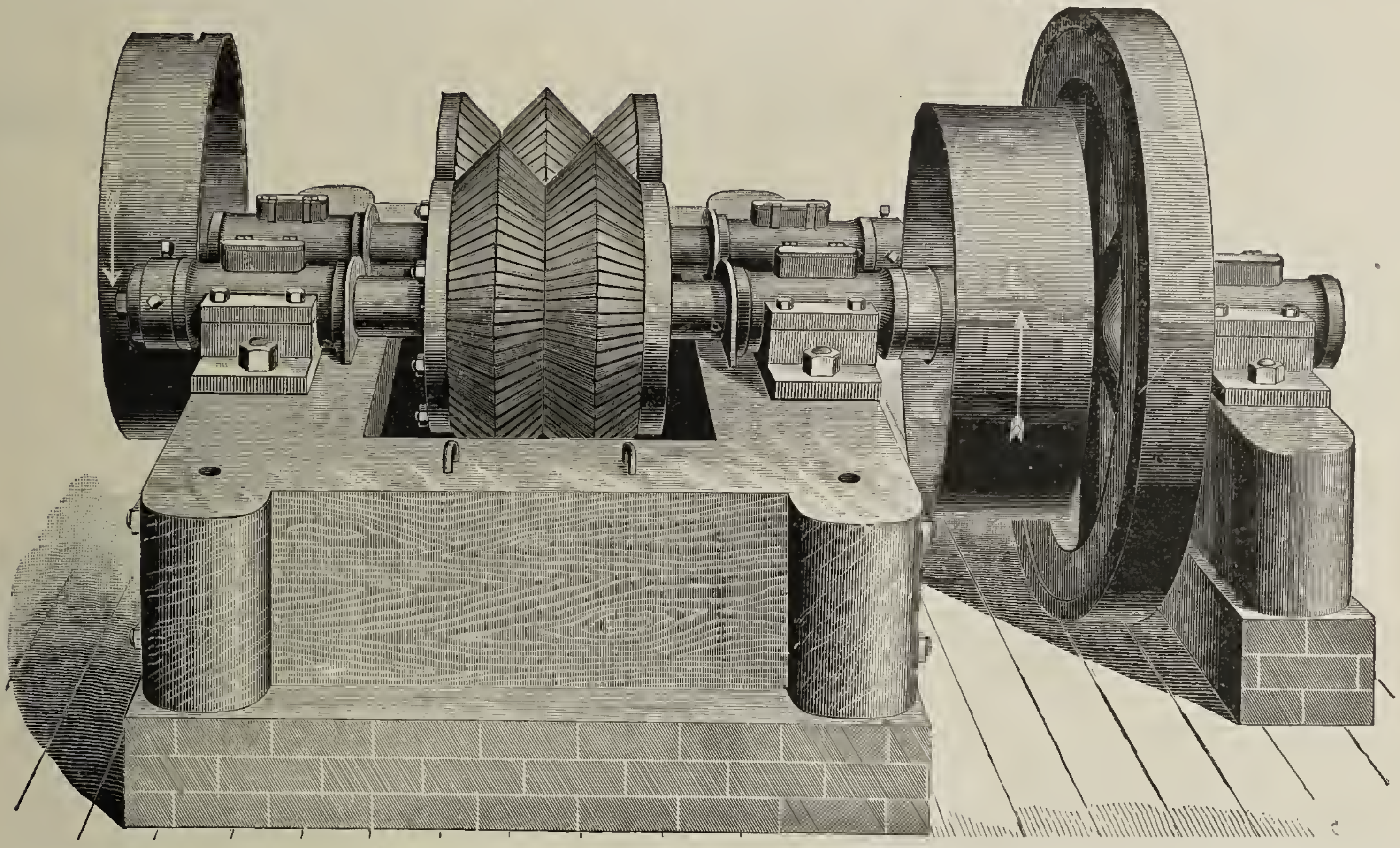
ARE the only machines made that will work any clay direct from the bank, and not choke or clog from hard, dry or wet, sticky clays. They are well built, of good material and will do the work claimed.

Beware of all machines using projecting bars working in combination with smooth roll or ridged abuting surface. **They are Infringement.**

C. & A. POTTS & CO., - Indianapolis, Ind.

NEWELL IMPROVED CLAY PULVERIZER

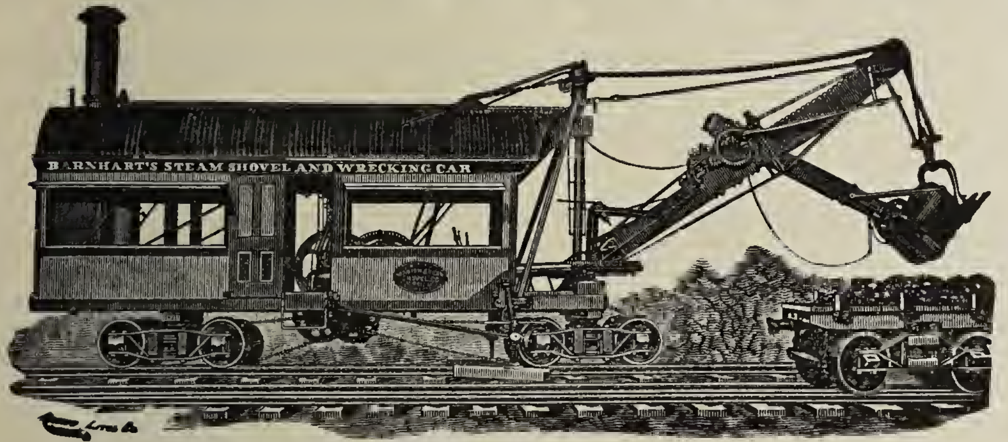
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
26 Cortland and 21 Dey Streets, **New York, U. S. A.**

Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

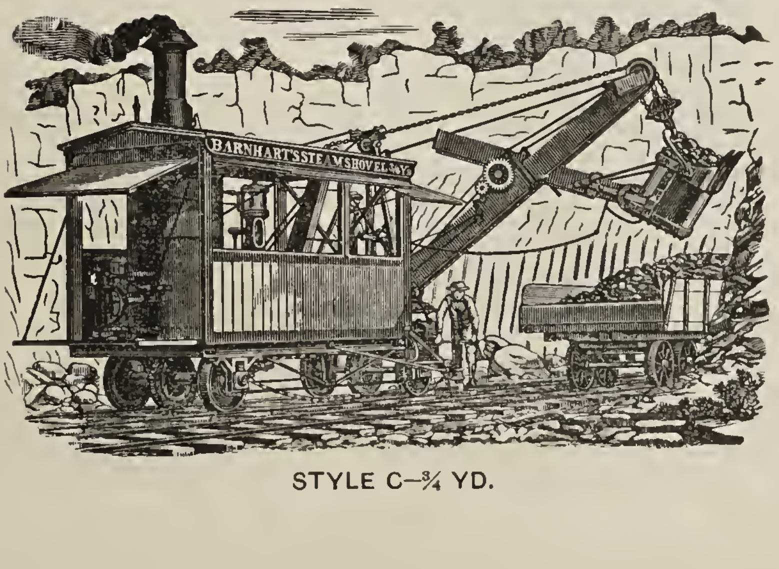
STYLE A—1½ YD.

OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

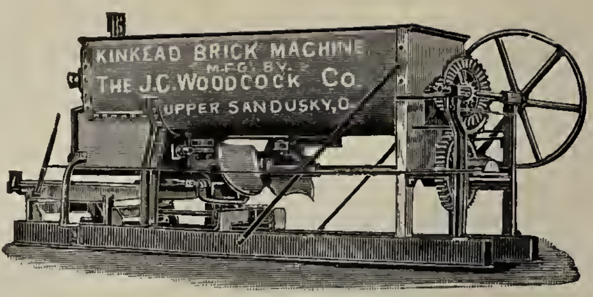
Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,
603 West Center Street, - **MARION, OHIO.**



STYLE C—¾ YD.

A Good Brick Machine:

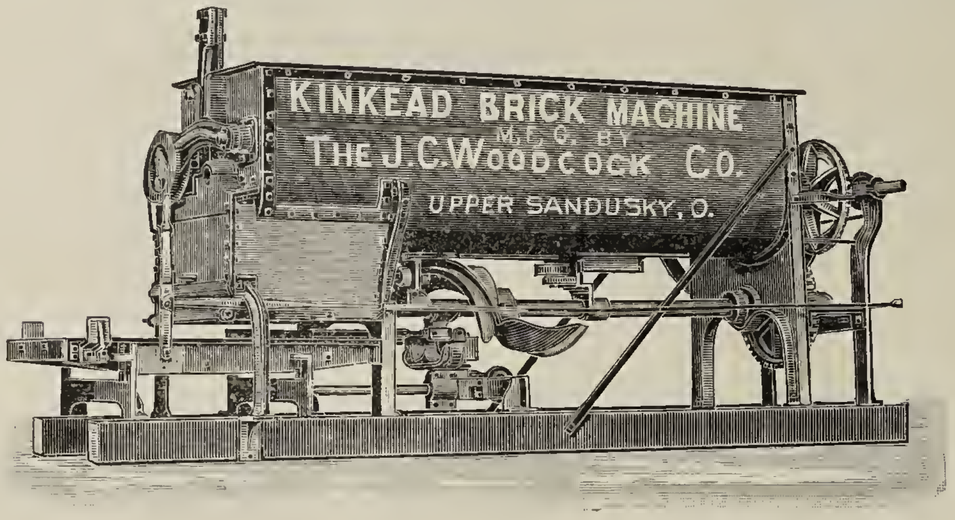

KINKEAD BRICK MACHINE
M'F'G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Rear View.

One that's Strong enough to withstand the severe strain of working stiff clay.

One that's Durable and will not only make good brick under favorable conditions but will make good brick under the varying conditions incident to brickyard work.

One that's Cheap because it is simple in construction and never breaks down or gets out of repairs but will turn out a desired quantity (30 to 50 M) every day, six days in the week is well nigh "worth its weight in gold." **We** offer it to you at a much lower price and also a line of excellent.


KINKEAD BRICK MACHINE
M'F'G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Front View.

Brickyard Supplies:==

Brick Moulds, Trucks and Barrows, Elevators, Pug Mills, Etc.

All warranted to be first-class and on reasonable terms.

Dont fail to get our prices.

**The J. C.
WOODCOCK CO.,
Upper Sandusky, Ohio.**

"LEVIATHAN."

"Upon Earth There is not His Like."

* * *

The T. B. Townsend Brick and Contracting Company.

Zanesville, Ohio, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

Gentlemen:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. Burton, Secretary and Treasurer.

* * *

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

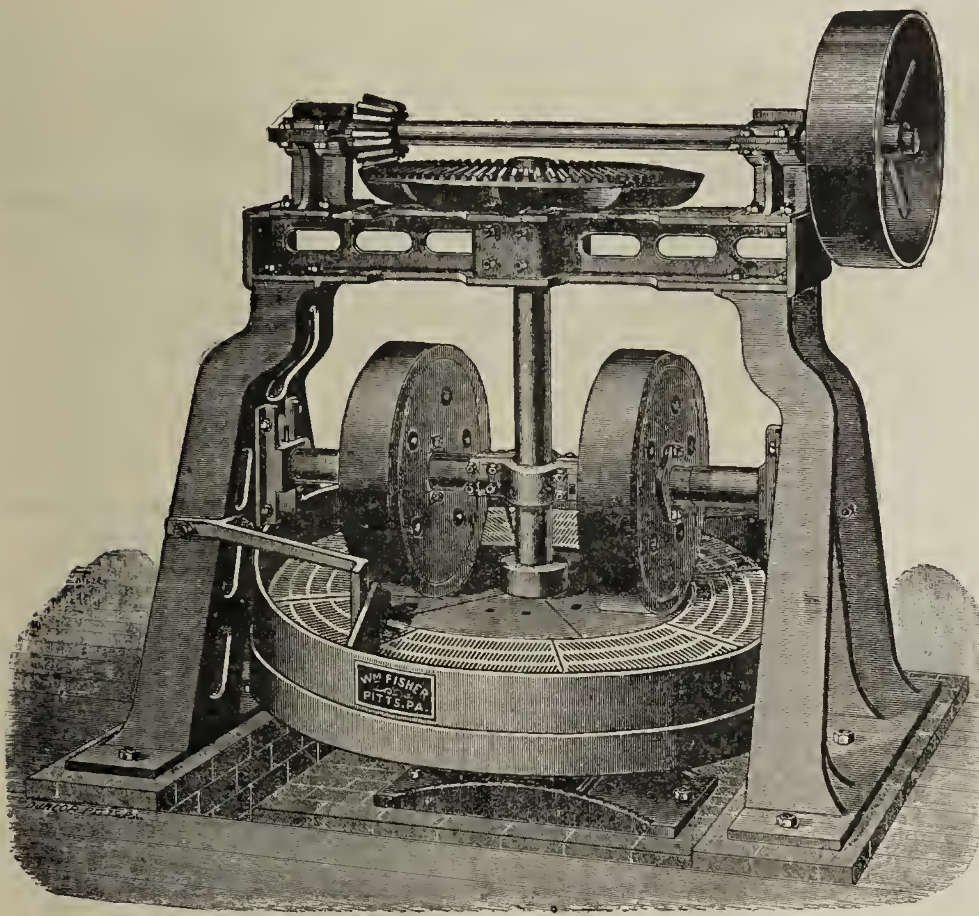
248 Randolph St., CHICAGO, ILL.

PHILADELPHIA:
1219 Carpenter Street.

BOSTON:
120 Pearl Street.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets.
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

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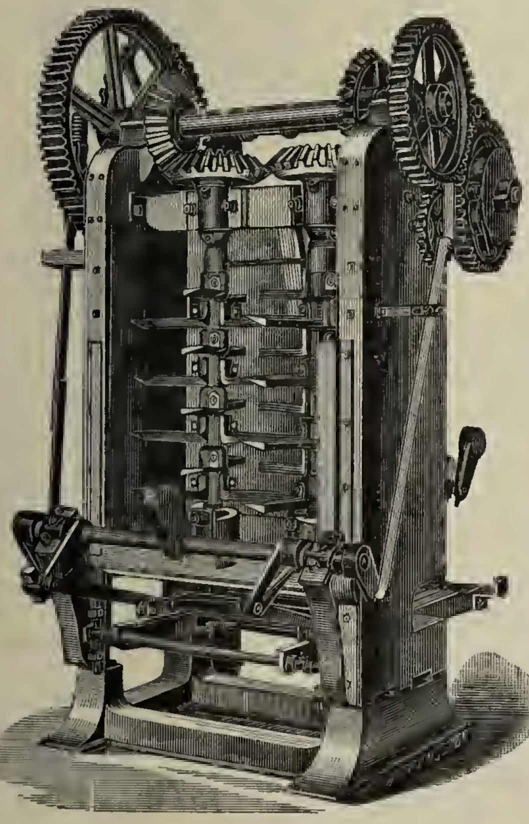
THE DUPLEX

Is the Standard of All Soft Clay Brick Machines.



It is made entirely of iron and steel, thus being very Strong and Durable, Simple in Construction, and makes a much stiffer brick than can be made with any other soft clay machine.

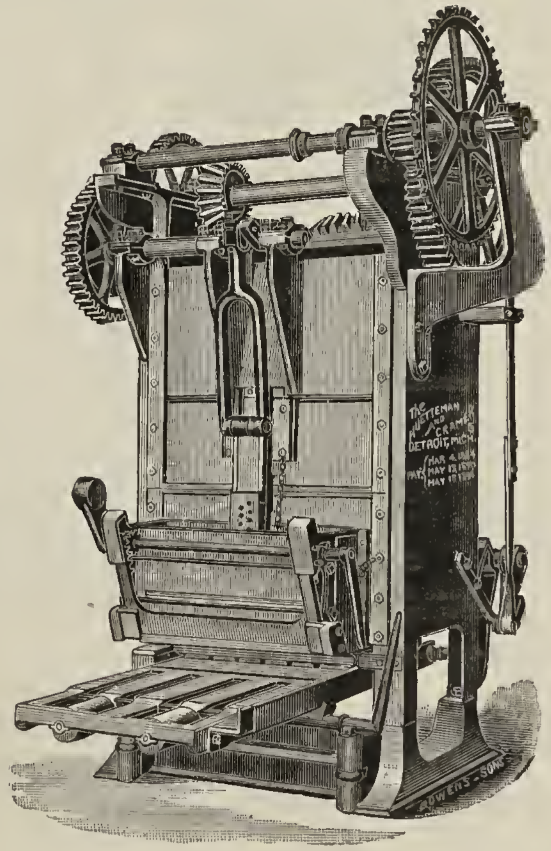
Write for Catalogue . .
. . . and Prices to

The Huetteman & Cramer Co.,

Manufacturers of the Duplex Brick
Machine and general outfit
for brickyards,

12, 14 & 16 Sherman St.,

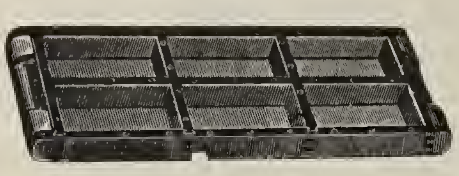
DETROIT, -- MICH.



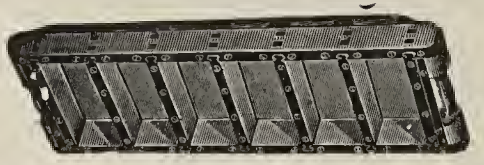
ARNOLD'S BRICKYARD SUPPLIES.

••⊰They are the BEST that are Made.⊱••

3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best.** Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

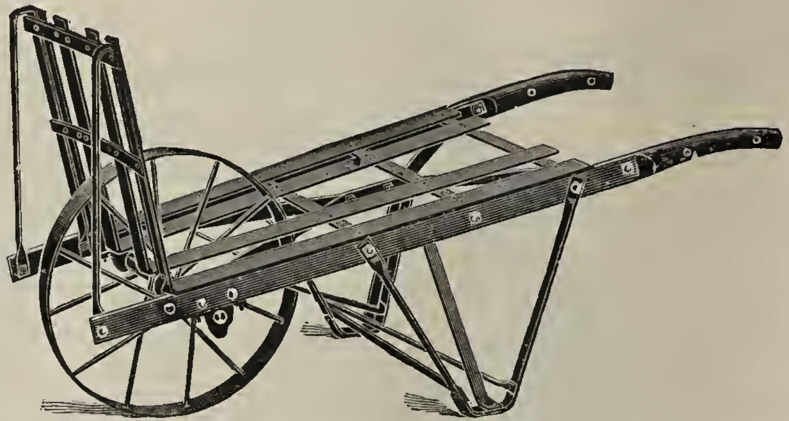
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

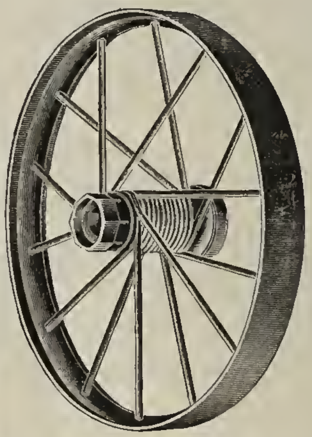
All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.





METAL WAGON WHEELS

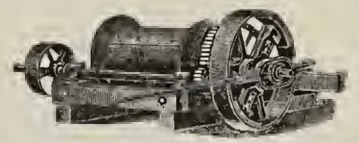
MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The *strongest* wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced.

Circular and prices sent on application. Address

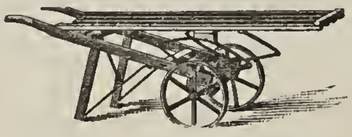
The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

If You Want Supplies

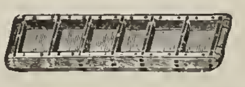
Of Any Kind



Friction Winding Drums.
Spur or bevel gear to suit any location.



Trucks for Brick or Tile.
One or two wheels.



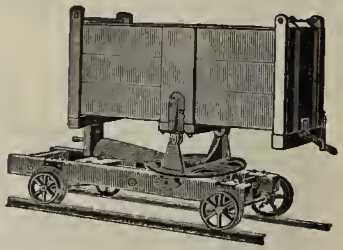
Brick Moulds.
Made from the best cherry, either for Hand or Machine.

Which are made from the best material, and the best workmanship, and at prices far below any, we can give it to you.

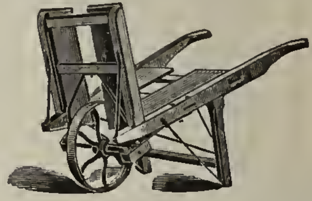
• • •

We manufacture all our goods therefore know what grade of material is used in their construction. You buy from the manufacturer and save all commissions.

• • •



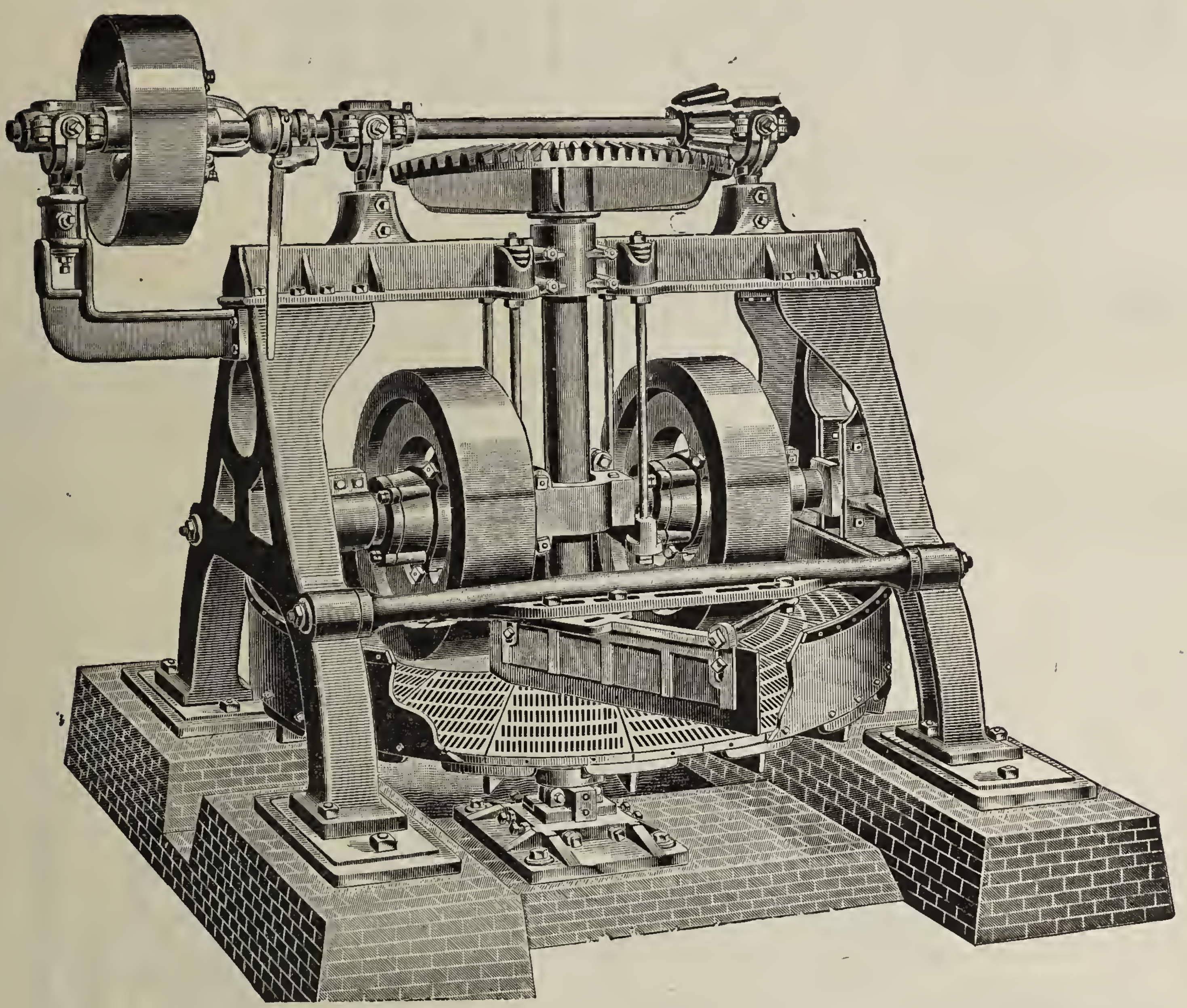
Dump Cars.
Side, bottom or revolving dump. Having chilled wheels, standard car boxes.



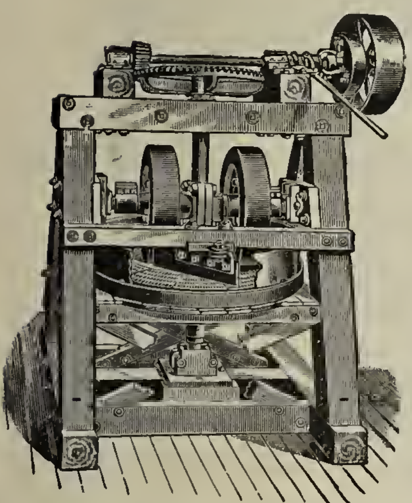
Brick Barrows.
With or without springs.

G. & A. POTTS & CO.,

420-428 West Washington Street, (Old National Road,) *INDIANAPOLIS, IND.*

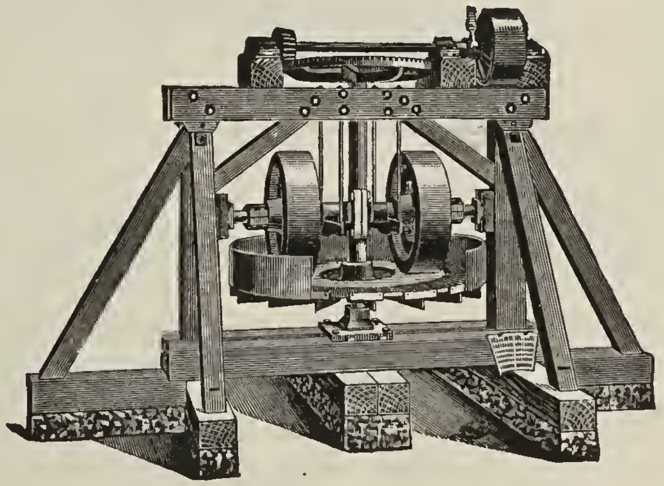


OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



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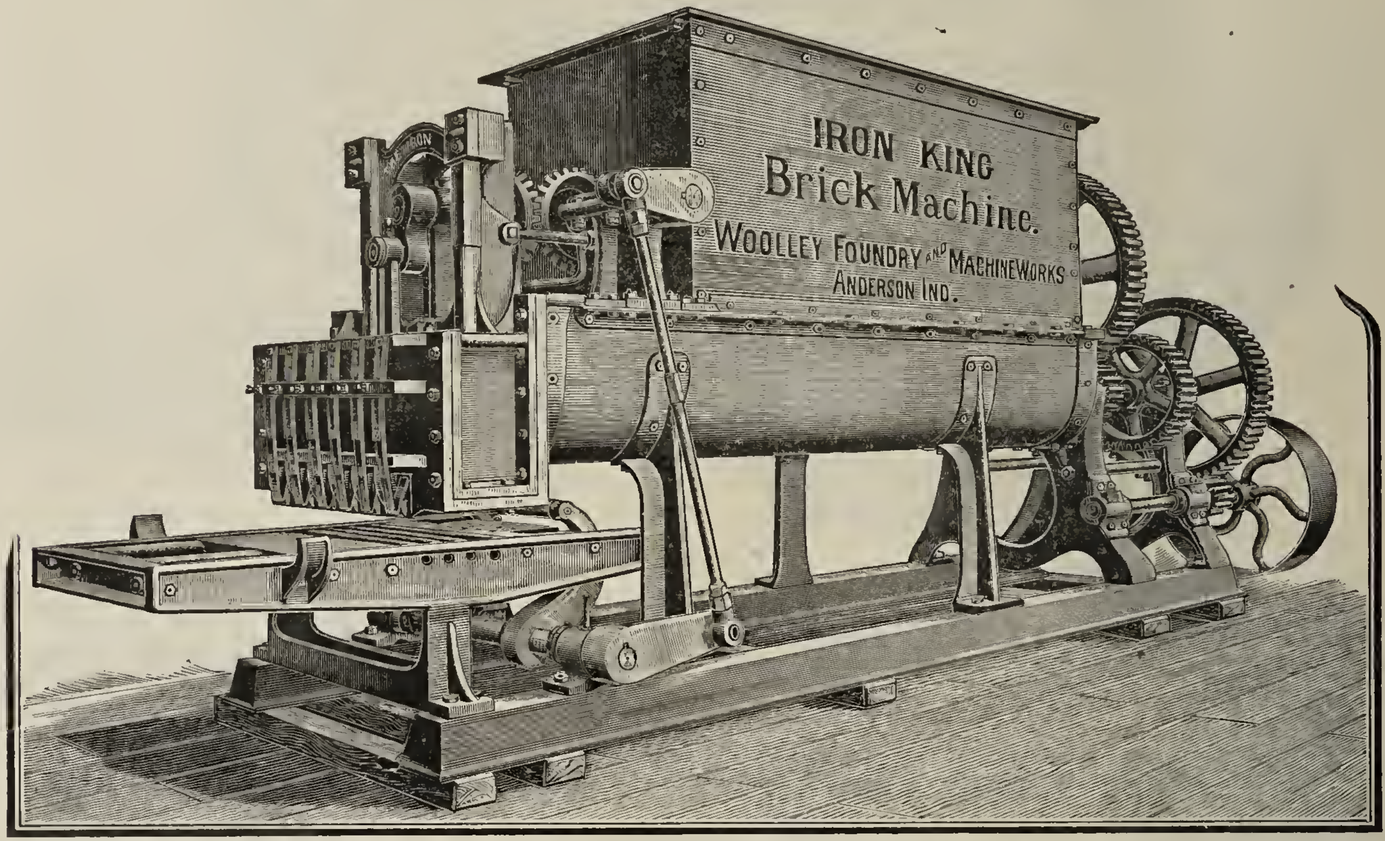
FROST ENGINE CO., Galesburg, Ill.,
U. S. A.

Great Strength—

Is a necessary factor in all Brickmaking Machinery, but that is not all that is required. To be effective a Brick Machine must have mechanical features that enable it to perform its work regularly though under varying conditions. In other words

The Successful Brick Machine

Is constructed on scientific principles. That is the kind of a machine we offer. **The IRON KING** is what its name implies—a monarch of strength. It is no experiment but has demonstrated great capacity and endurance in real every day brickyard use. It makes good brick without any hitches or break downs, and molds them so stiff they bear handling.


IRON KING
Brick Machine.
WOOLLEY FOUNDRY AND MACHINE WORKS
ANDERSON IND.

The Iron King....

Does this not merely by "main strength and awkwardness" but by virtue of peculiar methods of construction by which the clay is thoroughly tempered or pugged and then subjected to greater pressure than in any other machine using a sanded mould.

Brickmakers who want the best soft clay machine, and remember the best is the cheapest, are requested to investigate the merits of The **IRON KING**. It has many.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

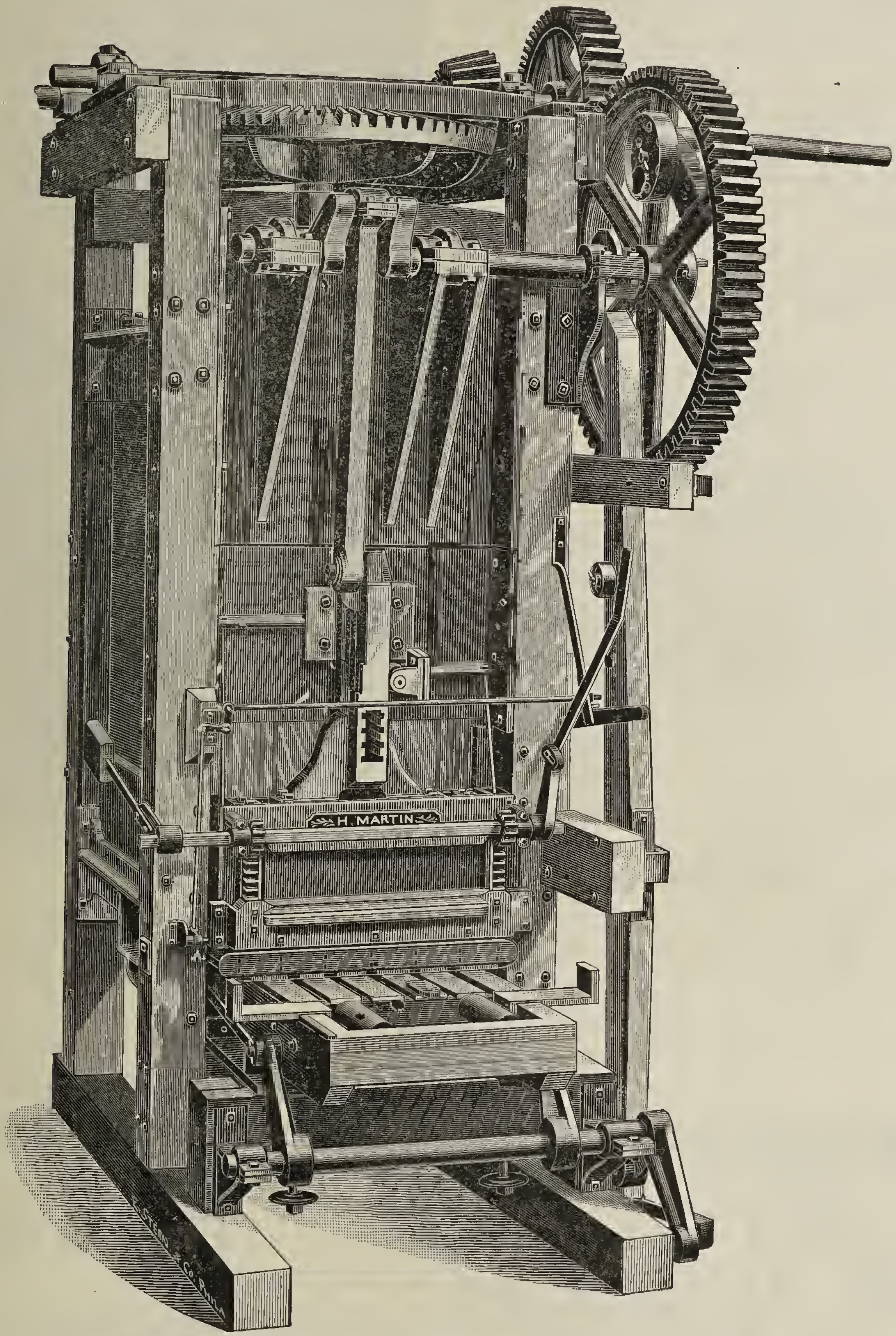
Inquire at the Largest and
Best Know Brick Plants using **The "Martin"**

And they Will Tell You Why

It Stands at the Head of Soft Mud Brick Machines.

ESTIMATES CHEERFULLY FURNISHED.

WE KEEP EVERYTHING REQUIRED ON A BRICKYARD.



MARTIN'S LETTER "A."

The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

LANCASTER, PENN.

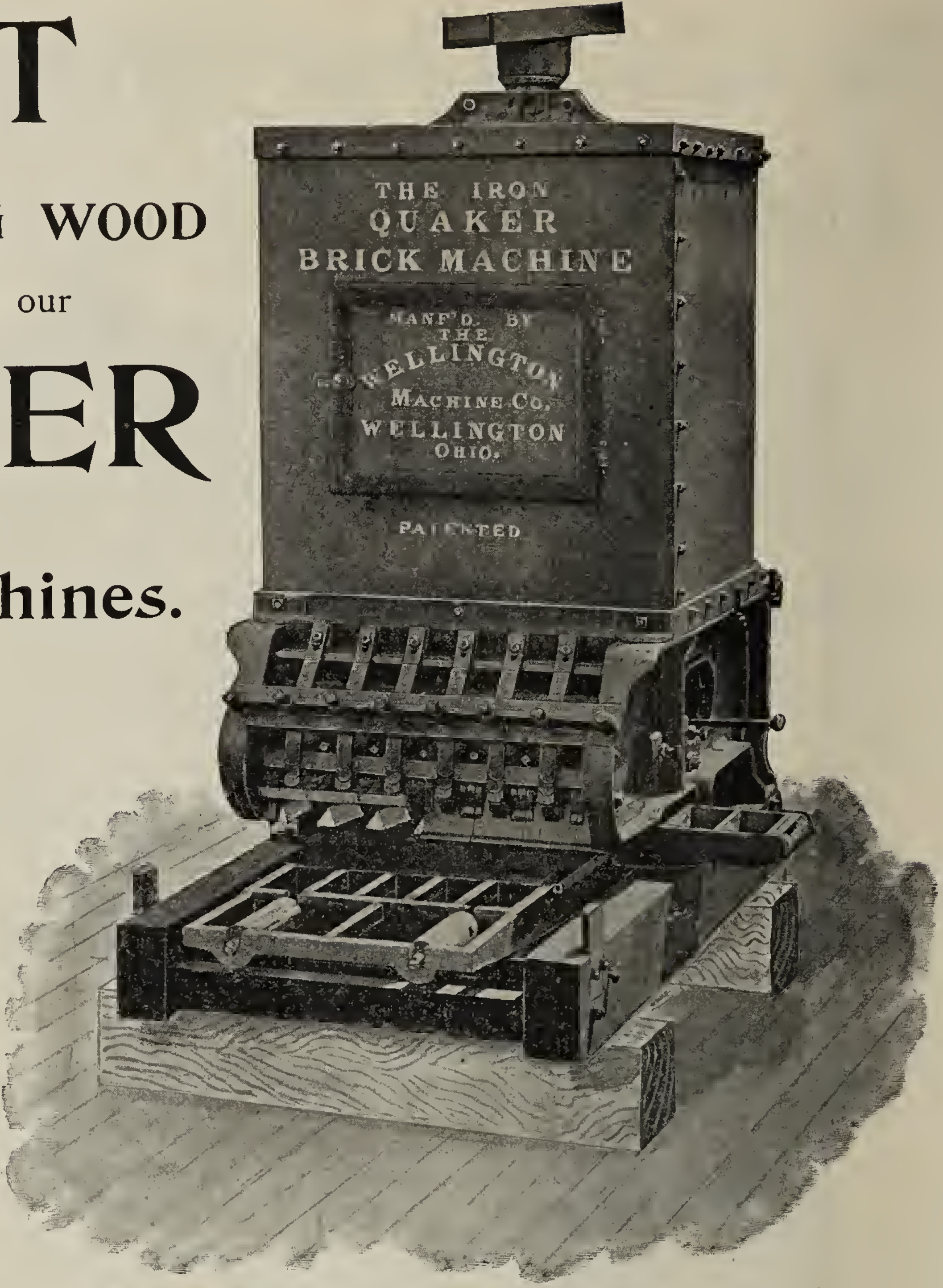
WE'VE QUIT

......USING WOOD

In the construction of our

QUAKER

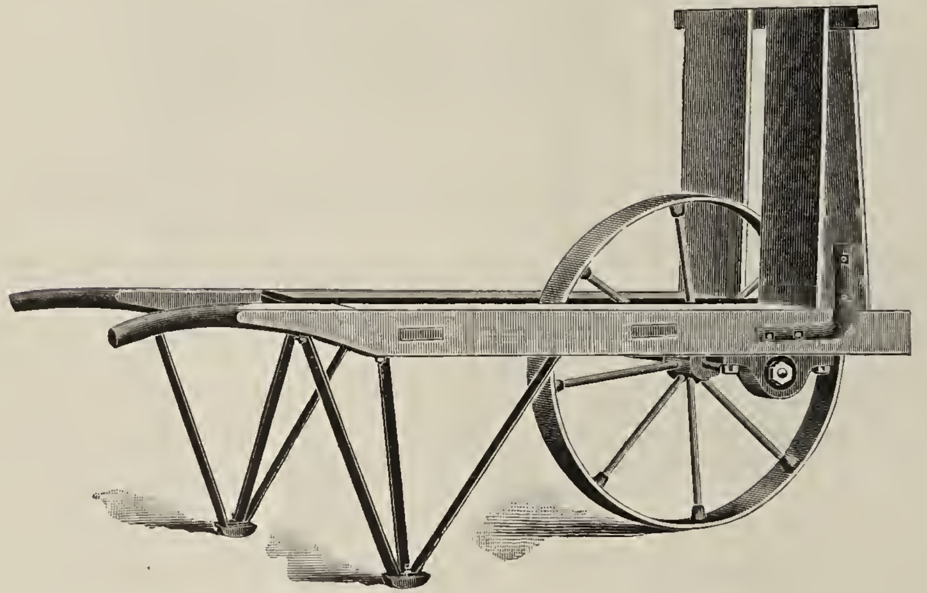
Brick Machines.



Two Styles:
Horse-Power.
Steam-Power.

Horse-Power can be changed to Steam-Power whenever desired.

PRICES NO HIGHER THAN BEFORE.



Ball-Bearing Brick Barrow

A user writes: "Send four more. There's a fight every morning among the hands, as to who shall have it, and then he wheels 15 per cent. more brick than any of the rest."

WE ALWAYS DEVOTED

Especial attention to supplies, etc., and have the largest line, and we think the best goods.

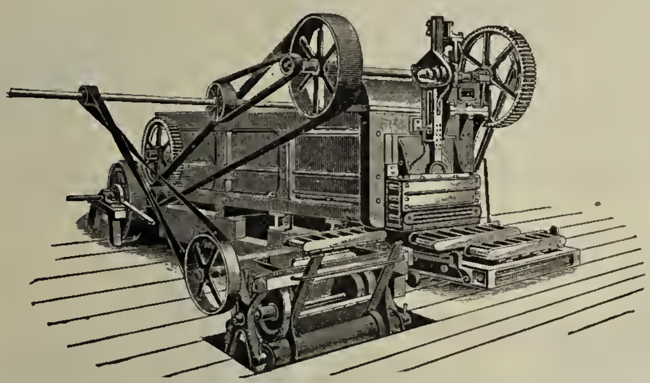
The Wellington Machine Co.,

DROP
A CARD
IN THE SLOT
AT YOUR P. O.
FOR CIRCULAR.

Wellington,
Ohio.

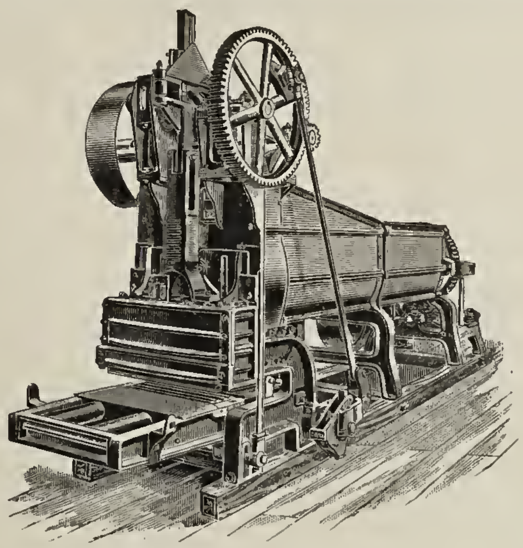
THE POTTS Horizontal Stock Brick ...Machines.

These machines have replaced a great many Vertical Machines and extra Pug Mills. They have never failed to do more and better work.



No. 1 WOOD FRAME PUG MILL, IRON FRONT and TABLE.
Over 250 In Actual Use.

The No. 1 Machine will make **more and better** brick than can be done by any machine on the market.



No 2 ALL IRON.
15 Sold the Past Season.

The No. 2 Machine has the reputation of being the best built on the market, it is without a doubt the **largest, heaviest and strongest** machine ever offered the trade.

Any person contemplating making sand mould brick will do well to investigate the merits of the above machines.

Remember that it is not always the cheapest, which is the best.

We manufacture a full line of Clayworking Machinery and Brickyard Supplies.

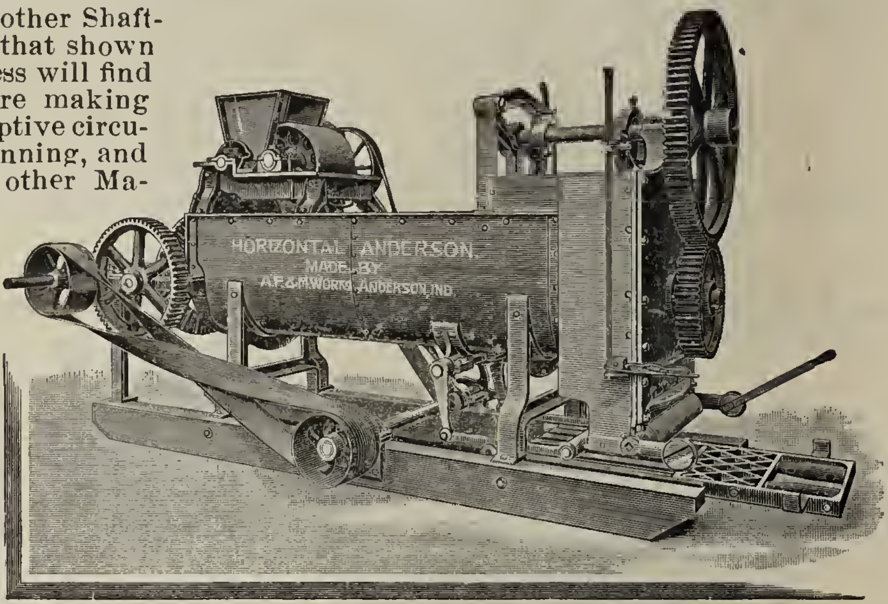
C. & A. POTTS & CO.,
420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.

A New Departure in Brick Machinery

THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.

This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.


HORIZONTAL ANDERSON.
MADE BY
A.F.&M.WORKS ANDERSON, IND.

* * *

INDIANAPOLIS, IND., March 20, 1894.

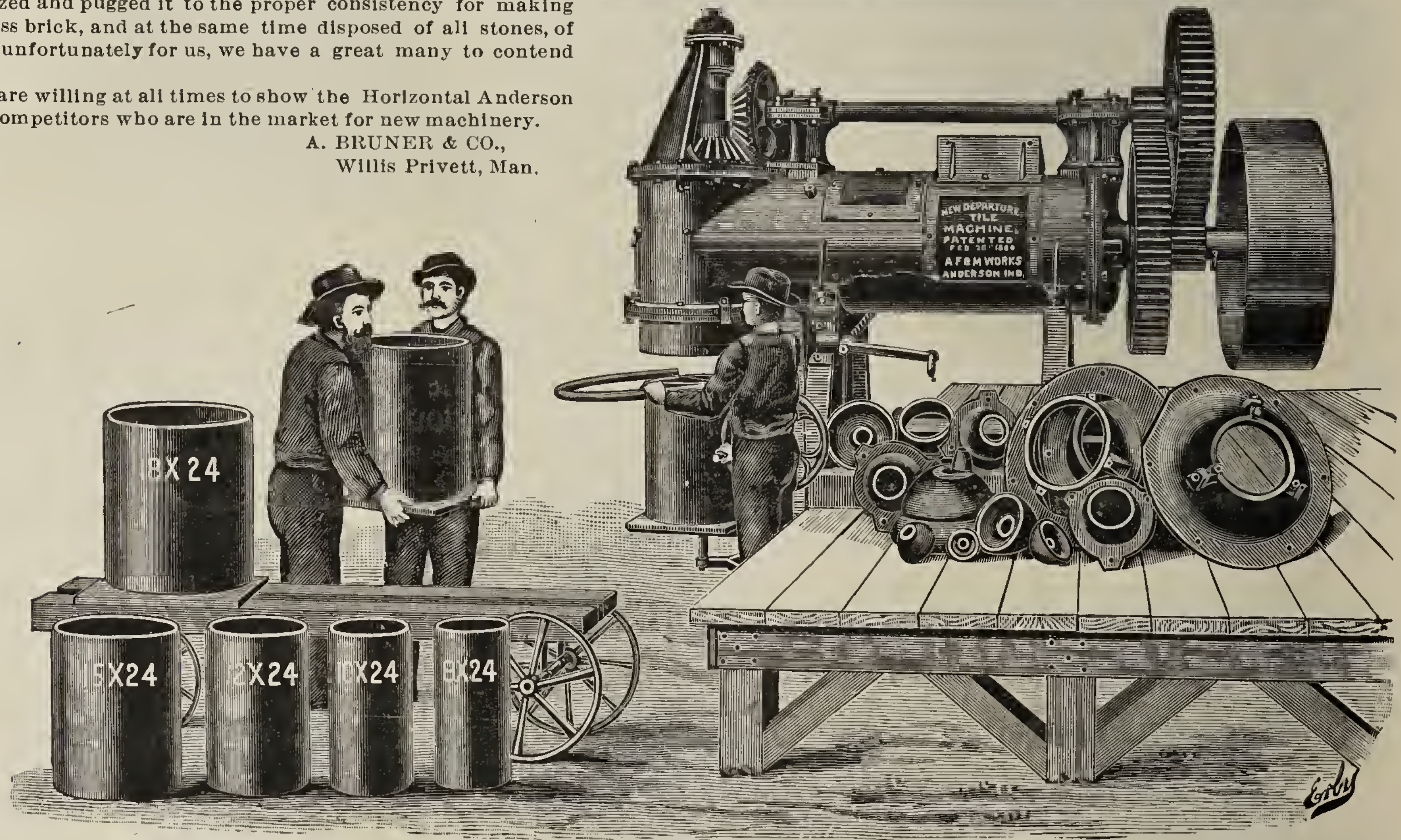
ANDERSON FOUNDRY AND MACHINE WORKS,
Anderson, Ind.

Gentlemen:—It affords us much pleasure to state that the Horizontal Anderson Brick Machine purchased of you last season has given us the best of satisfaction. We have owned and operated eight different Brick Machines previous to this one, and we do not hesitate to pronounce the Horizontal Anderson superior to any and all of them.

We operated the machine during the extremely dry weather of last season and found that no matter how dry and hard the clay was when taken from the bank, the machine thoroughly pulverized and pugged it to the proper consistency for making first-class brick, and at the same time disposed of all stones, of which, unfortunately for us, we have a great many to contend with.

We are willing at all times to show the Horizontal Anderson to our competitors who are in the market for new machinery.

A. BRUNER & CO.,
Willis Privett, Man.


NEW DEPARTURE TILE MACHINE, PATENTED FEB 26
A F & M WORKS ANDERSON IND.
18X24
15X24
12X24
10X24
8X24

THE GREATEST ON EARTH.

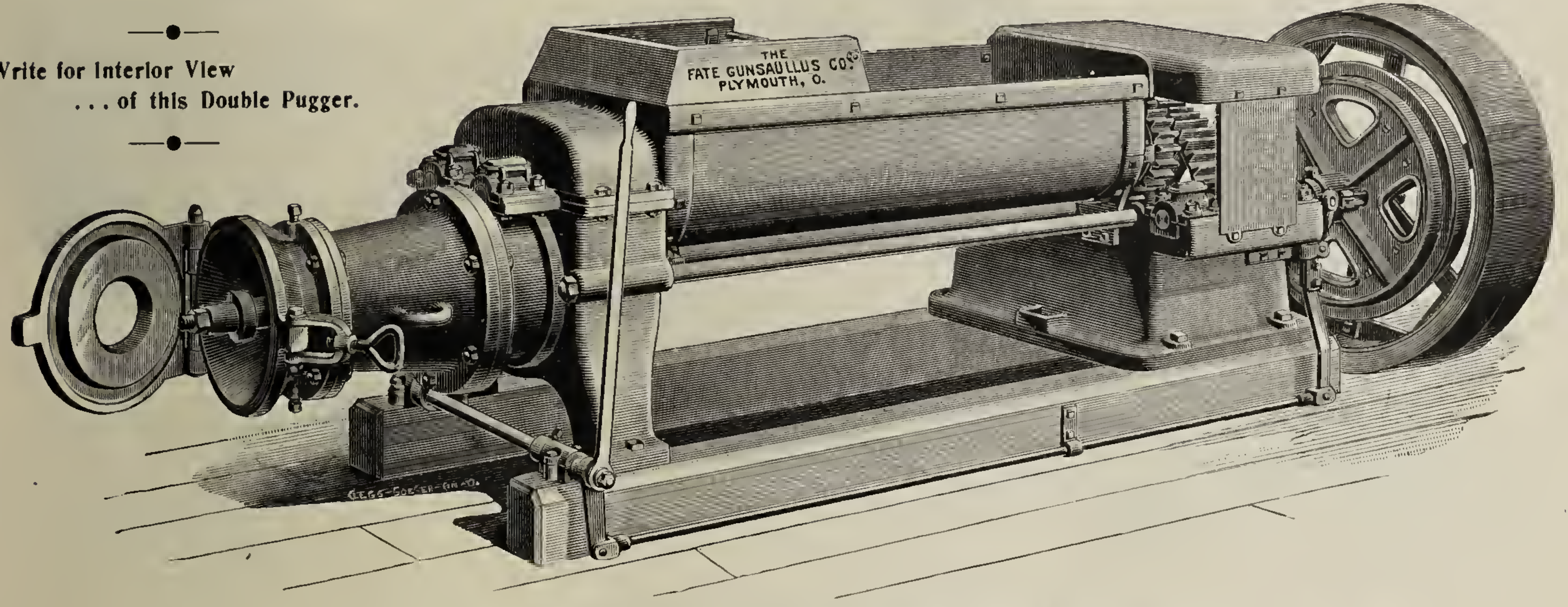
We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.

DOWN DELIVERY FOR LARGE TILE. SIDE DELIVERY FOR SMALL TILE.

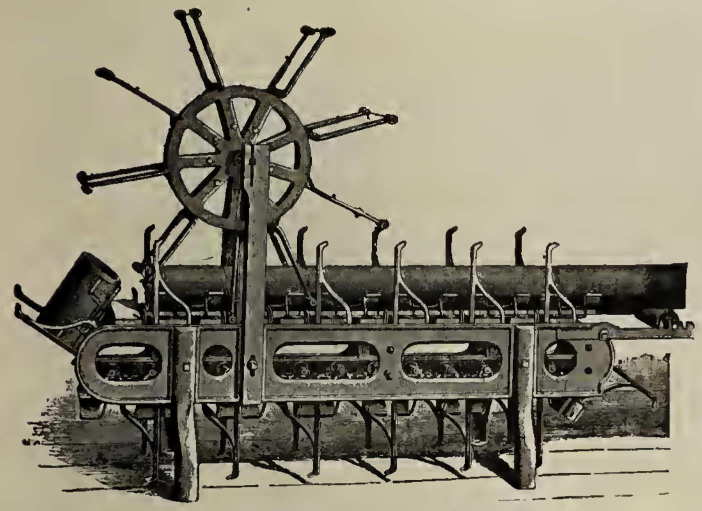
THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.

The "PLYMOUTH."

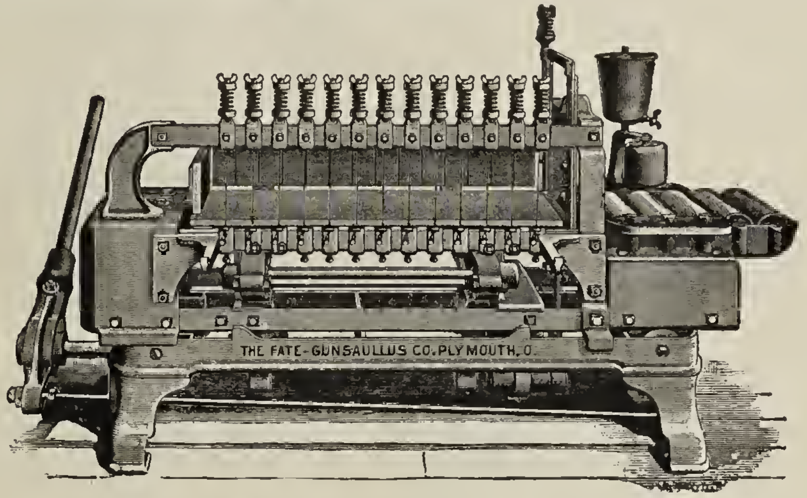
Write for Interior View
... of this Double Pugger.


THE FATE GUNSAULLUS CO. PLYMOUTH, O.

The "HUMMER" Combined Pug Mill, Brick and Tile Machine.



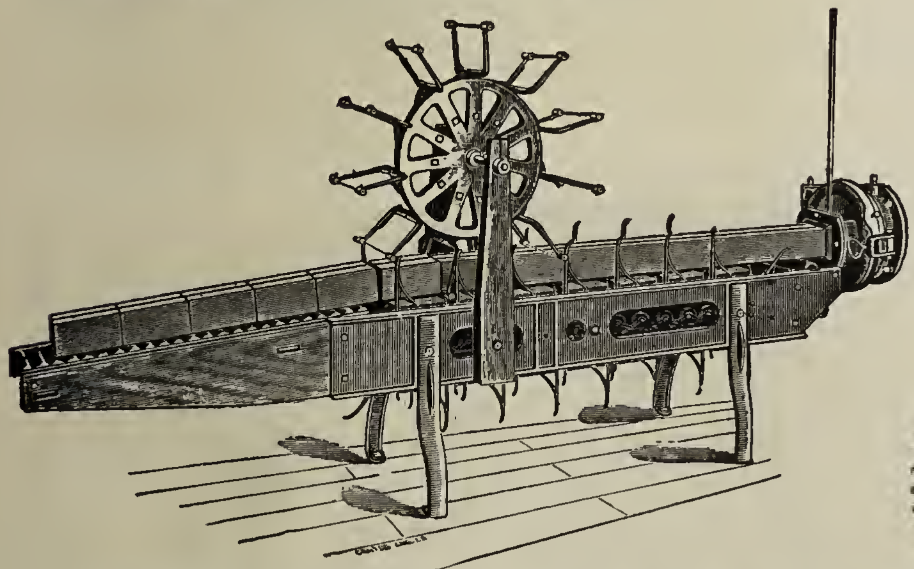
Automatic Table for Tile 2½ to 8-inch and Hollow Blocks.


THE FATE-GUNSAULLUS CO. PLYMOUTH, O.

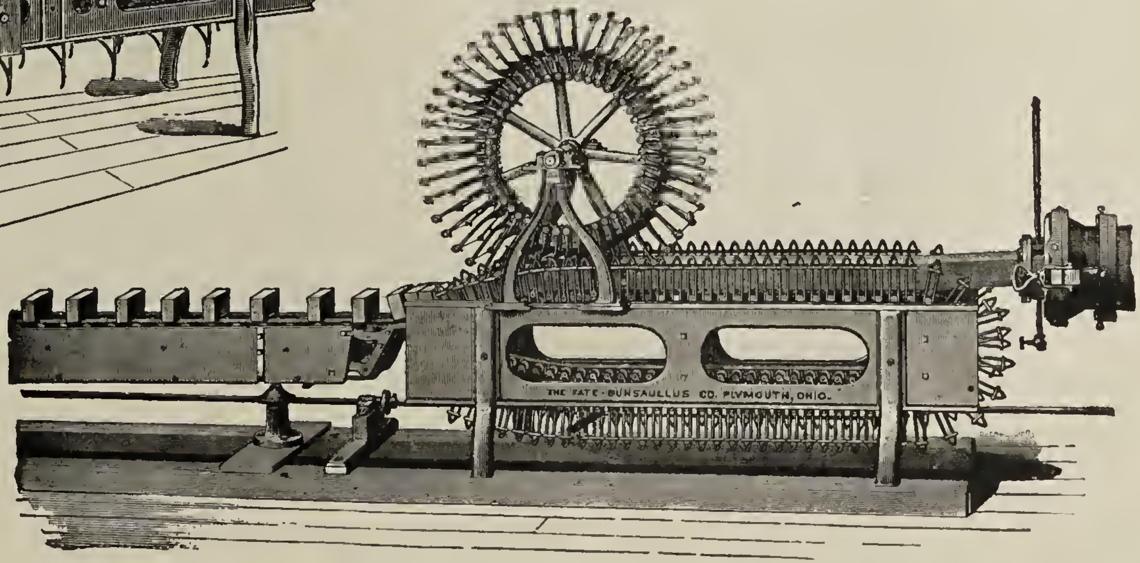
Board Delivery Side-Cut Table.

The Happy Family

All work together in Harmony. . . .



Automatic End-Cut Brick Table.


THE FATE-GUNSAULLUS CO. PLYMOUTH, OHIO.

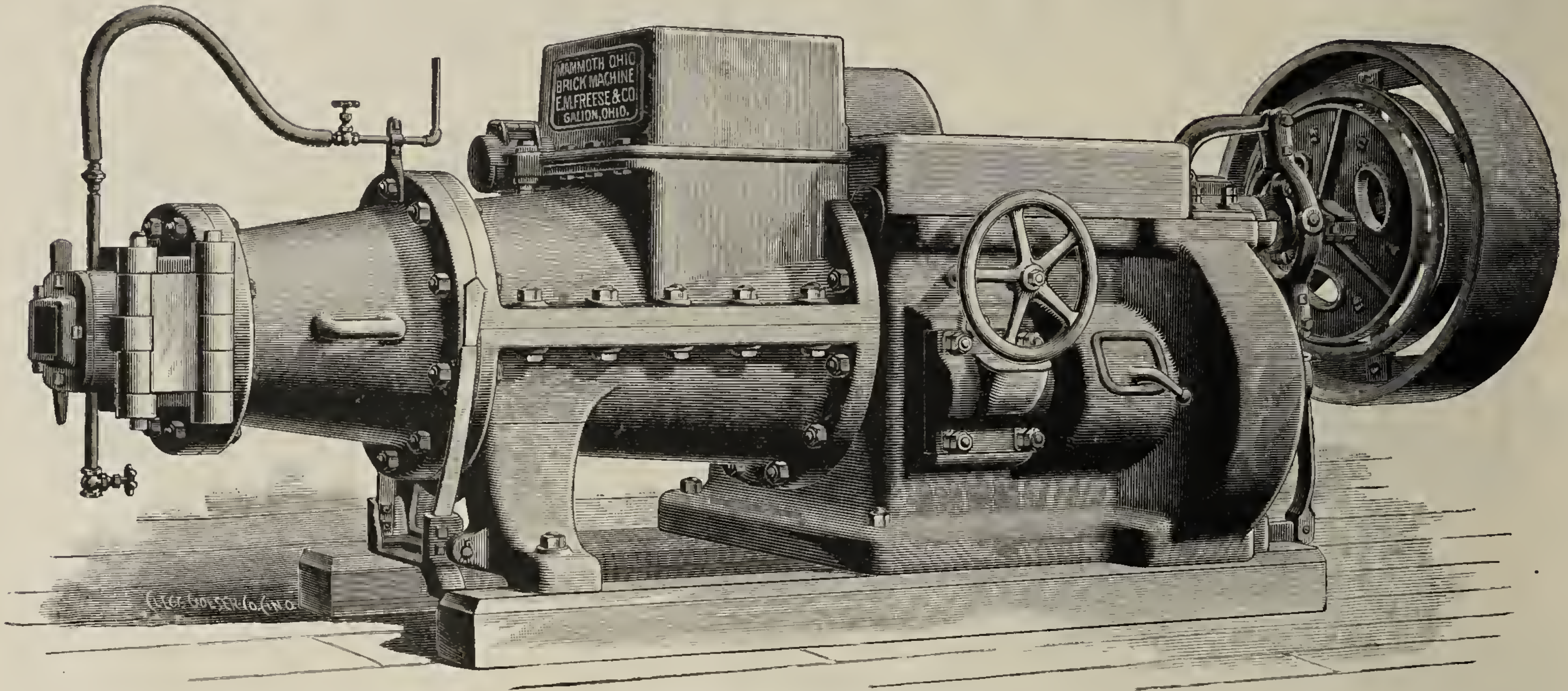
Automatic Side-Cut Brick Table.

Write for particulars to

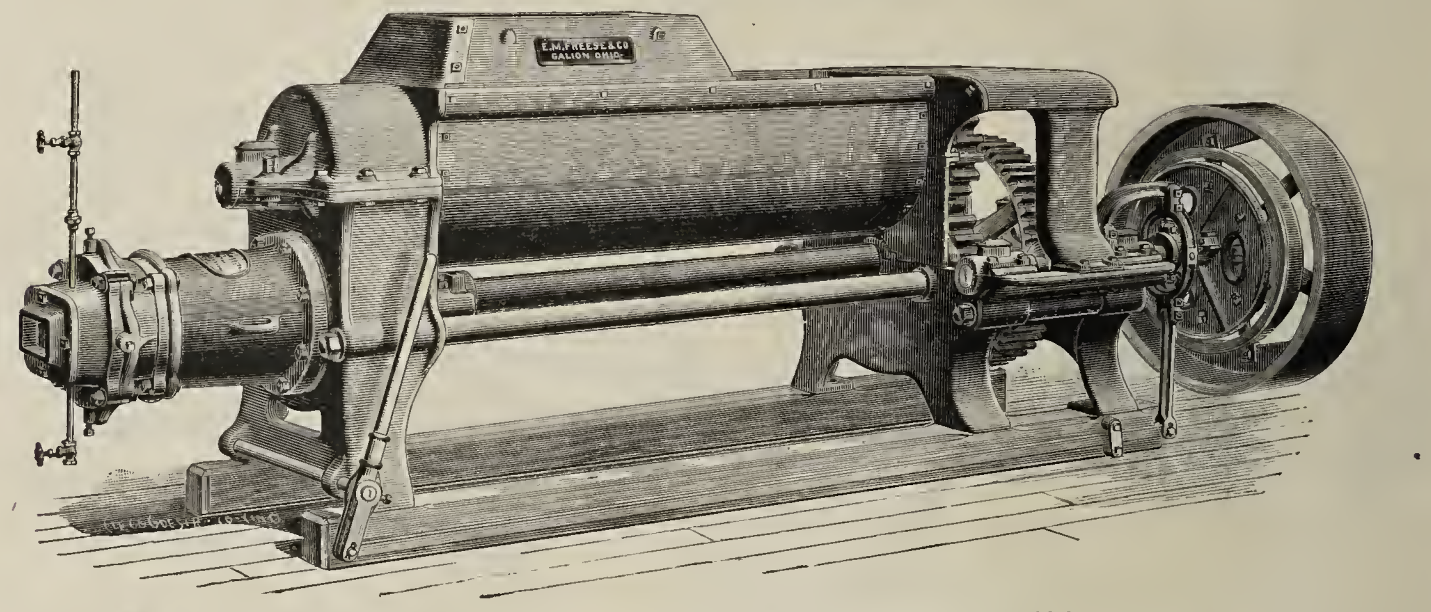
The Fate-Gunsaullus Co.,

PLYMOUTH,
Richland Co., OHIO.

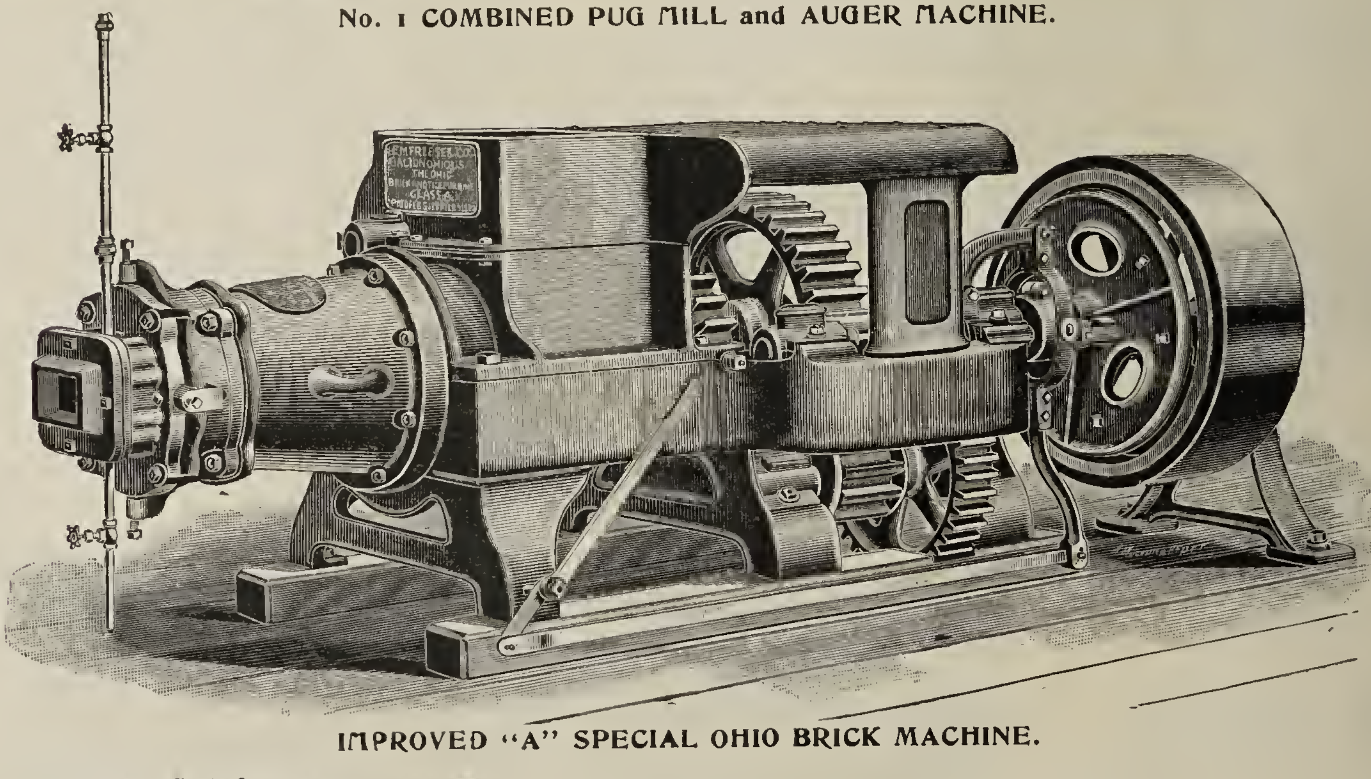
E. M. FREESE & CO., GALION, OHIO.



MAMMOTH BRICK MACHINE.

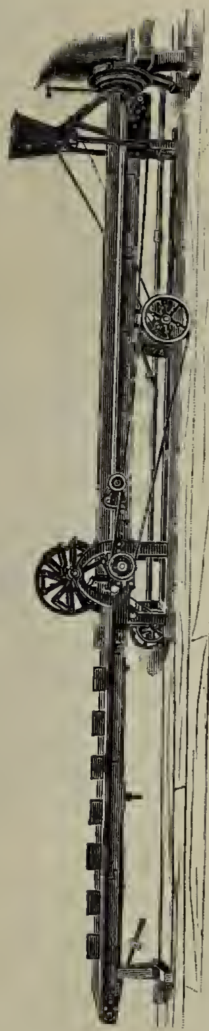


No. 1 COMBINED PUG MILL and AUGER MACHINE.

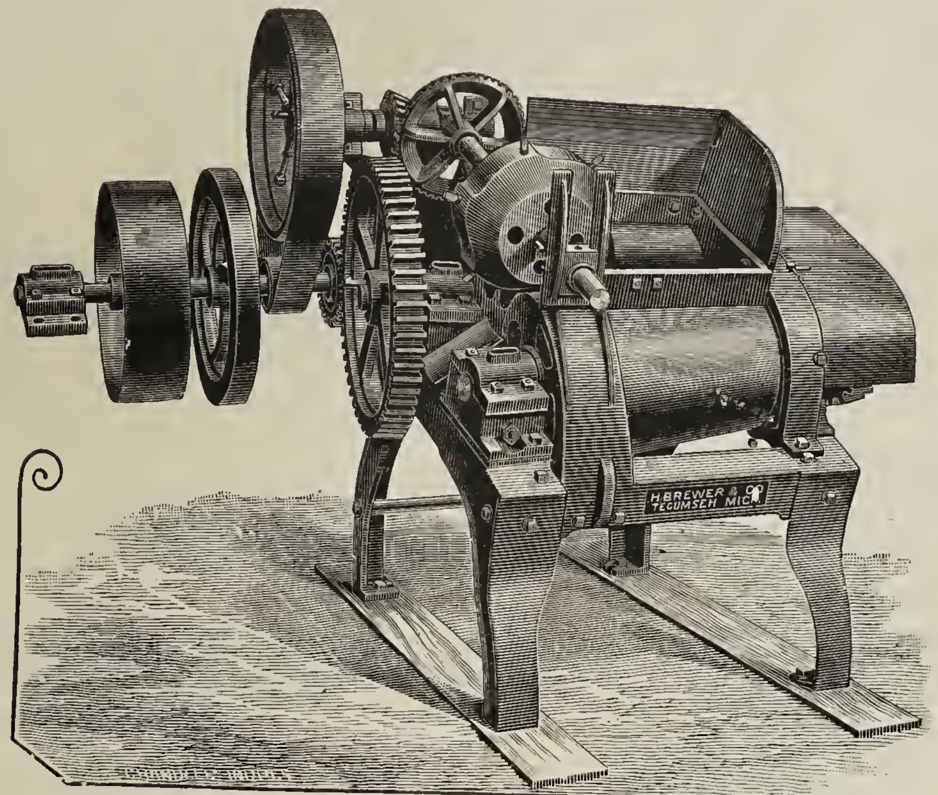


IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.



AUTOMATIC BRICK CUTTER with SANDER ATTACHED.

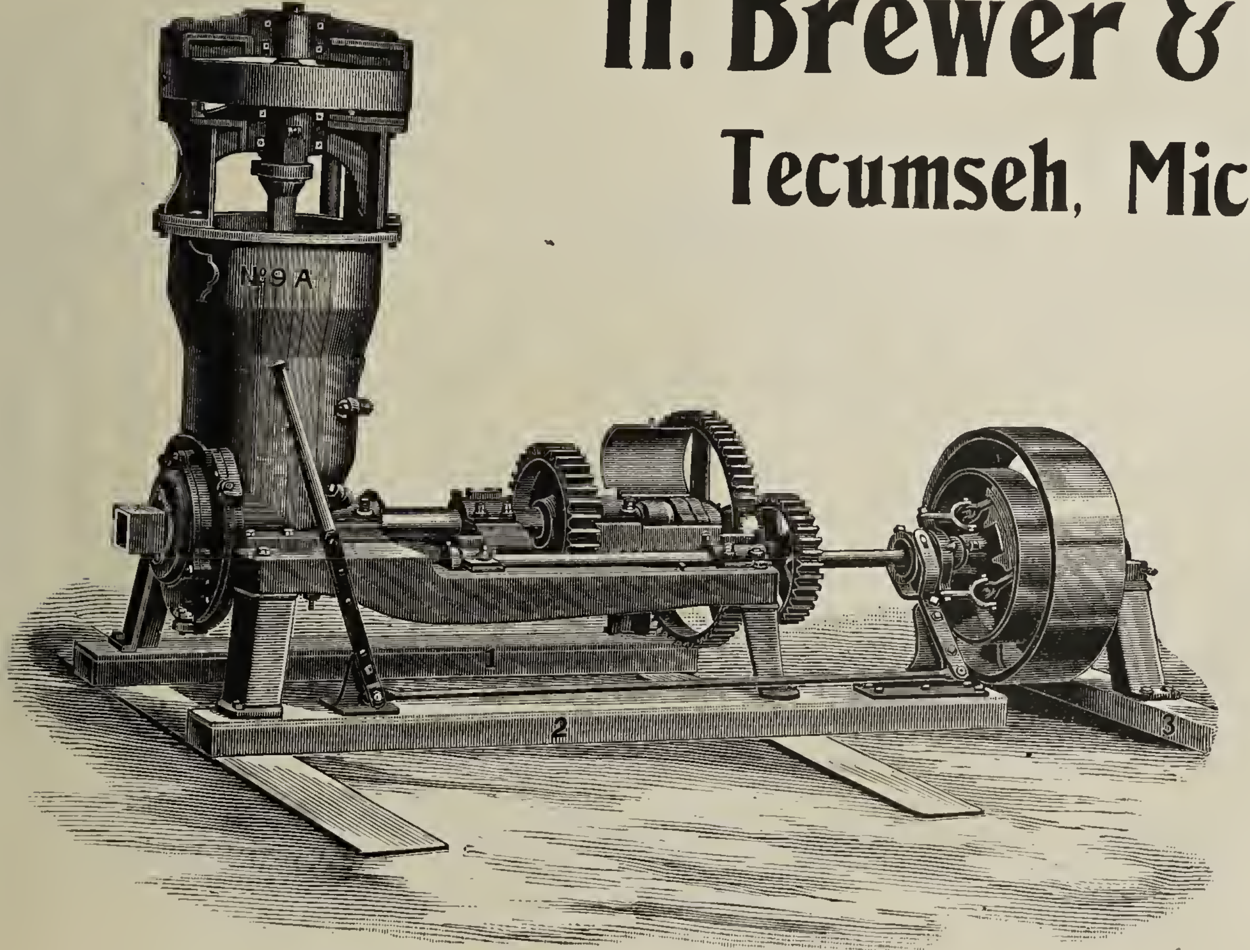


STONE EXTRACTING CLAY CRUSHER.

Manufactured by

H. Brewer & Co.,

Tecumseh, Mich,



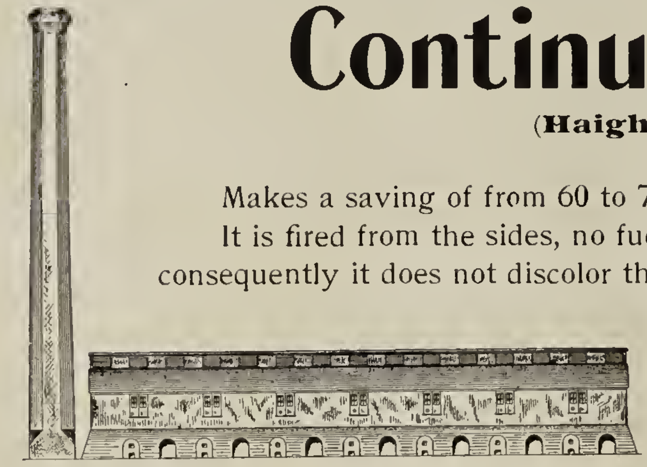
No. 9 "A" BRICK MACHINE.

The Cost of Burning Brick

Is quite as important as the cost of making them on the machine. . . . . . .

The Universal Continuous Kiln.

(Haigh's System.)



Makes a saving of from 60 to 75 per cent. in the cost of fuel. It is fired from the sides, no fuel being fed among the brick, consequently it does not discolor the ware.

It burns successfully not only common brick but also paving brick, fire brick, pressed brick and hollow ware.

It combines the economy of continuous systems, with the convenience and efficiency of ordinary down-draft or up-draft kilns, and with equal adaptability for handling successfully a wide range of products.

It will pay you to investigate it.

Write us for details.

J. W. Penfield & Son,

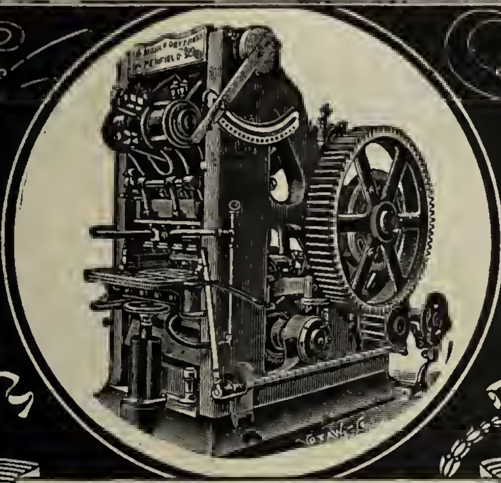
Willoughby, Ohio, U. S. A.

Consulting Engineers,

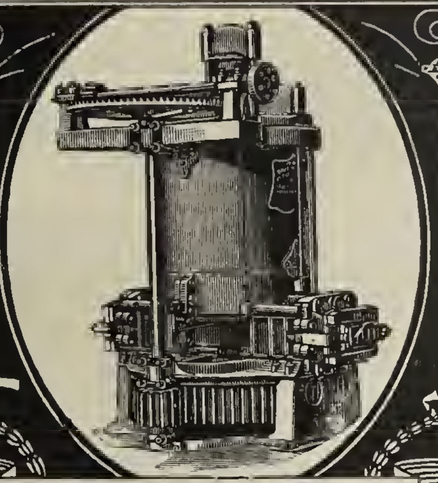
Manufacturers of Modern Clayworking Machinery.
Designers and Equippers of Complete Brickmaking Plants,
Including Drying and Burning Systems.

Send for Our 1896 Catalogue.

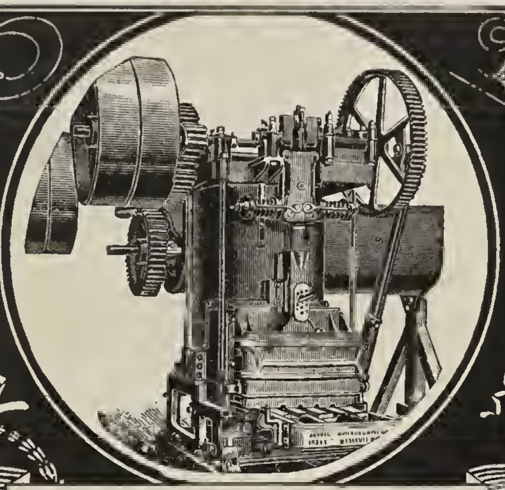
CLAY-WORKING MACHINERY



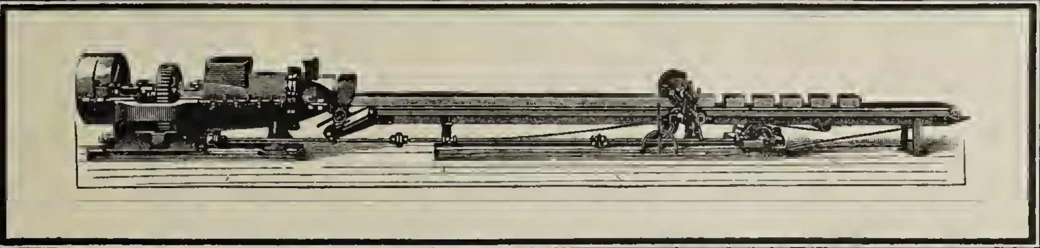
DRY PRESS BRICK MACHINES



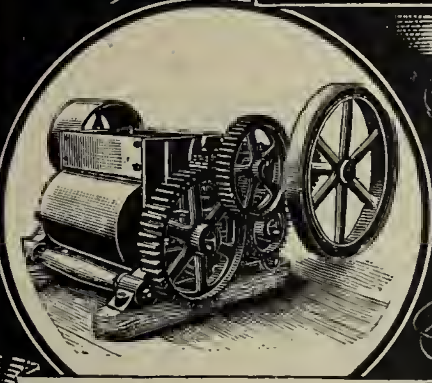
PLUNGER BRICK MACHINES



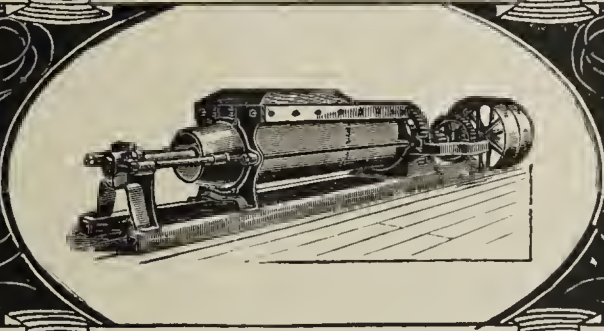
SAND-MOLDING BRICK MACHINES



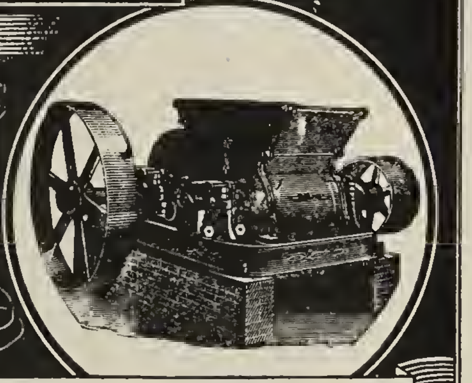
AUGER BRICK MACHINES



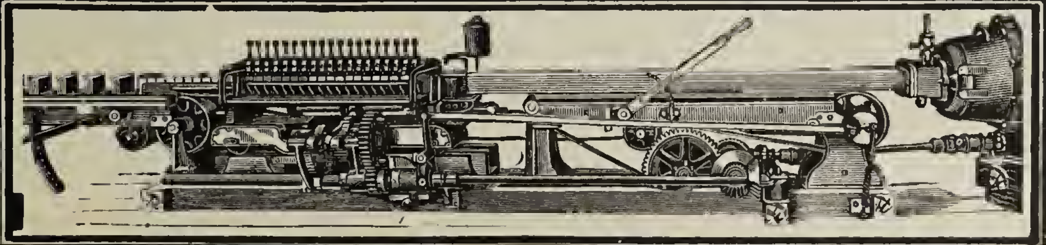
CLAY CRUSHERS



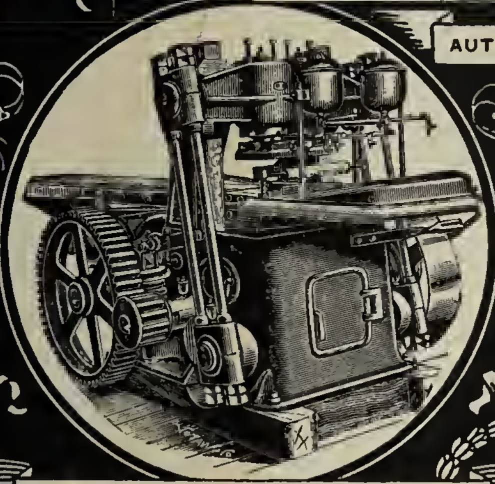
PUG MILLS



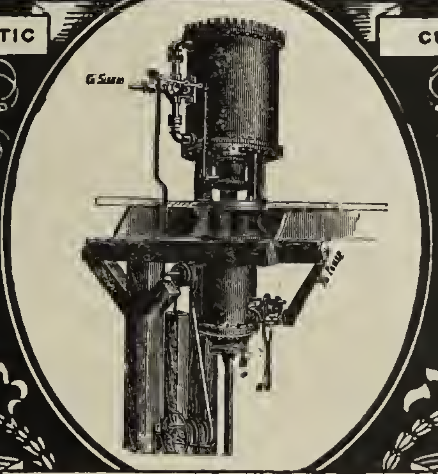
DISINTEGRATORS



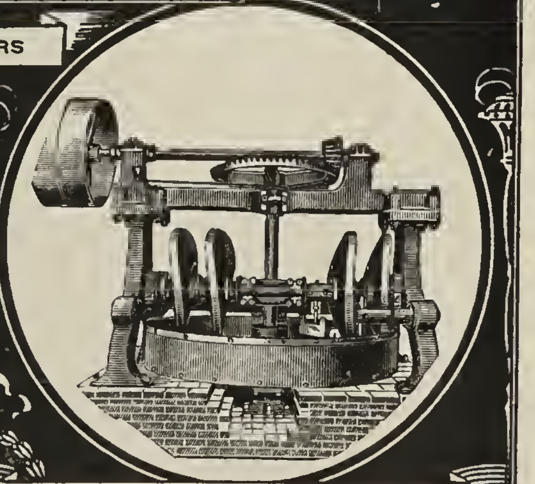
AUTOMATIC CUTTERS



BRICK REPRESSES



SEWER PIPE PRESSES

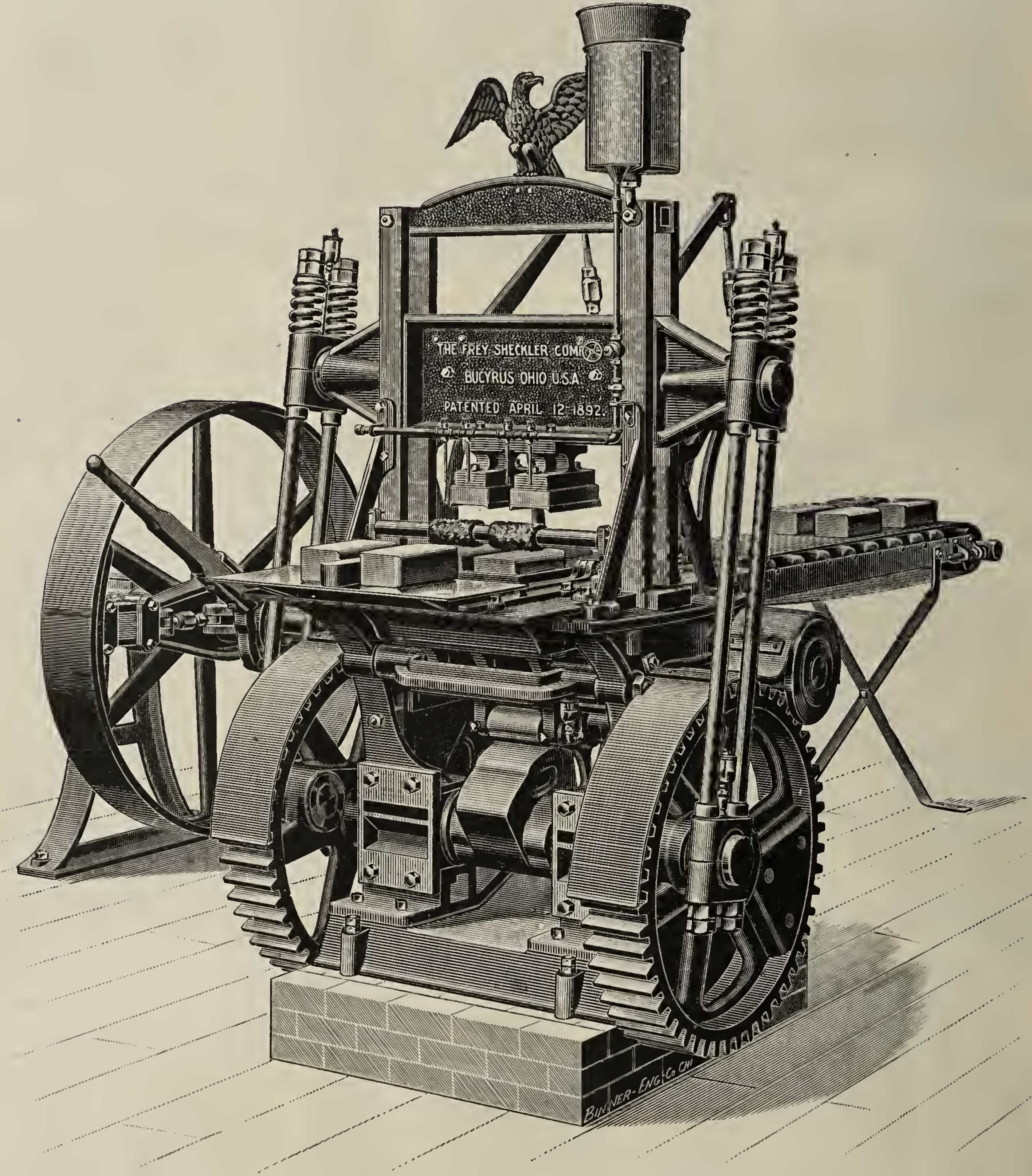


DRY PANS, WET PANS, ETC.

J.W. PENFIELD & SON, WILLOUGHBY, O. U.S.A.

Purington HAS TRIED AND APPROVED

The Eagle Repress.


THE FREY SHECKLER COM
BUCYRUS OHIO U.S.A.
PATENTED APRIL 12 1892.
BINNER-ENG-CO CHI

At Galesburg, Ill., The Purington Paving Brick Company worked the **EAGLE REPRESS** side by side with a Repress built by one of our neighbors. After constant trial for more than three months, please listen to what Mr. Purington says concerning it:

> "We are very much pleased with the Press, and have never as yet spent one cent on it since it was put in. Please ship the three Represses ordered from you."

Such encouraging words of approbation from one of the largest, most reputable and capable brick manufacturers in the world is a prize worth working for, and proves the standard quality of our Repress.

It will last four times as long as any other Repress, and will not cost one-tenth as much for repairs.

THE FREY-SHECKLER CO., - Bucyrus, Ohio, U. S. A.

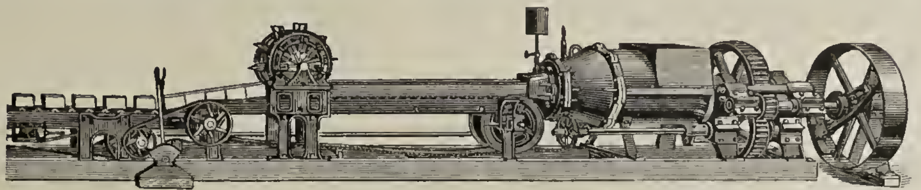
Manufacturers of Clayworking Machinery, and Builders of the Bucyrus Steam Tunnel Dryer.

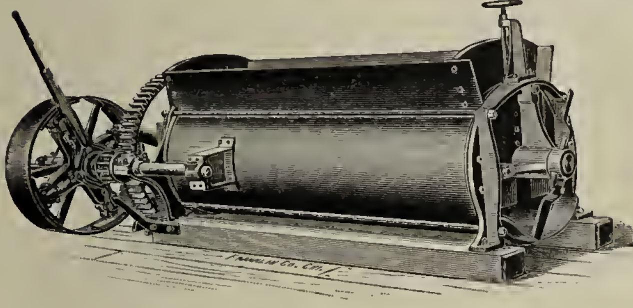
BRICK MACHINERY FOR 1896.

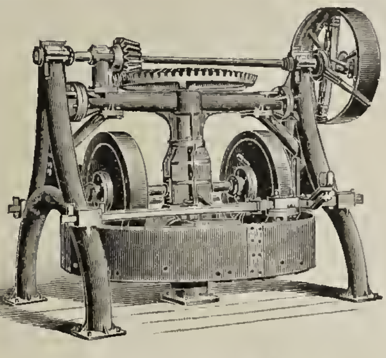
Write for
Catalogue.

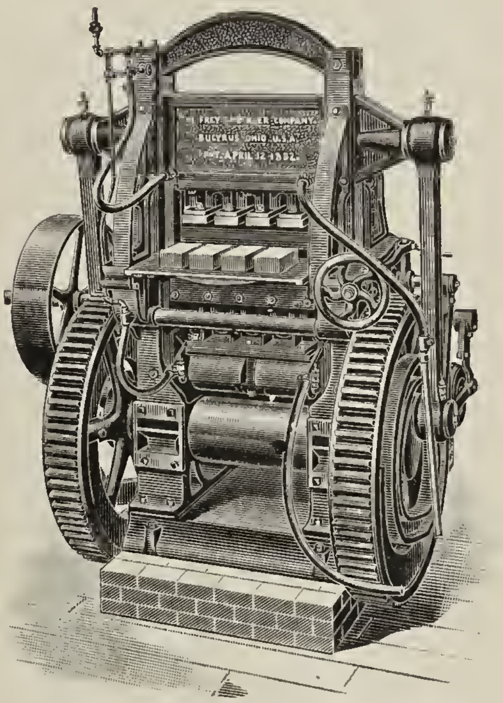
Before Buying

Write for our Prices.

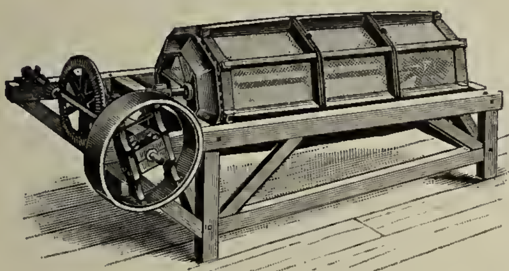

No. 1 Giant Machine and Automatic End Cut Table.

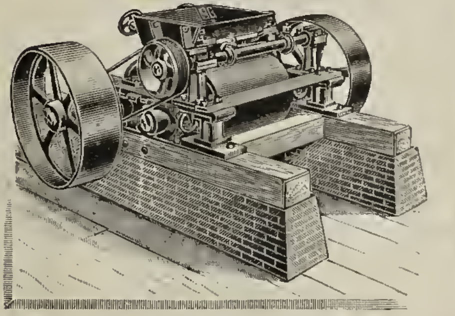

Pug Mills and Granulators.

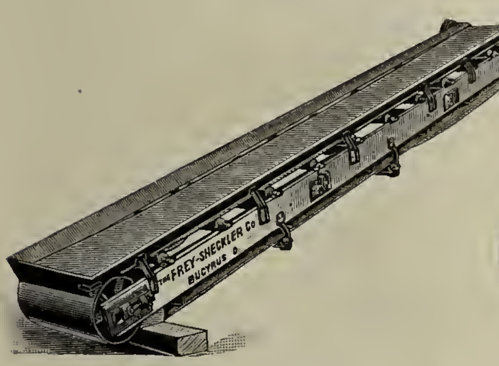

Dry and Wet Pans.



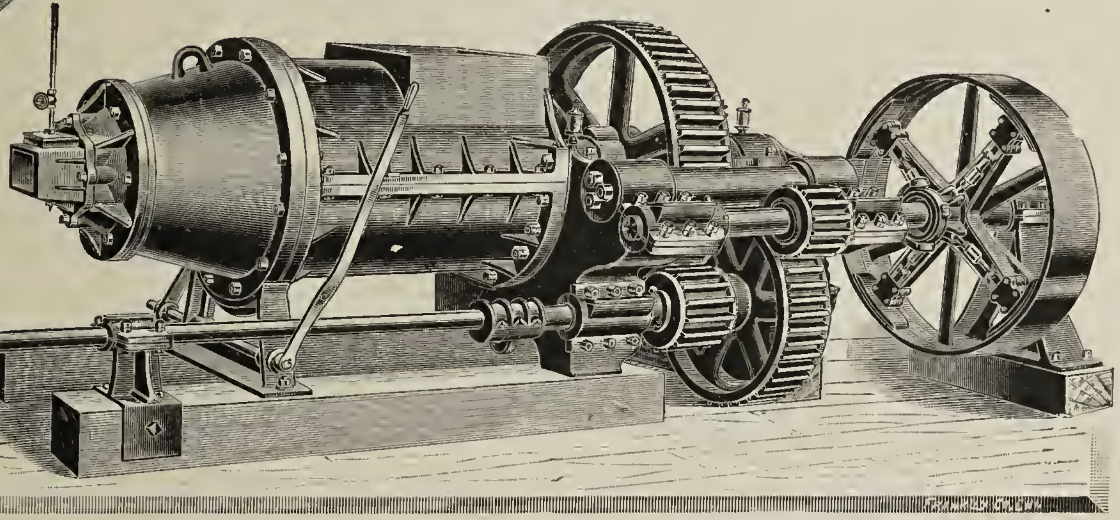
4-Mould Semi-Plastic Brick Press.

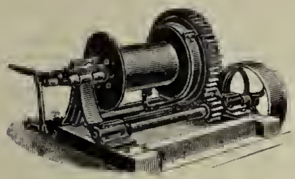

Clay Screens.

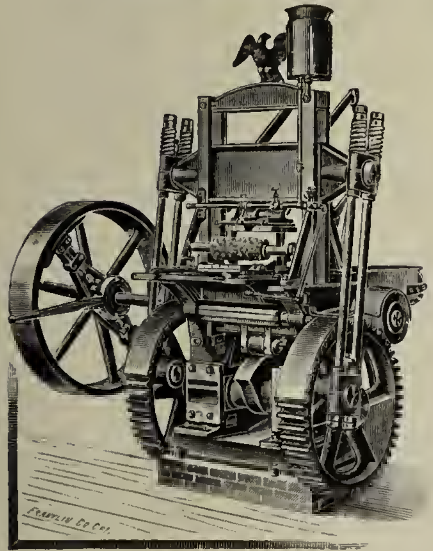

Crushers.

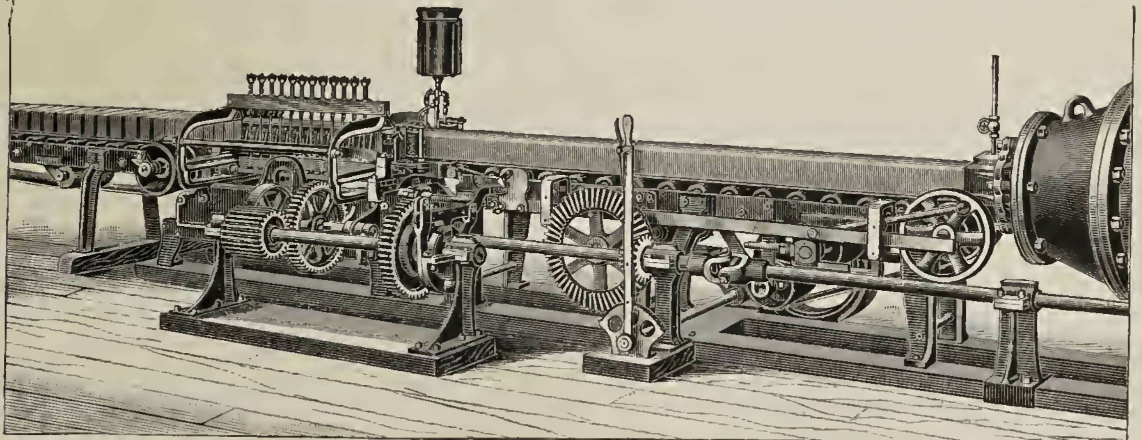


Clay Conveyors.


Special Bucyrus Giant Brick Machine.


Winding Drums.

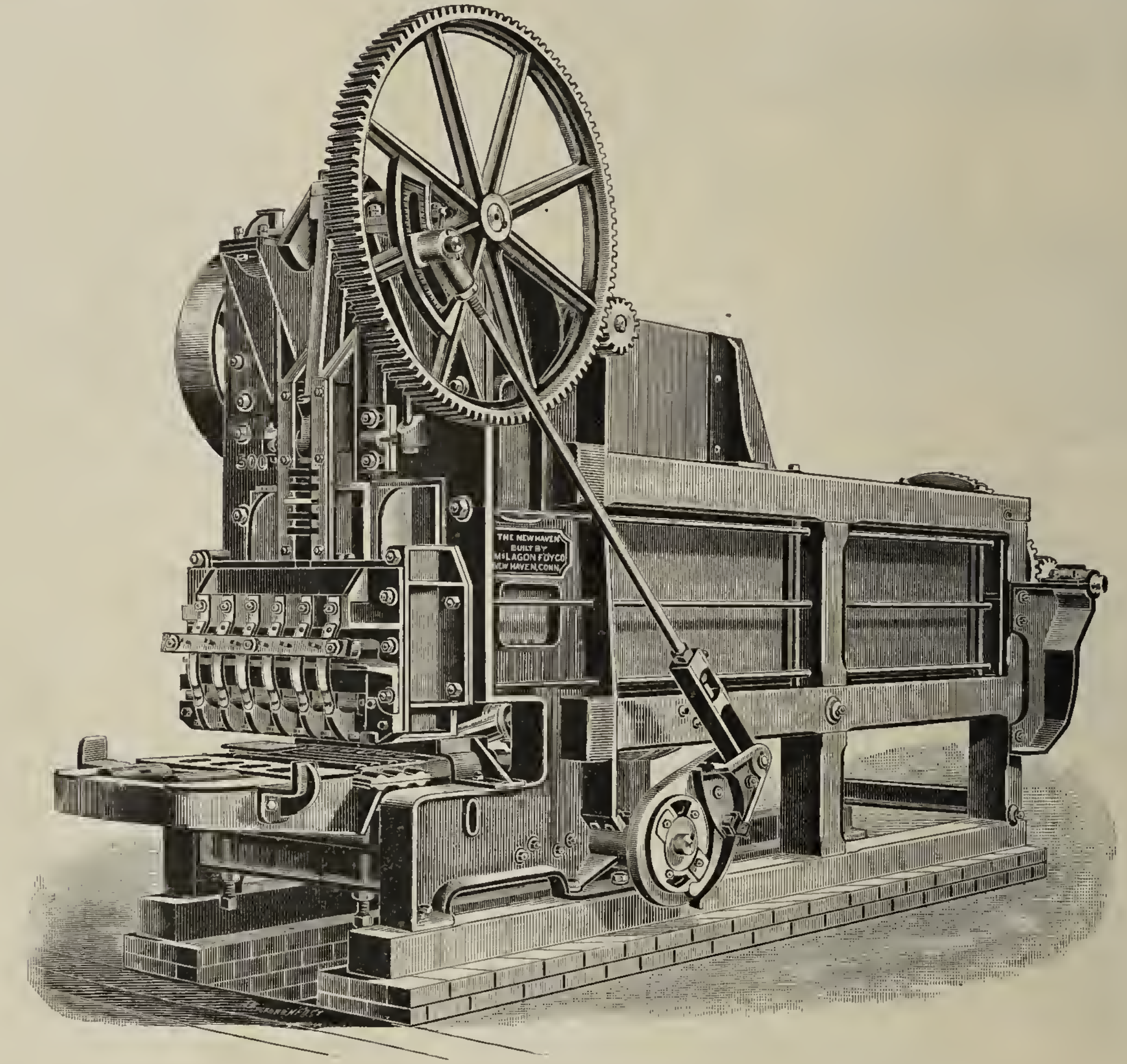

Brick Re-Press.


Bucyrus Automatic Table for Side Cut Brick.

The Frey-Sheckler Co., BUCYRUS,
OHIO, U. S. A.

Results Prove Efficiency.

The history of our "New Haven" Brick Machines does not Record a Single Failure. . . . .



None Have Ever Worn Out.
None Have Ever Been Thrown Out.
None Have Ever Been Sold Second=Hand.
None Have Ever Failed to Please.
All are Working Satisfactorily To=day.

We aim to Please Every Customer.

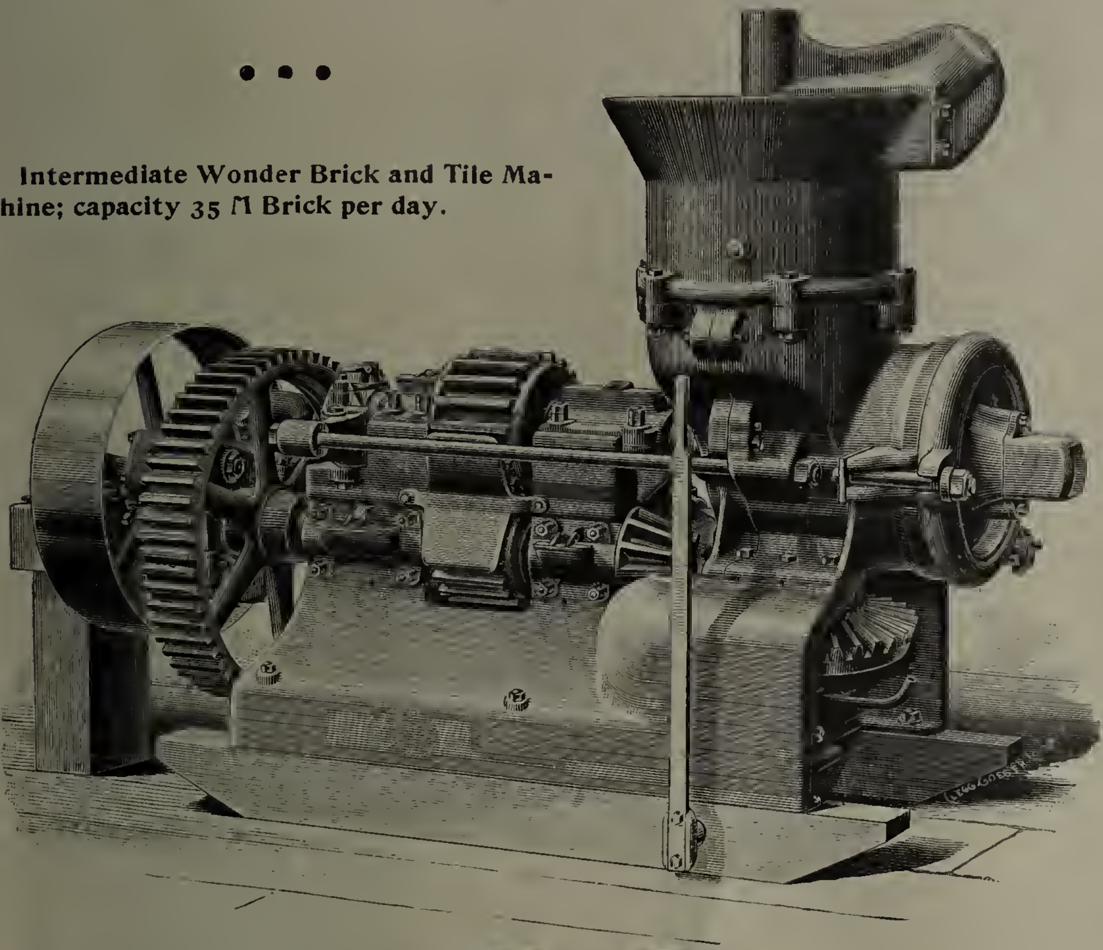
The Eastern Machinery Co.,

NEW HAVEN, CONN.

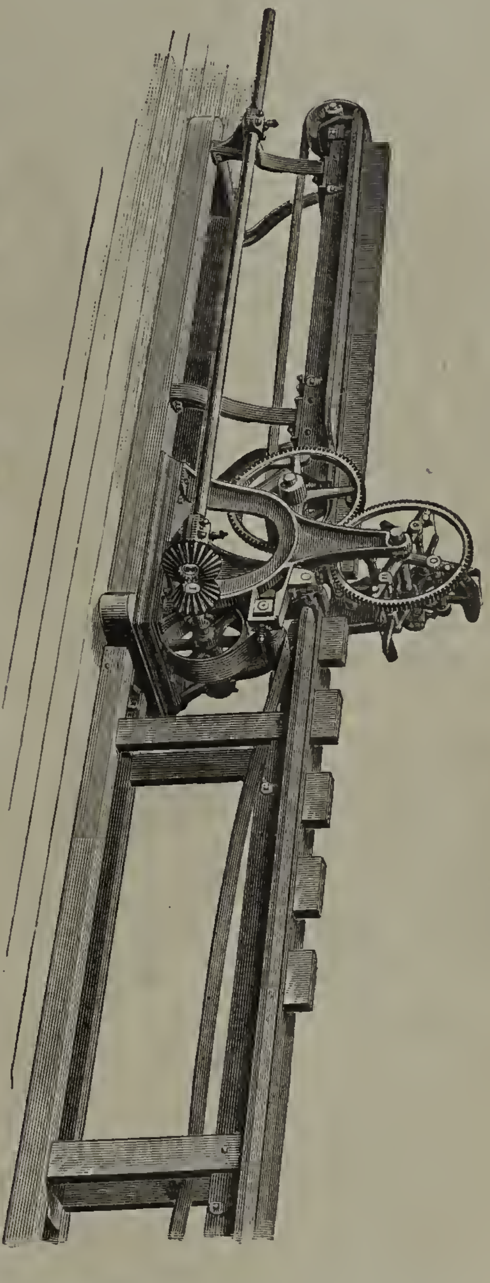
WONDER MACHINERY,

For Brick and Tile.

• • •



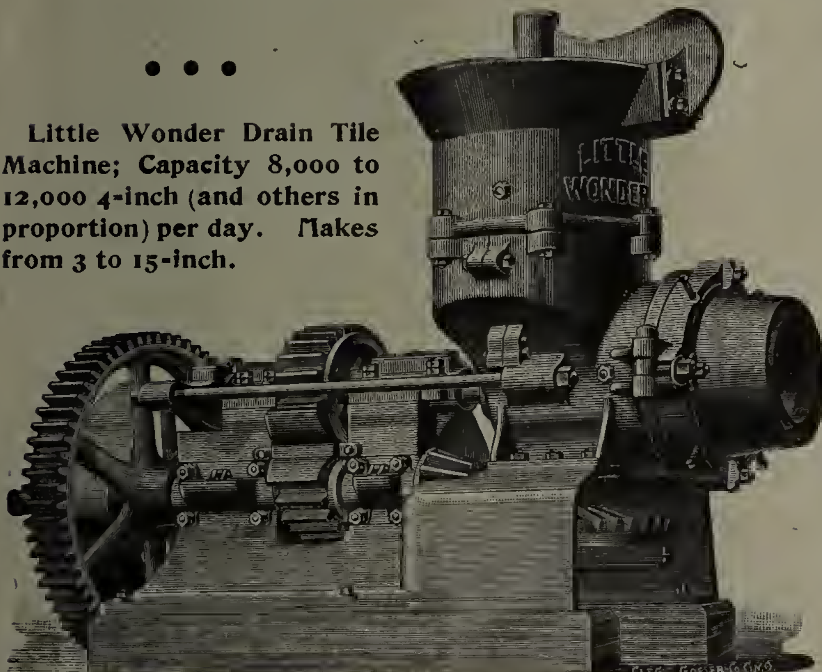
Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



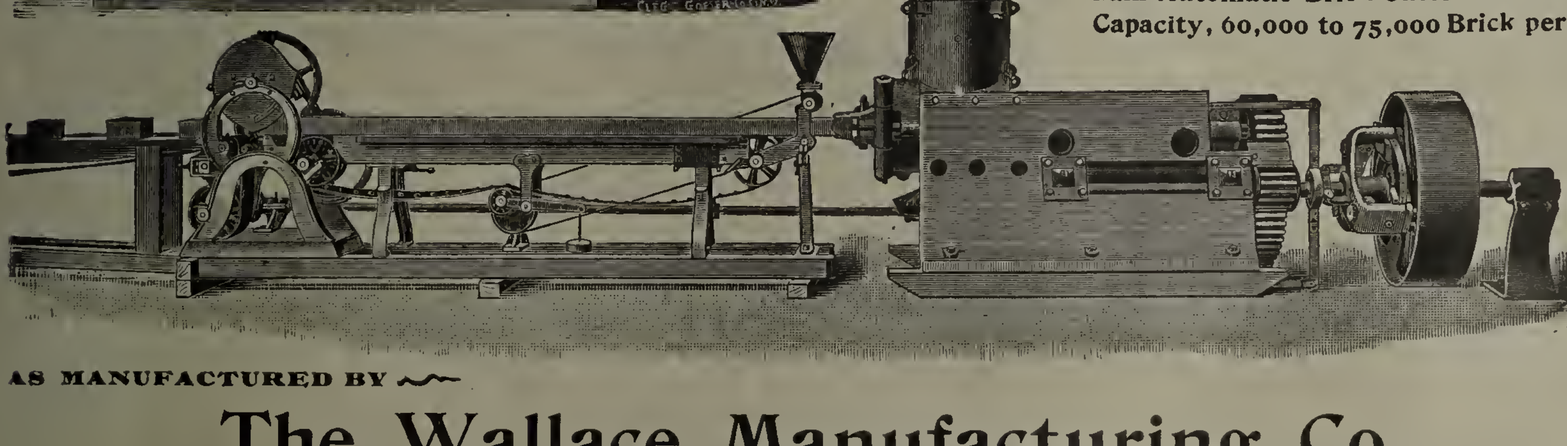
Cunningham's Single Stream Automatic End Cut Brick Cutter.

• • •

• • •



Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.

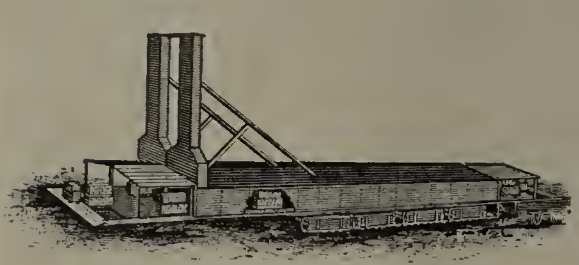
AS MANUFACTURED BY

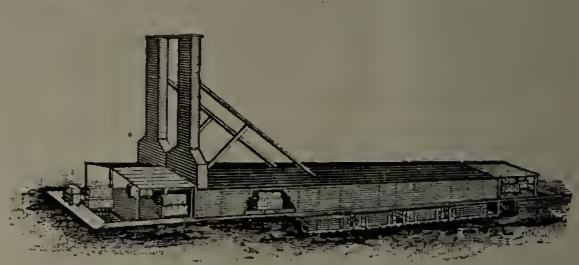
The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

Iron Clad Dryer....IN THE LEAD





DRYING BUILDING BRICK.

CHICAGO, July 18, 1894.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—We have had one of your 12 track dryers in use for nearly three years, and two six track dryers for more than two years. Since you have improved these dryers by means of the receiving tank and pump system, we are drying 175 to 180 M brick per day, with a saving of 20 to 25 per cent. of steam used under the old system. It is possible to dry up to 200 M bricks every 24 hours without injury to the ware, and we have done this on several occasions, when we were compelled to run over time.

Our experience with other dryers formerly used on our plant and the results obtained by other manufacturers in this neighborhood with hot air and fire dryers, compels us to say, that in our estimation, your dryers are more economical and show better results than any we have seen. We use 2 boilers 5x18 feet for these dryers, and at times have to reduce the quantity of steam used, to prevent getting the bricks too dry. Pressure carried 85 pounds.

Yours respectfully,
WECKLER-PRUSSING BRICK CO.,
Alexander Prussing, Sec'y.

DRYING PRESSED BRICK.

MONTREAL, P. Q., September 13, 1895.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—Replying to your favor as to how the dryer erected by your Mr. Lederer is working, I have much pleasure in telling you that we have no fault to find. We dry our bricks easily in twenty-four hours, and so far, without a hitch of any kind.

Your system of returning condensation is undoubtedly the best the writer has ever seen, it needs very little attention and is a decided success in every way. We are drying dry-press, square, ornamental and plastic builders and pavers with equal success.

Wishing you a deserved success, we remain.

Very truly yours,
LA PRAIRIE PRESS BRICK & TERRA COTTA CO.

DRYING SOFT MUD BRICK.

MILWAUKEE, WIS., November 5, 1895.

WOLLF DRYER CO., Chicago, Ill.

Gentlemen:—One season has passed with us in the manufacture of brick, where we used the dryer you built for us, and I must state that we have had more success than we expected, as our clay is very hard to dry, and we could do nothing drying our brick out doors, they all would check. Our repairs have not amounted to 5 cents, and think it recommends itself. If we had to build another dryer, it would be the Iron-Clad Dryer only.

Yours truly,
MILWAUKEE BRICK CO.,
R. Reinke, Vice-Pres.

DRYING PAVING BRICK.

LOUISVILLE, KY., April 12, 1895.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—Replying to yours of the 11th inst., will say that the dryer you recently put in has worked splendidly, exceeding our expectations. It dries our brick perfectly in twenty-four hours and would dry a good many more than we make, which has been 30 M per day, re-pressed brick.

Our green brick measure 9¼ x 4⅝ x 2 9-16. Your dryer has far exceeded the old Penfield, in which it took four days and then did not dry. Will be pleased to hear further from you.

Yours truly,
KENTUCKY VITRIFIED PAVING BRICK CO.,
P. Bannon, Pres.

Write for prices and illustrated catalogue to

WOLFF DRYER CO.,

358 Dearborn St., Room 303, *CHICAGO, ILL.*

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THE CLAY WORKER
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA-COTTA SEWER PIPE POTTERY ETC.
T. A. RANDALL & CO., PUBLISHERS.
CHANDLER SC. INDPLS.

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXV, No. 4. INDIANAPOLIS, IND., APRIL, 1896. $2.00 a Year in Advance.

Brick Making Machinery.

FOR SALE.

One second-hand self-contained Dry Pan, seven feet in diameter, and a total weight of about eight tons. The crushing rolls are 40 inches in diameter by 10-inch face. The pan has been repaired by us and has a new main center casting, complete set of new grinding plates, new perforated screens, and is provided with friction clutch pulley 30 inches in diameter by 10-inch face.

The price is $450 net f. o. b. Philadelphia.

Chambers Brothers Company,

FIFTY-SECOND STREET, BELOW LANCASTER AVE.,

J. E. EASTES, Chicago Agent,
174 South Clinton Street.

PHILADELPHIA, PA.

The Cummer Dryer is a Direct Heat Dryer.

THE CUMMER DRYERS

. . . **NO** . . .
Boilers,
Pumps,
Steam Pipes,
Big Fuel Bills,
Experimenting.

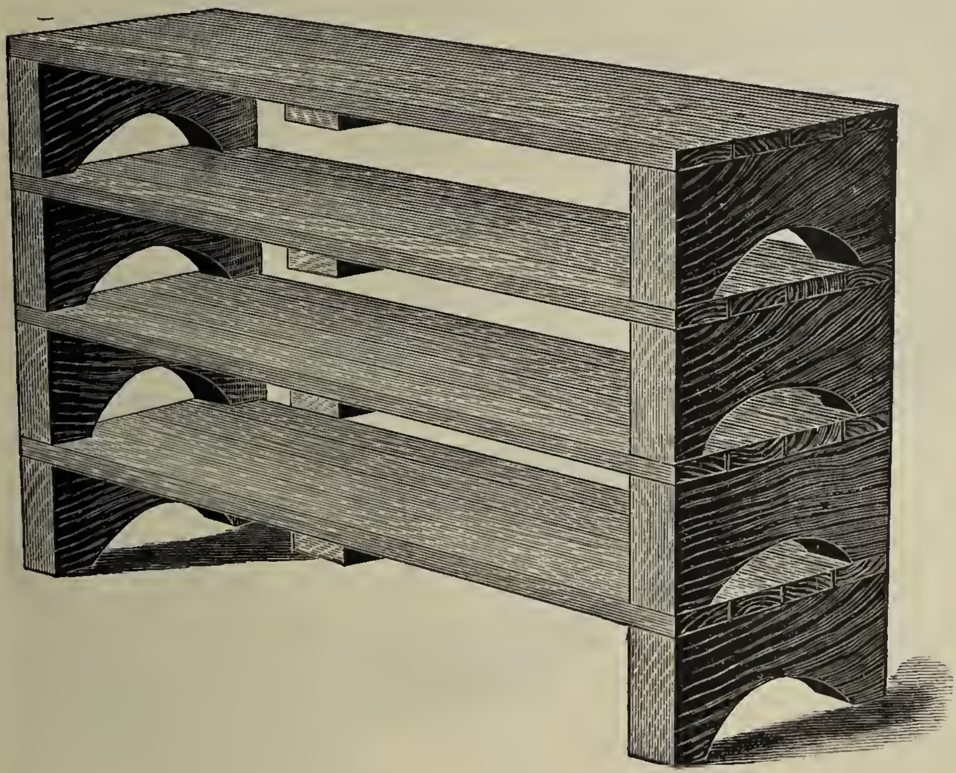
. . . **YES** . . .
We Guarantee Results and will guarantee to dry your brick with a given amount of fuel. For instance, if your brick each carry one pound of moisture and you want to dry 20,000, we will guarantee to dry them with less than 3,000 pounds of **Slack Bituminous** coal.

CONVERTED
If you have a Dryer that is not satisfactory, it can be **Converted** into a **"CUMMER"** at slight expense.

The CUMMER REVOLVING CLAY DRYER has many users and is well known. Clay can be dried cheaper in it than by any other method.

The F. D. Cummer & Son Co.,

CLEVELAND, OHIO.



IF YOU NEED..

Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

Rack Pallets,
Hacking Pallets,
Pallets for Dryers,
Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

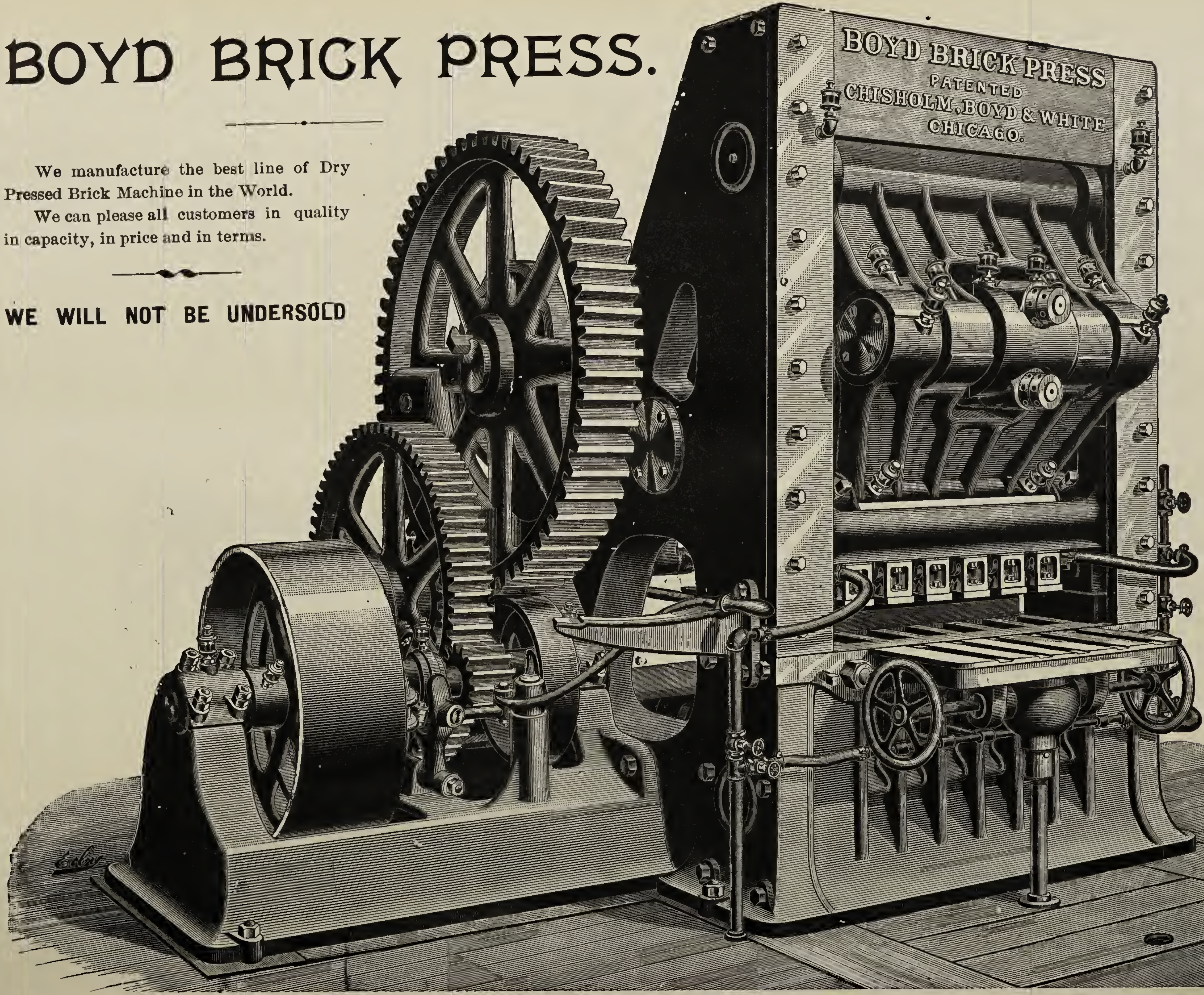
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

BOYD BRICK PRESS.

We manufacture the best line of Dry Pressed Brick Machine in the World.

We can please all customers in quality in capacity, in price and in terms.

WE WILL NOT BE UNDERSOLD



The CHISHOLM, BOYD & WHITE CO., 57th and Wallace Sts., Chicago.

A SURE THING.

We will construct and equip a Brick Plant of any capacity desired for any responsible party, furnishing Brick Presses, Power, Kilns, Clay-preparing Machinery, Shafting, Belts, etc., and erect the necessary Buildings. We will make and burn one or more kilns of brick, and turn the Plant over to him in proper working order under guarantee of satisfactory results as to quality of product and cost per 1,000; the loss to be ours in case of failure.

Why experiment when you have a sure thing?

THE CHISHOLM, BOYD & WHITE CO.,

57th and Wallace Streets. CHICAGO.

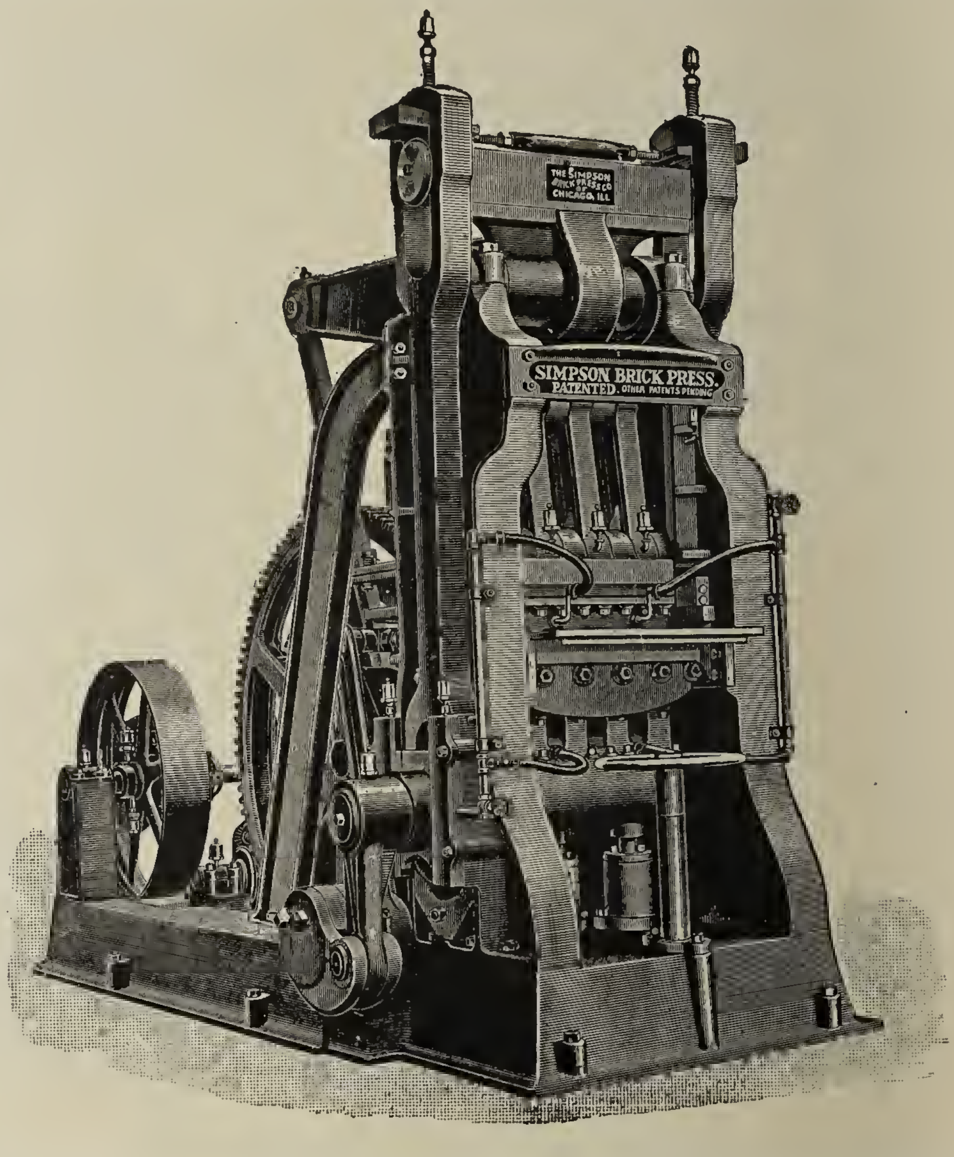
Clay-Working Machinery.

The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line of Brickyard Equipments. . .


THE SIMPSON BRICK PRESS CO CHICAGO, ILL.
SIMPSON BRICK PRESS. PATENTED. OTHER PATENTS PENDING

Complete plants constructed and guaranteed. Write for catalogue, etc.

THE SIMPSON BRICK PRESS CO.,

Chamber of Commerce
Chicago...

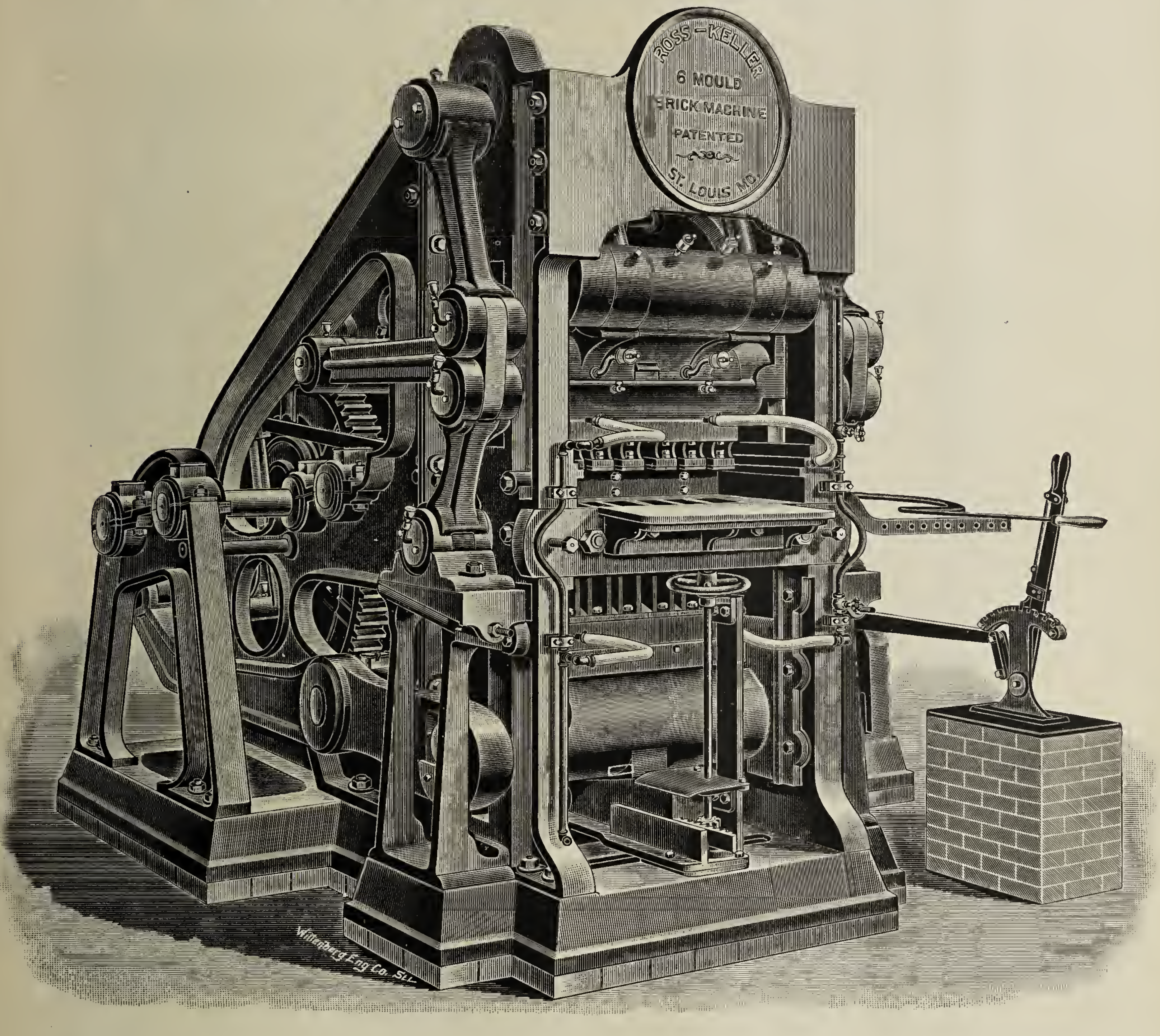
Agents for Canada:
WATEROUS ENGINE WORKS CO.,
BRANTFORD, ONTARIO.

The Latest Improved

Ross-Keller TRIPLE·· PRESSURE Brick Machine.

Manufactured in four and six-mould sizes. Weight of four-mould machine 58,000 pounds; capacity 24,000 brick per day. Weight of six-mould machine 75,000 pounds, capacity 36,000 brick per day.

BRICK SET IN KILN DIRECT FROM MACHINE.



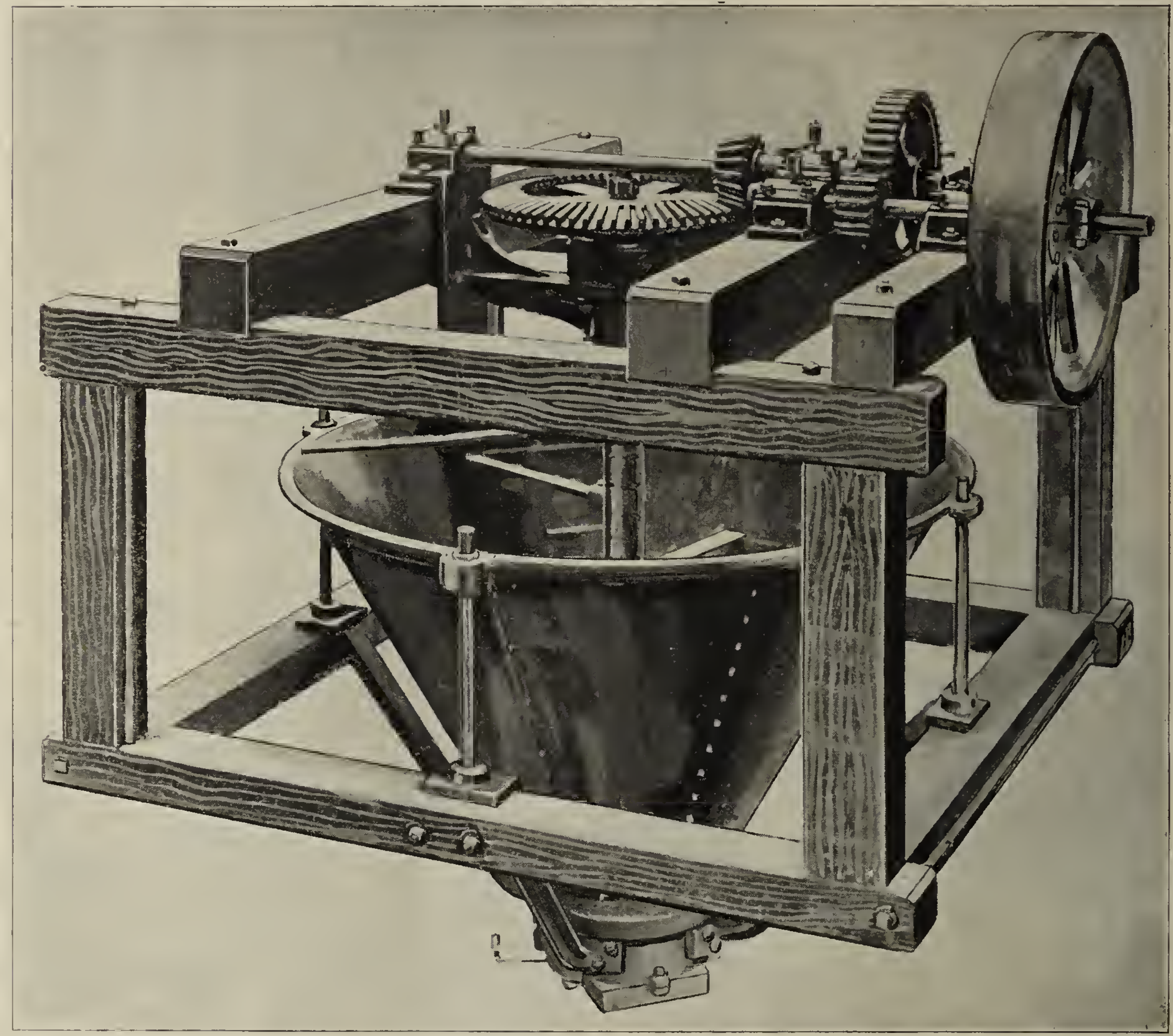
The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

If you want the best come and see us, or write for price and full particulars, address

Ross=Keller Brick Machine Company,

Office 108 Rialto Building, —— ST. LOUIS, MO., U. S. A.

"Our Doubts are Traitors and Make us Lose the Good We Oft Might Win, by Fearing to Attempt."

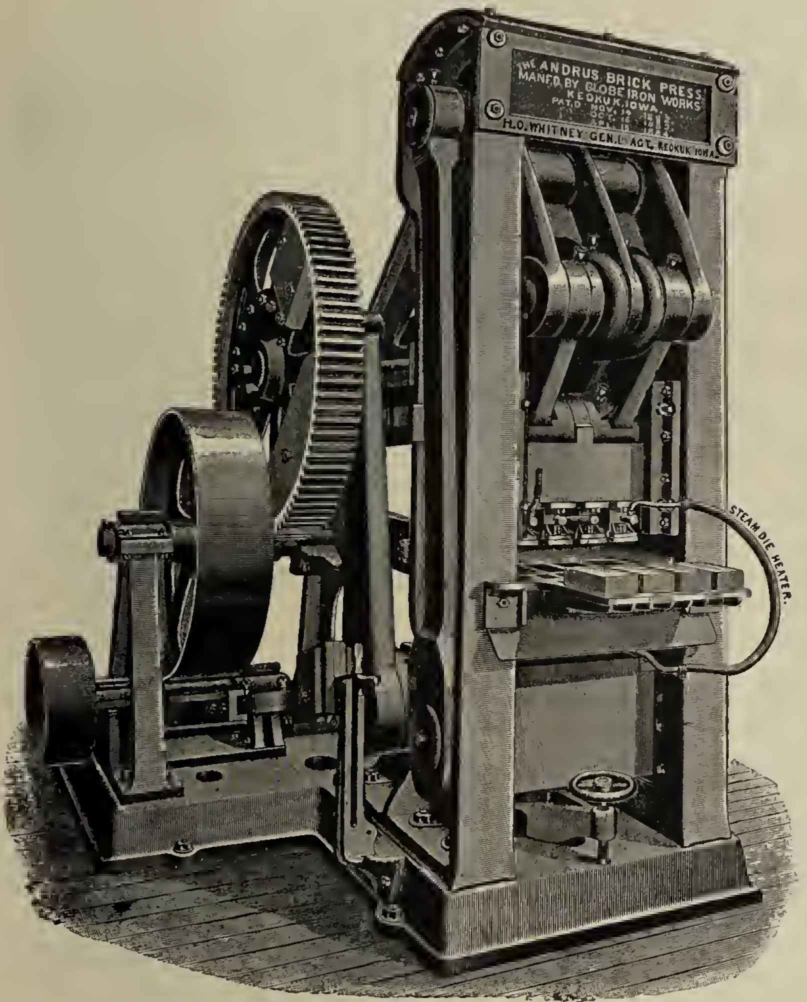


ONE reason why paving brick manufacturers do not make more first class brick is that they do not temper their clay uniformly well, the reason they do not temper their clay better is that they have not the facilities for doing it—they depend upon the constant attention and judgment of a man or boy to adjust the proper amount of water to a clay supply which is constantly varying; they do not know that the machine illustrated above will temper their clay automatically much better than any man can possibly do it. All we ask is an opportunity to prove that our machine will do this and more. We do not expect a man to pay for any machine of ours until he is satisfied that it will do all we claim, and do it better than any other machine made for the purpose.

W. D. Richardson & Co.,

809 Cuyahoga Building, —CLEVELAND, OHIO

THE ANDRUS DOUBLE PRESSURE BRICK PRESS.



We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

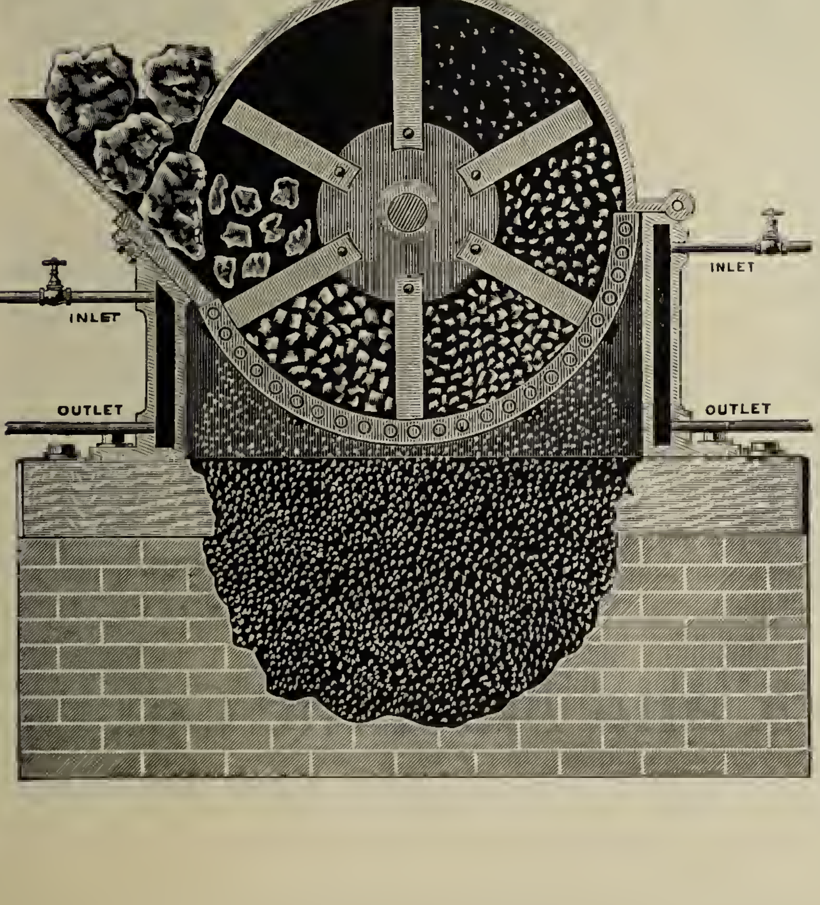
They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . .

Send for descriptive Catalogue, address

H. O. Whitney,
General Agent,
KEOKUK, IOWA.

WILLIAMS'S COMBINED SHALE CRUSHER and CLAY PULVERIZER



This machine is a marvel and surprise to all who have seen it in operation. It does the work of two machines and prepares the Clay or Shale in a most thorough manner. It cannot choke with ordinary damp clay; it will do more and better work, with one-half the power, than any other kind of Pulverizer; the cost for repairs will be less than one-half, and the cost for oil will also be less than one-half.

We will furnish these machines upon 30 days' trial, to responsible parties.

FOR FURTHER
INFORMATION,
ADDRESS

MILTON F. WILLIAMS & CO.,
2705 North Broadway, ST. LOUIS, MO.,

Builders and Contractors of Complete
Dry-Press Brick Plants. . . . . . .

Some Reasons Why You Should Use a

"Columbia" Press.

All working parts are made of Steel.

The pressure is direct.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

All cumbrous toggles and levers dispensed with.

The pressure is absolutely equal on top and bottom of brick, also on all parts of the brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

All cog bearings and gearings are out of the way of clay dust.

Any part of the gearing can be removed without taking machine apart.

The mould box can be taken out in a few minutes, without disturbing the other parts of machine.

Every adjustment on the machine is easily and quickly made.

The "COLUMBIA" will work any kind of material whereof a pressed brick can be made, either dry or semi-dry.

The "COLUMBIA" presses clay or shale as dry as a hydraulic press, or so damp as to approximate a stiff mud brick, so that the range of products is from building brick to pavers. No other press does such a variety of work.

The "COLUMBIA" is the only brick press on the market that meets ALL the needs of a brick plant.

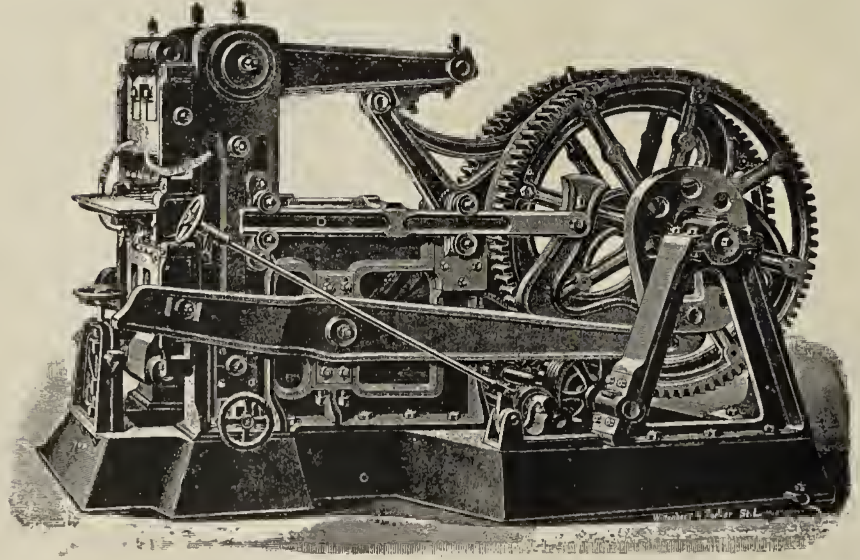
Another Reason Might be Added—That of Price. As the "COLUMBIA" is the Simplest Press made, so ought it to be the Easiest to Build, Hence the Cheapest. . . . .

Investigate all, Understand the Merits of all, and You will Buy a "COLUMBIA."

COLUMBIA MANUFACTURING CO.,

Room 34, De Menil Building, 7th and Pine Sts., - - - *St. Louis, Mo.*

The Progress Brick Press



FOR PLAIN AND ORNAMENTAL BRICK. . . .

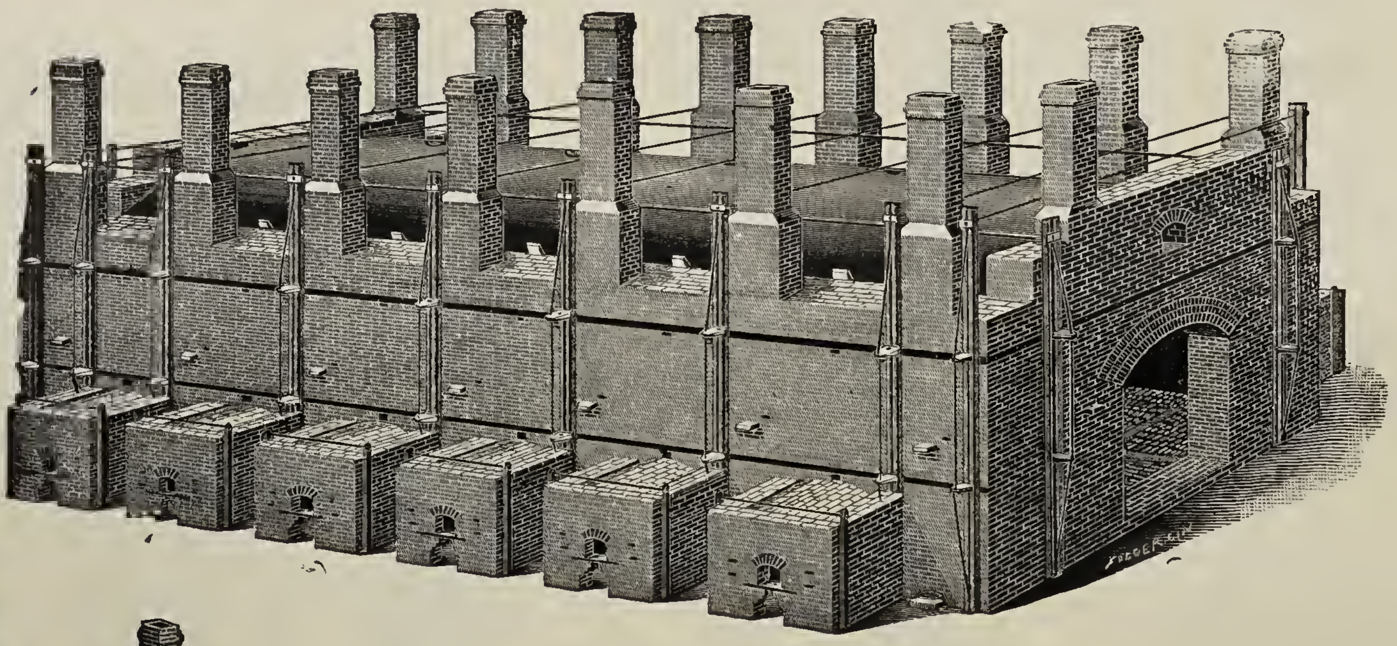
The Progress Brick Mould, Brick Grinding and Mitering Machines, Dry Clay Gatherers, and a full line of Dry Press Brick Manufacturers equipments.

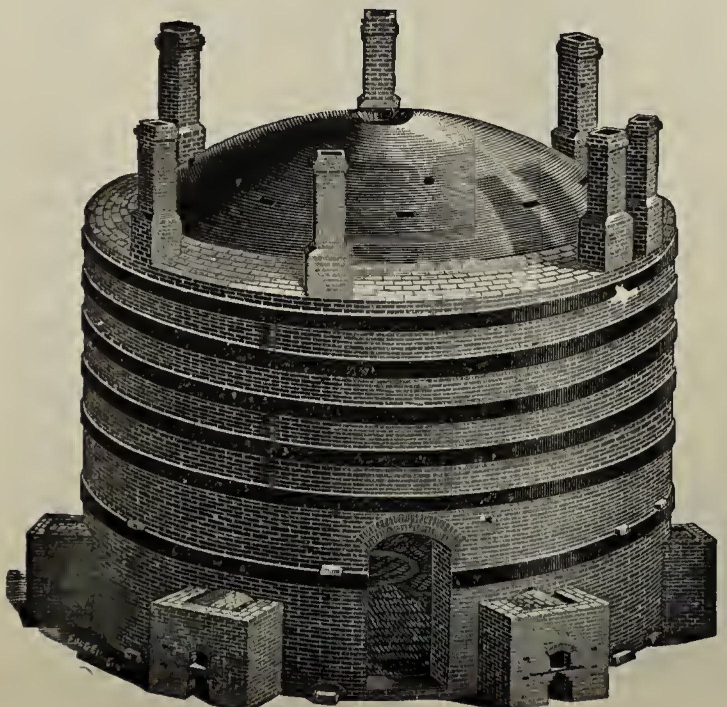
DESCRIPTIVE CATALOGUE ON APPLICATION. . . . .

Progress Press Brick and Machine Co.,

King's Highway and Oak Hill R. R. ***ST. LOUIS, MO.***

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy in cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, Cincinnati, Ohio.

ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.

WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS,COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

HON. A. DESJARDINS, President. JOS. BARSALON, Vice-Pres. HUBERT DESJARDIN, Man. Director. N. T. GAGNON, Secretary.

MONTREAL TERRA COTTA LUMBER CO.
LIMITED.
Maisonneuve, P. Q.
Office, 86 *St. Peter Street, Montreal.*

MONTREAL, July 12th, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—In answer to yours of the 1st inst., we are thoroughly satisfied with the kiln you built for us. We find we have better burnt material than we ever had before. Your system of kilns we consider as near perfect as one can expect. Our ware is all burnt alike from top to bottom. We have burnt it many times round, and the more we use it the better we like it. Shall be glad to answer any enquiry from anyone interested in your kilns, as you deserve success. Your very truly,

N. T GAGNON, *Secretary.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety)

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers.
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and* 2 *Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

Let us give you full Particulars.

The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ELMIRA, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

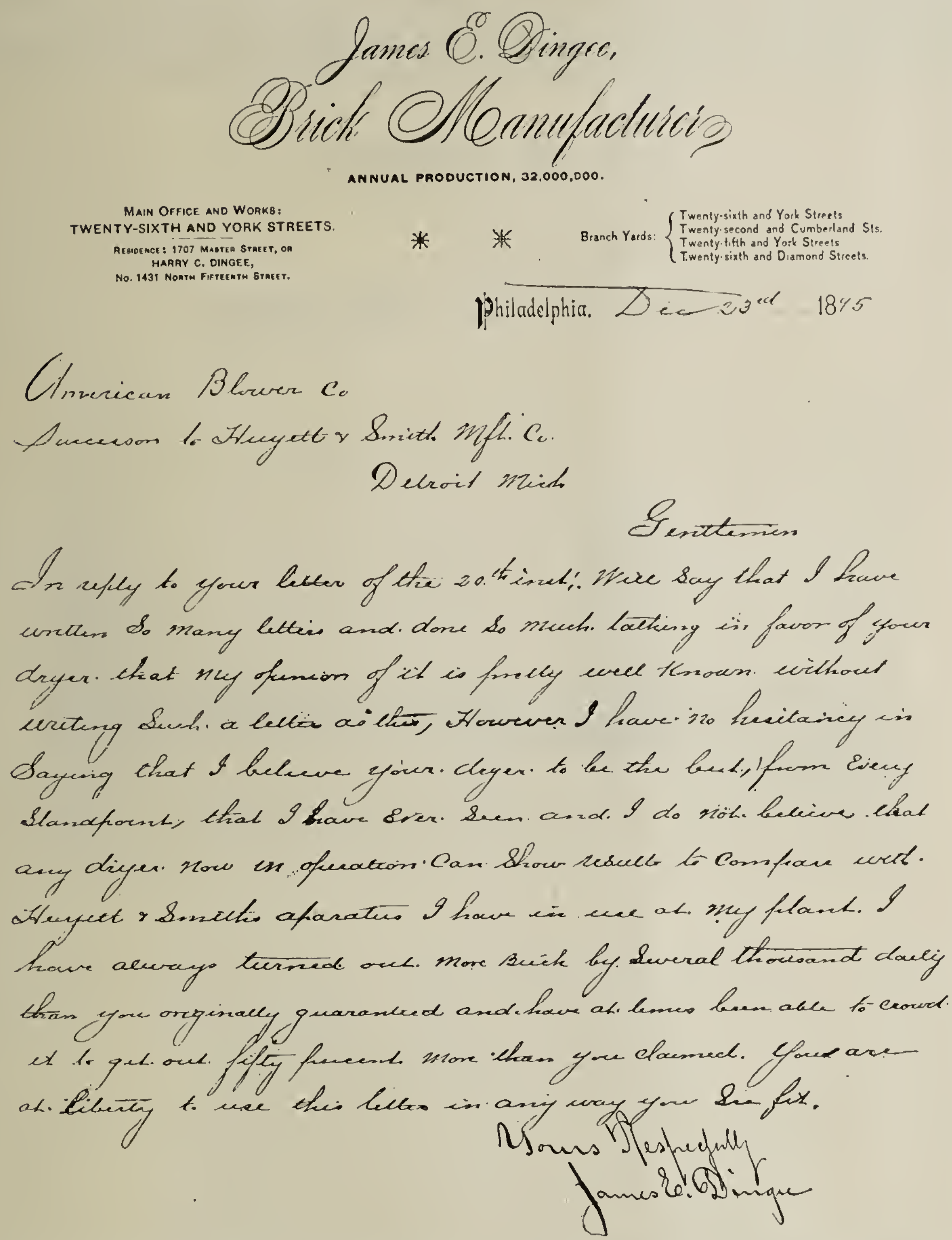
OUR... Improved Hot Blast Brick Dryer

Read this Letter.

"THE BEST FROM EVERY STANDPOINT."

NO DRYER now in Operation CAN SHOW RESULTS to Compare with THIS ONE.

50 per cent. More Brick Dried Daily than Guaranteed. A Record Hard to Beat.



James E. Dingee,
Brick Manufacturer.
ANNUAL PRODUCTION, 32,000,000.

MAIN OFFICE AND WORKS:
TWENTY-SIXTH AND YORK STREETS.
RESIDENCE: 1707 MASTER STREET, OR
HARRY C. DINGEE,
No. 1431 NORTH FIFTEENTH STREET.

Branch Yards:
Twenty-sixth and York Streets
Twenty-second and Cumberland Sts.
Twenty-fifth and York Streets
Twenty-sixth and Diamond Streets.

Philadelphia. Dec 23rd 1895

American Blower Co
Successor to Huyett & Smith Mfg. Co.
Detroit Mich

Gentlemen

In reply to your letter of the 20th inst. Will say that I have written so many letters and done so much talking in favor of your dryer that my opinion of it is pretty well known without writing such a letter as this, However I have no hesitancy in saying that I believe your dryer to be the best, from every standpoint, that I have ever seen and I do not believe that any dryer now in operation can show results to compare with Huyett & Smith's aparatus I have in use at my plant. I have always turned out more brick by several thousand daily than you originally guaranteed and have at times been able to crowd it to get out fifty percent more than you claimed. You are at liberty to use this letter in any way you see fit.

Yours Respectfully
James E. Dingee

AMERICAN BLOWER COMPANY
SUCCESSOR TO THE HUYETT & SMITH MFG CO.

Brick Cars,
Transfer Cars,
Tee Rail.

Send for....
Catalogue,
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Main Office and Works, DETROIT, MICH.

CHICAGO, 31 South Canal St. NEW YORK, 26 Cortlandt St. LONDON, ENG., 70 Gracechurch St.

A Good Investment!

That's how Mr. Florey regards his purchase, as a perusal of his letter below will show, and he but voices the sentiment of **all users** of

The Standard Improved Brick and Tile Drier.

Downingtown, Pa., October 25, 1895.

THE STANDARD DRY KILN CO., Indianapolis, Ind.

Gentlemen:—I have been operating one of your improved Natural Draft Driers about two months now and have given it a very thorough test. After getting the temperature and drafts regulated to suit my clay, it hasn't given me a particle of trouble; in fact, has been running along nicely ever since. My clay checks and cracks very easily, but I have no difficulty in drying my brick perfectly in your Drier.

*I use the **Chambers Stiff Mud Machine** and make 35,000 brick every day. The Drier takes care of them nicely, and I have never had to set a wet brick.*

I look upon the purchase of your Drier as one of the best investments I ever made, and cheerfully recommend it as the least complicated, and in every way the most practical device of the kind I know of. It is costing me 25 cents per thousand for coal to run the machinery and dry my brick.

Yours truly,

JAMES FLOREY.

Its adaptability to the drying of all kinds of clay and all varieties of clay products and the further fact that it is **no experiment**, but a **proven success**, makes it the **popular Drier** of to-day. If you have this subject under consideration, our 110 page catalog will surely interest you.

Can we Send You a Copy?

The STANDARD DRY KILN CO.,

Patentees and Sole Manufacturers,

186 South Meridian St., INDIANAPOLIS, IND.

THE CLAY-WORKER

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXV. INDIANAPOLIS, IND., APRIL, 1896. No. 4.

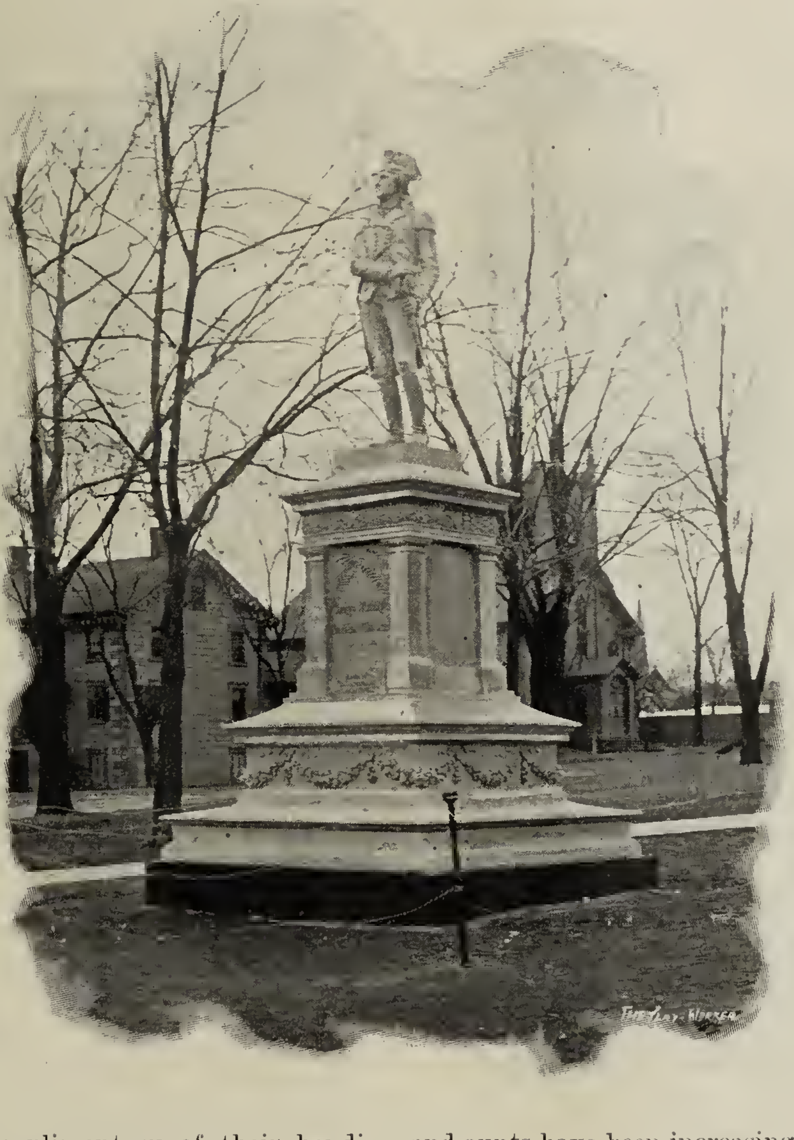
Written for the CLAY-WORKER.

A TERRA COTTA MONUMENT.

The Father of our Country in Jersey Clay—An Appropriate Gift From the Foreign Born Clayworkers of America's Greatest Clay Center to the Municipality of Perth Amboy.

THE ACCOMPANYING illustration will give the readers of the Clay-Worker an idea of the appearance of the fine terra cotta statue of George Washington which was presented to this city by the Scandinavian population of the city on the 22nd of February last, as an emblem of the good feeling they have for their adopted country and more particularly for this city where there are now 3,000 Danes and Swedes many of whom are in good circumstances.

As the monument is of terra cotta, made of Jersey clays perhaps it is a rarity, and your readers may be pleased to see how beautiful and lasting clay may be made.



To relate the origin of this monument it will be necessary to go back some two years next Labor day, at that time an immense parade of the industrial interests took place entirely composed of the Scandinavian race residing in this city. In that parade every industry in the city was represented on floats, amongst the mile of floats was one with a bust of George Washington undergoing the modeling process as the procession passed on the way. Every one who saw the parade was not only pleased but immensely surprised at the vastness of the interests represented and many congratulations were passed from the native born to our foreign brothers, complimentary of their handiwork. After this undertaking the idea was suggested that these people alone should construct and erect a lasting monument which should be presented to the city. A committee was at once appointed of lively workers, who asked the city council if they would grant permission to erect such a monument in the public park, such permission was immediately granted; then the committee commenced in earnest to make plans to provide means and ways to erect the statue, which so beautifully adorns our city park at this writing.

It was at once decided that none but those of Scandinavian birth should subscribe one cent, or do any of the work.

Entertainments were given and the work was started in the studio of Mr. C. C. Alling in this city, who modeled the statue as the photo shows, full life size. The whole thing was burned in the kilns of the New Jersey Terra Cotta Co. This concern is owned by Danes who are graduates from the Perth Amboy Terra Cotta Works. The pedestal is about eight feet square and nearly eight feet high of a buff color. The statue is a beautiful piece of work representing the immortal George in the act of sheathing his sword after the many struggles he passed through in the Revolutionary War.

On the 22nd of February this year the monument was unveiled by the small daughter of Mr. Alling the artist who created the work. Speeches were made by Danes, Swedes and by the Mayor of the city, the chairman of city council and by one of Washington's descendants.

After looking at this magnificent piece of work made of Mother Earth we wonder why such material is not more generally used, certainly nothing more grand can be produced from granite or marble.

The first Dane to arrive in this city was one John Hanson in 1882, since then his cousins and aunts have been increasing at a wonderful rate, almost one-third of the population are now of Scandinavian origin. As a race they are steady men and women, saving, industrious and seem to take to the American idea of independence, become voters as soon as they can, and in fact do their share towards building up the city.

In presenting our city with this token of their patriotism and industry they evidence a spirit of Americanism that might well be emulated by many of our native born workmen.

W. R. Osborne.

Written for the CLAY-WORKER.

A TRIO OF ANGLO-AMERICAN POTTERS AND THEIR WORKS.

BY EDWIN ATLEE BARBER.

IT WILL BE interesting to collectors of old blue china to learn something about the men who produced it for the American market, because their names in this country are now as familiar as they were in England sixty or seventy years ago. Among the most prominent of these are Enoch Wood, James Clews and William Ridgway.

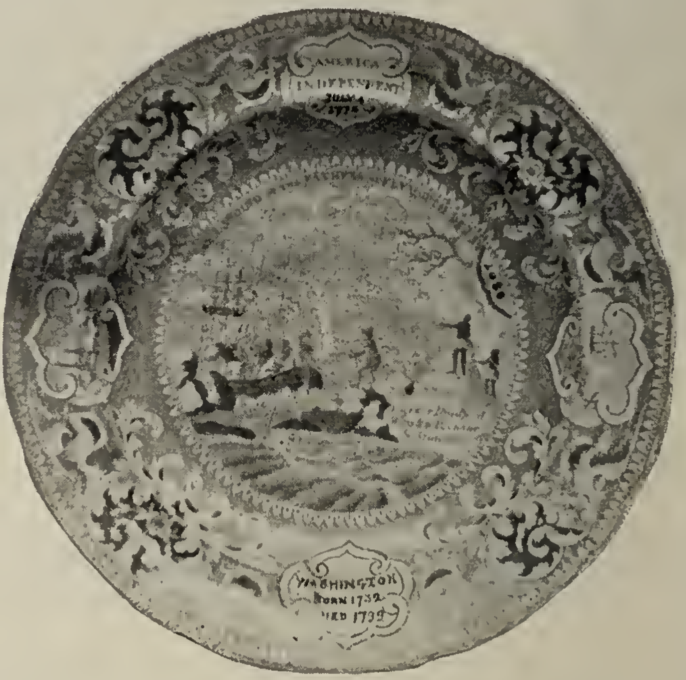
The recent revival of china collecting in the United States, which has been brought about largely by the various patriotic societies which have recently been established, has forced these names into prominence again, and it is, therefore, an opportune time for the presentation of such facts pertaining to the originators of historical designs as can be gathered together at this late day.

—Enoch Wood,—

Sometimes called "the father of pottery," was born on Jan. 31, 1759, and was married in December, 1780, to Ann Bourne, of Burslem, England. He commenced potting on his own account in the year 1783, and in 1790 was joined in business by Mr. James Caldwell. In 1818 he purchased his partner's interest, and the firm then became Enoch Wood & Sons.

Portrait of Enoch Wood.

The founder of the Burslem works was one of the foremost potters in England, and his name became a household word in the United States during the first quarter of the present century. No English potter devoted more attention to the preparation of special designs for the American people than he. Among these were busts of Washington and other celebrities in basaltes, table and toilet services, in rich, dark blue color, with pictures of American scenery and public buildings. The plates of this dark blue series were usually finished with a characteristic border device of sea shells, and by this they may be readily recognized. There were views of the Capitol at Washington, the house at Mount Vernon, the Baltimore & Ohio railroad and scenes in the Catskill mountains. There was also a representation of Commodore MacDonnough's victory on Lake Champlain, and, to commemorate the two-hundredth anniversary of the landing of the Pilgrim fathers at Plymouth in 1820, he produced an appropriate and attractive design, which is now among the most valued and desirable pieces among collectors to-day.


AMERICA INDEPENDENT JULY 4 1776
WASHINGTON BORN 1732 DIED 1799

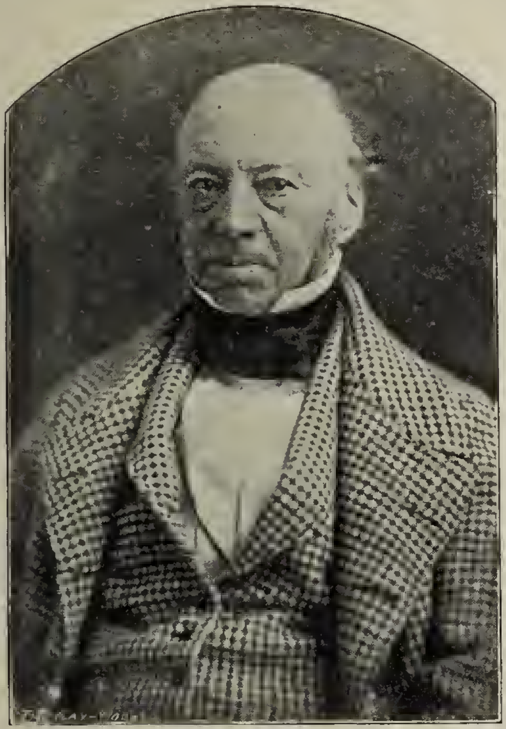
Landing of the Pilgrims in 1620. (Wood)

After the style of Enoch Wood & Sons (E. W. & S.) had been adopted a new series of American patterns took the place of the dark blue ware, which included such decorative subjects as the Natural Bridge, Trenton Falls, etc., in black, brown, pink and other colors.

Enoch Wood also executed a set of plates with Scriptural subjects, such as Jacob wrestling with the angel, the flight into Egypt, Peter in the garden, and a scene from the book of Revelations, which were distinguished by an appropriate border containing biblical symbols. A set of plates for the French trade was distinguished by an entirely different border design, containing representations of the iris, hollyhock and grapevine. This series included well-known castles in France, such as the Chateau Ermenonville, La Grange, the residence of General Lafayette, and an old mill on the Marne at Charenton. Mr. Wood was one of the most prominent and public-spirited citizens of Burslem, and for many years held some of the highest offices in the gift of the town, and in 1835 he was selected to lay the corner-stone of the new covered market. He died on Aug. 17, 1840, in his eighty-second year. Every china collector in this country is familiar with the name of Enoch Wood, and the very excellent portrait which is here reproduced from an old engraving, furnished by one of his kinsmen, Mr. Thomas F. Wood, master potter of Burslem, must prove of great interest to his admirers in this country.

—James Clews,—

Of Coleridge, was another noted English potter whose American devices on china gained for him a wide reputation. He succeeded Mr. A. Stevenson in business about the year 1819, and continued the works for ten years. During this period he employed some of the best copper-plate engravers in England to prepare subjects which would appeal to American purchasers, and among his most popular works was the "States" design, which had an enormous sale among our ancestors. This seemed to catch the popular fancy for the reason that it included among its numerous details a supposed portrait of Washington and Masonic emblems, and was encircled by fifteen festoons, each inscribed with the name of one of the States. This is perhaps the most satisfactory and the best known design produced by the old English potters for the American people. When General Lafayette revisited the United States in 1824 Mr. Clews took advantage of the opportunity to execute, in commemoration of the event, a view of the General's reception at Castle Garden, New York, in dark blue, and the "Landing of Lafayette" plates were sold extensively throughout the country, and are to-day still abundant. The same scene is found also on other pieces, such as pitchers, bowls, platters and pepper boxes, and was probably printed on all the pieces of full dinner and tea sets. At a later date he produced some attractive patterns representing natural scenery on the Hudson river, in light blue, black and brown.



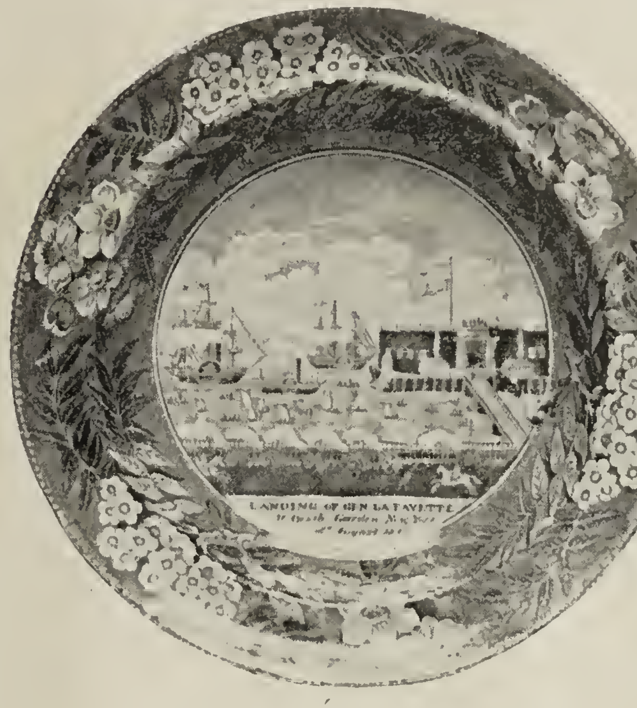
PORTRAT OF JAMES CLEWS.

In 1836, after the closing of his Coleridge works, Mr. Clews came to this country with the intention of manufacturing the same class of wares on this side of the water. He went to Troy, Ind., where a company was formed, and workmen were procured from England. But the Indiana venture did not prove a success, on account of the difficulty of obtaining suitable clays and the incompetency of the operatives. After considerable money had been sunk in the enterprise Mr. Clews returned to England.

There is perhaps only one portrait of James Clews in existence, which is a daguerreotype in the possession of one of his sons, Mr. Henry Clews, the well-known financier of New York city, who has kindly permitted a copy to be made, which is here reproduced. As a potter Mr. Clews had no superior, and no finer ware of its kind was made than that produced at the Coleridge works.

—William Ridgway—

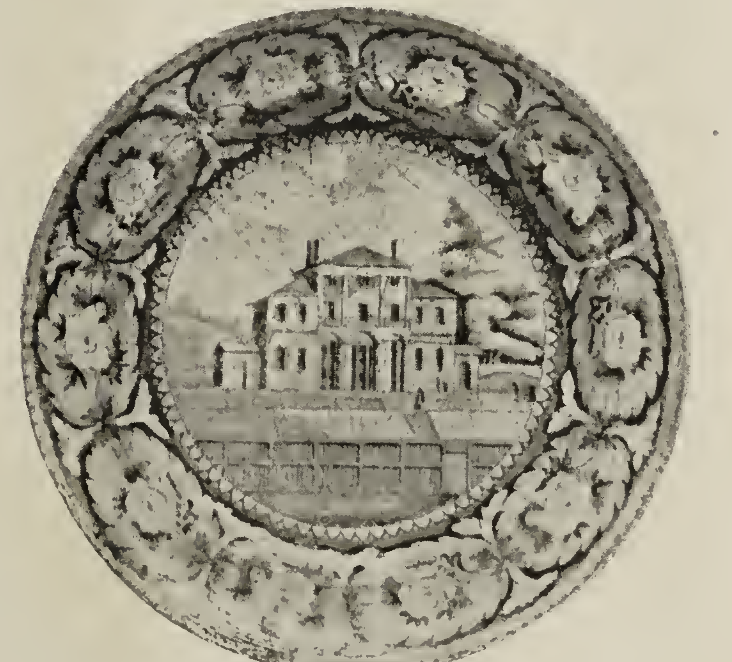
Was among the most extensive manufacturers of his time, about 1830, when he was the head of at least six important establishments in England. Previously he had been associated with his brother, John Ridgway, under the firm name of J. & W. Ridgway. They commanded a large American trade on account of the numerous special designs which they printed in dark blue for American purchasers. The "Beauties of America" series covered a wide range of subjects, principally views of the prominent buildings in the larger cities of the Union. Among these were the national Capitol, Philadelphia Library, Boston Almshouse, and Insane Hospital, Boston. The border design of roseleaf medallions was handsome and characteristic. After William Ridgway commenced manufacturing alone he issued a series of new designs in light blue, black, etc., which portrayed the natural scenery of various parts of the country.



LANDING OF LAFAYETTE IN 1824. (Clews.)

About 1843 Mr. Ridgway came to the United States and began the erection of a pottery in Kentucky, but this was never finished on account of some reverses with which he met about that time. He then returned to England, where he afterwards died.

There were other prominent English potters who manufactured largely for the American market, such as Joseph Stubbs, R. Stevenson, W. Adams and T. Mayer, but their American designs were not so numerous, and consequently they are not so well known here. The names of the trio of Anglo-Ameri-



INSANE HOSPITAL, BOSTON. (J. and W. Ridgway.)

can manufacturers' that we have sketched above, however, will continue to live on this side of the Atlantic as long as collectors continue to pursue their hobby and the beautiful, dark blue, historical designs survive.

Written for the CLAY-WORKER.

STANDARD SPECIFICATIONS.

BY D. W. STOOKEY.

"Come, now, and let us reason together."

THE FELLOW that is on the side of the minority is considered stubborn or cranky by the majority. Maybe he is. Possibly the majority is wrong. In this land, where the majority rules, the minority is allowed to make what is known as a "minority report," although it seldom carries more influence with it than a protest. In many cases the question is carried by the majority without the minority report, simply because those of the unpopular opinion do not like to appear stubborn or cranky.

As my bump of self-esteem is a depression, and my caution is very largely developed, and my veneration or deference full, I cannot be accused of egotism if I presume to hold or seem to hold opinions at variance with the majority. My apology for taking the position that I do may be found in the fact that my firmness and conscientiousness are large, and I thus naturally and stubbornly stand up for what seems to me to be right. With caution unusually full, I would not dispute the opinion of a big fellow unless my conscientiousness and firmness were so strong that they overruled my caution. They seem to have done so in the present instance; so here goes for a dig at the idea of standard specifications for paving brick.

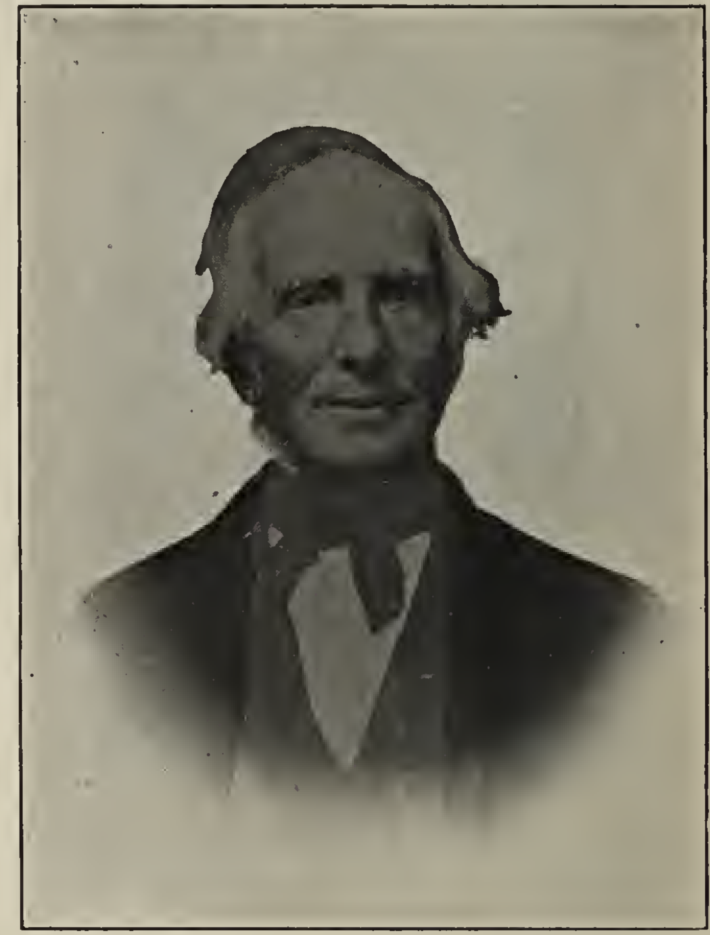
First of all, I do not believe that any standard set of specifications could ever be formulated that would be generally accepted by municipal engineers, and secondly, if such a set of specifications should be established they would of necessity so favor certain clays and methods of manufacture as to smack strongly of favoritism and monopoly.

Good paving brick are those that will make good pavements. A good pavement is one that gives satisfaction at a reasonable cost. As the requirements of pavements vary for different places, it is just that the specifications should vary. A pavement that satisfies all requirements in one street might not be equal to the demands of another where the requirements are greater, and yet the pavement is a good one for the street with lesser needs. When a satisfactory pavement can be laid in a street with moderate traffic at a cost below that of such a pavement as would be required in a street with heavy traffic and severe tests, it should be used. Pavements that will stand the needs of heavy traffic are necessarily more costly than those that will satisfy in streets with moderate tests, and to specify and use the expensive pavements in the quiet streets or smaller cities is to put an unnecessary expense upon the taxpayers of those localities.

There are several objections that might be urged to a single standard list of specifications. One is that they recognize no difference in degree in the needs of different streets, but call for the same grade of brick for the quiet residence street as for the busy business thoroughfare with a heavy freight traffic. Another is that it allows a market for only one grade of brick. This makes it hard on the brickmaker, for no matter how successful he may claim to be in getting a large per cent. of No. 1 brick from his kilns, all practical men know that there will be many brick that cannot go as No. 1. If there is no other market for the inferior brick there is a strong temptation to put them in as first-class. This will lower the standard of the average and defeat the object of the specifications. If there is no market for the second class, the price of the first class must, in justice to the manufacturer, be high enough to cover the loss of the seconds.

Again, a single standard set of specifications would probably favor certain classes of clays and methods of manufacture, to the detriment or exclusion of others that might make just as good paving brick. Specifications have been drawn that called for "shale brick," "repressed brick," and brick "as good as the best Blank brick." While the idea is not entertained for a moment that the committee will recommend such specifications as these, they are mentioned as an introduction to the thoughts that follow, and will serve to show how specifications may be partial to certain clays and processes. One only has to be familiar with the history of brick pavements to know that shale is not essential to the manufacture of good paving brick. In fact, the use of shale in the manufacture of paving brick suggests the story of the horseman who took a foot traveler up behind him to ride. In a short time the man behind claimed the horse as his, and wanted the other man to get off.

All localities do not have shale. Many sections of the country are geologically older than the formations in which shale is found. When such sections have clays that make good paving brick, it would be unjust to the local brickmakers and to the taxpayers, and add unnecessarily to their burdens, to require that pavements should be made of shale brick and be shipped in at additional expense. Brick made of clays other than shale might and probably would show higher per cents. of absorption than shale brick, and yet would be good and satisfactory paving brick.



PORTRAIT OF WILLIAM RIDGWAY. (Page 337.)

Toughness is the one great essential of a good paving brick, and this is being sacrificed in the attempt to reduce the per cent. of absorption. The idea that well-burned brick that absorb water to a moderate extent will be disintegrated by frost is not sustained by experience. Builders using soft mud brick, with a high per cent. of absorption, accept as weather brick, any that are burned to a cherry red, and they do withstand the influence of water and frost. Whether the fact can be explained by saying that burned clay is elastic and expands and contracts with the freezing and thawing, or whether it can be explained in any way or not, it certainly is true that well-burned brick do withstand the action of frost.

To reject good, tough, well-burned brick because they absorbed water above 2, 3 or even 4 or 5 per cent. would probably be unjust to the brick and their manufacturer. Too much stress has been placed upon the absorption test.

A set of rigid specifications that required brick to come up to certain standards for all the tests which have been recognized as valuable in testing brick for paving would unavoidably be unjust to many brickmakers. The experience by practical tests in Bloomington and Decatur, Ill., and many other places where the value of brick for street paving was first demonstrated by the trying tests of use for years, has shown that many makes of brick that would fail when subjected to the popular tests of to-day have grandly stood the more valuable test of time in the street. I mean that many good brick that would satisfy all requirements in the street would fail and be rejected if submitted to the tests so much relied upon to-day. I do not wish to disparage the use of these tests, but, on the contrary, I consider them valuable as short preliminary methods for the examination of different brick, but I do not believe they should be relied upon to the exclusion of the conclusions drawn from experience and mature judgment.

The best method of testing paving brick is by personal examination by one who knows what a good paving brick is when he sees it. The apparatus necessary to make this test is:

One good eye.
One good ear.
One good light hammer.
One good conscience.
One good judgment, and
One good education in the subject of brick pavements and paving brick.

Brick that are tested by this method and apparatus will receive fair treatment, whether they be made of shale or not, whether they be made by one method or another, whether they be "as good as the best Blank paving brick" or not.

The committee appointed by the N. B. M. A. last winter have wrestled with the question for almost a year, and now report that they are unable to formulate a set of standard specifications, and ask for time and funds to conduct a series of experiments. These experiments are to be tests of samples of paving brick. It is hoped that these experiments will supply the data necessary to decide what the standard specifications should be. The very small minority with the very large bump of caution is haunted by the fear that the final decision of the committee will be that there is no absolute standard that will be satisfactory and just to all parties concerned. The committee may be able to select certain arbitrary standards that are a compromise, and the engineers, contractors and brick manufacturers may accept these established specifications as standard, but the probabilities are that the standard will not be rigidly adhered to, but will be bent to suit local conditions.

Whether the committee succeeds in deciding upon certain standards or not, and whether or not a set of standard specifications are finally selected and approved of by the members of the N. B. M. A., the work of the committee will not have been in vain. Should the idea of establishing a set of standard specifications be abandoned as impracticable, the work of the committee will be of inestimable value to the cause of brick paving. This thorough agitation and investigation of the subject will call attention to the conditions as they exist, both as to needs of pavements and possibilities at present of the manufacturers of paving brick. Much discussion and investigation will be evoked, and the needs will be made manifest. When the essentials of good brick pavements and the characteristics of good paving brick are well known by municipal authorities, there will be no longer a need of standard specifications.

I, for one, to be plain, don't think that a set of standard specifications that will be satisfactory will ever be made. The conditions of different clays and in different localities are so varied that they can never be brought under one set of rules.

Written for the CLAY-WORKER.

PREPARATION OF CLAY AND BRICK MACHINES.

BY R. B. MORRISON.

MANY MACHINES have been invented for preparation of clay, and there are some very successful for soft clay brick. The pugger is, perhaps, best. If clay is soaked well the pugger will prepare clay well for soft-mud machines. Preparing clay for dry-press brick has been pretty nearly perfected. The clay, after passing through pulverizers and screens, is ready for the dry-press machine, and produces a brick of finished appearance on the surface. The fact that dry clay pulverizes more readily than damp clay accounts for the successful preparation of dry clay.

This brings us to the stiff or plastic clay process. It is the most difficult process for which to prepare clay. It is not moist enough to dissolve, like the soft clay process, and it is not dry enough to pulverize. Roll crushers reduce it to small particles, but not to fineness. The disintegrator, a valuable machine, reduces it to granulation, but not fine enough. The pugger then does its work, and is good in its way, but for stiff clay it cannot and will not dissolve the small, hard particles that appear in nearly all clays that have not been dissolved by moisture. They are there; they do not appear on the surface, but can be seen when the brick are broken.

What is needed now is a process that will pulverize clay as it comes from the mine, so that we need not add water to it or extract moisture from it before it can be properly prepared. It is a difficult thing to do, but it can and must be done. Going from plastic brick to soft clay brick we cannot, and there are many clays that will not make dry-press brick profitably. The trade demands a machine that will make brick from clay as it comes from the mine without adding moisture or extracting it, and the foundation of success of this process or machine is the pulverizing of moist clay so that it can be prepared for the machine and molded into bricks as it comes from the mine.

When the pulverizing of moist clay is made a success, then a machine will be invented to convert this thoroughly prepared clay into a brick form, of fine texture and face smooth and solid. How can moist clay be reduced to proper fineness? I think this can be accomplished by gradual reduction by the roller process. One set of rolls to reduce lumps to small size; another set, still closer, to reduce still finer; a third to roll it in thin sheets. Then pass it through a very rapid disintegrator, with knives close together, running close as practicable to its cylinder. This would destroy all lamination and leave the clay in proper shape for the machine.

We hold this as a self-evident truth, that a brick should be made in a mold, and, when delivered from the mold, should have two good, smooth faces, two equally good ends and flat sides of fair smoothness, sharp corners and well-defined angles. The writer's crude ideas of such a machine were expressed in an article that appeared in the December, 1894, issue of the Clay-Worker. My good friend Crossley (who, by the way, coquetted with Miss Columbia for twelve years, then returned to his first love), in a recent article in the Clay-Worker, refers to my description of this ideal or imaginary machine, and describes one he saw in England, built substantially on the lines suggested.

The serious obstacle to overcome after clay is in proper condition is filling the mold ready to receive pressure. Pulverized dry clay will flow freely into the mold; moist clay will not flow so freely, hence it might be necessary to put more clay into the mold than was required to make the brick, give it sufficient pressure to pack the clay closely in the mold, then deliver it, partially cut off surplus clay, and subject it to a pressure that would give it a solid surface, then let it move a short distance in the mold under heavy pressure to polish the sides and ends of the brick.

There is a demand for a machine of this kind which our inventors and manufacturers of machinery have not responded to. A well-finished plastic brick, made in a mold, with solid, smooth surfaces, would fill "a long-felt want" in the brickmaking world. Such a brick would possess all the virtues of a dry-press brick. It would be hard enough when it came from the machine to bear handling without losing its shape, and less liable to break at the edges in handling. There would be less water in it when molded than a plastic brick contains, and less moisture to be expelled after it is made.

If a machine built on this principle can be made and operated in England, I can't see why another much better cannot be built this side the Atlantic. Americans know a good thing when they see it, and usually "push it along." I have no doubt that readers of the Clay-Worker would be pleased to hear further from Brother Crossley in reference to this particular machine, and he could doubtless give some pointers and valuable advice that might lead to practical results. Improvements in all lines of machinery pertaining to brickmaking have in the last twenty years been simply wonderful, and our inventors deserve great credit for what they have accomplished, and yet there is little doubt that the next twenty years will keep pace with the march of the past twenty.

So far as plastic machines are concerned, manufacturers have for several years followed the beaten path. There has been no important change from first principles, so far as shaping and finishing the brick is concerned. More attention has been given to automatic cutting of the brick, perfecting and strengthening the various parts. What is needed now is a "new departure," and I feel confident this great want will be supplied by our enterprising manufacturers, and I fully expect to make brick on a machine built on these general principles unless I should die a young man.

Written for the CLAY-WORKER.

ROOFING TILES.

TO STUDY HOW to improve our homes is certainly a pleasing and a very beneficent occupation, and to improve them so that they shall look more pleasing is to create a thing of beauty which shall be a joy while it endures, and also have a redeeming and elevating influence upon all beholders. Such is the gracious power of beauty in architecture. How to make a roof look well is a problem for architects, and the only solution is found in the use of roofing tiles. The use of any other material presents large, flat, dark, monotonous surfaces, unrelieved by any form or line of beauty. Roofing tiles are older than the Christian era, and, there is good reason to believe, older than written history, and yet in all ages much inferior material has been used for the covering of roofs. Virgil wrote, forty-one years before Christ:

> "And shall I, after many years of woe
> E'er my loved country tread, e'er hail again
> My turf-roofed cot, the palace of my reign?"

Long after the more aesthetic civilization of Greece had made roofs of tiles of still unsurpassed beauty, "the Romans used shingles for the long period of five ages." Bullrushes were used in the north of Europe, but the Romans seem to have introduced the use of reeds there and in England, and "the buildings of colleges and town houses in other countries were then generally covered with it." "Such was the roofing in London within the three last centuries."

In "Brown's Domestic Architecture," published in London in 1841, thatch is mentioned as a suitable covering for the roofs of "genteel rustic cottages."

> "Where houses be reeded (as houses have need),
> Now pare off the mosse and go beat in the reed;
> The juster ye drive it, the smoother and plain,
> More handsome ye make it to shut off the rain."

The author does not pay so good a compliment to tiles, and only mentions them in comparison with slate, as follows: "Slates are much dearer in London than tiles, but the former are nevertheless getting greatly into use, slate being found preferable in every respect," and he quotes Bishop Watson as saying: "Tiles, though extensively used in many provincial towns, as well as the metropolis, constitute a very heavy covering for houses, and, what is still worse, they injure the timber on which they are laid, and tend to make a house damp from the facility with which they are penetrated with moisture."

The Encyclopedia Britannica gives substantially the same opinion of roofing tile. It is greatly to be hoped that these serious charges do not apply to roofing tile as they are at present made in England, and that the Britannica republished opinions of many years ago. After carefully reading an English work on the manufacture of bricks and tiles, published in 1873, the writer is convinced that these charges were at that time true, but hopes that there, as well as in this country, the manufacturers have, by the use of machinery, a better selection of clay and improved methods of burning, been able to produce a much lighter and non-absorbent tile. The work was written by Edward Dobson, A. Q. C. E., M. Q. B. A., revised and corrected by Charles Tomlinson, F. R. S., with additions by Robert Mallett, A. M., F. R. S., M. Q. C. E., and the preface states: "Though small and elementary, this work may probably claim to be the most complete upon its subject in the English language." Who can doubt its reliability, and that it represents the state of the art as it was in England twenty-two years ago? The authors write of the manufacture of bricks and drain tiles by machinery, but not of roofing tiles, hence we may infer that machinery was not used, or used but very little, for that purpose. This is more manifest from the fact that they treat of hand-molding quite elaborately, and give illustrations of all the implements and processes used for the purpose. We learn from reading the work that the same clay is used for making roofing tile as for brick, but without any admixture of loam; that the tiles are hand-molded; that pantiles are five-eighths of an inch thick, and that in the country it is common to burn bricks and tiles together. It is of tile made in this way of which Bishop Watson writes that "all unglazed tiles imbibe a seventh part of their weight of water in ten minutes" and the Britannica writes disparagingly. And it is quite evident to any American manufacturer that any one of the above-named conditions would make an imperfect roofing tile, and that all of them would make a roofing tile not fit to be used in the northern part of this country, or in the very moist climate of England. The charges are undoubtedly true, but do not apply to tile made by American manufacturers.

The American manufacturer uses a much better clay for the purpose than is generally used for making common bricks, preferring that which may be safely burned to a vitreous body. They are burned to a heat that would deface a common brick, and are molded by power presses, and to a thickness of from one-fourth to three-eighths of an inch. There is, consequently, no comparison between the products of the two systems of manufacture.

There seems to have been a great retrogression in the art of making roofing tile, for we read in Ionian antiquities of the Temple of Diana at Eleusis that the roofing tiles of the propylaea were made of baked clay. "The alternate joint tiles terminated at the ridge and eaves with a flowing ornament composed of the honeysuckle flower and two scrolls belted together, and supported by three acanthus leaves." How does this word-picture of aesthetic beauty compare with

The LaRabida Convent as Reproduced at the Worlds' Fair.

the roofs of the La Rabida Convent, built two thousand years after? Some one has said that roofing tiles were first invented at Cyprus. We doubt it, because we cannot resist the conviction that the Assyrians, who nearly four thousand years ago were skillful workers in metals, familiar with glass-making, and knew how to make enameled brick probably as well as we know to-day, also knew how to make roofing tiles, and that this art moved westward to Greece. They were carried by the Romans into Germany, France, England and Spain, and by the latter country into Mexico and South America; but no nation has given to them such beautiful forms as were molded by the Grecian artist for the temples of his gods. More wealth and skill and taste are given to their improvement than ever before since Greece became a Roman province, and the results obtained by the use of machinery within the last thirty years indicate a renaissance in roofing tile.

Geo. S. Tiffany.

A NEW CLAY PRODUCT—TERRA COTTA FENCE POSTS.

IF ITS ADAPTABILITY can be demonstrated, and it can, clay would seem to be the most desirable material for an artificial post, it is so abundant, so widely distributed, so cheaply mined, so readily worked, and, when properly burned, is not affected by the weather, cannot be destroyed by fire, does not rot, rust or disintegrate, but practically lasts forever. It is strange, therefore, that so little attention has been paid to clay by the many who for the past fifteen or twenty years have been striving to produce an artificial post that would meet all the requirements of a practical fence post for general farm and railroad use. We cannot understand why the inventive mind should have so generally put its faith in iron and steel as the materials for such a post. It is true that a stronger post can be wrought out of iron or steel with less weight of material than such a post can be made of clay, but it costs more to make the iron or steel post, and it is not nearly so good a post after it is made. It is better than a wooden post, perhaps, because it is fireproof, but it will not last much if any longer than a good wooden post. Contact with the damp ground seems to affect iron chemically in some way. Some attempt has been made to overcome this by the use of an insulating material like asphaltum, but we doubt its success. Some little attention has been given to clay by inventors. Several posts have been produced partly composed of clay—combination posts they might be called—where burned clay has been used for the base of the post, the part in contact with the ground when in use, and the post proper made of iron or steel, which is set into the clay and fixed by cement or otherwise, or where the iron or steel post is more or less enclosed in a shell of burned clay; but no post has been produced during this time made exclusively of clay, except the terra cotta fence posts that we are now about to describe, and which we have claimed as

—Another New Clay Product.—

The Noxall fence posts, as they are aptly called, if what is claimed for them is true—and we leave you to judge of that—are a recent invention, the first patent being dated in this present year. The post, as the illustrations show, is perfectly plain and straight, made all in one piece, without any anchoring piece or other attachment to complicate its manufacture. It does not differ materially in appearance, in a picture or viewed from a distance when in a fence, from the ordinary white cedar post so commonly used in railroad fences. It is, however, of hollow construction, instead of being solid, as the cedar post is if the heart is sound. The fence wires are attached in much the same way they are attached to the cedar post, the difference being that with the Noxall posts the staples extend entirely through the post, and are securely fastened on the side opposite the fence wires, so that a strain against the fence in any direction meets the full resistance of the post, and, if the fence wires do not break, the fence remains intact. The staples cannot pull out, as they frequently do with a cedar post. In the first illustration the shorter of the two men (the one on the left) is about 5 feet 7 inches in height, and the other perhaps 3 inches taller. The taller of the two upright posts is supposed to set on top of the ground, so that its whole length is visible, while the other is supposed to be set into the ground just as it would appear in a fence, so that you can get a fairly good idea from this picture of the proportions of the post and the distance it goes into the ground. The small pile of posts with their ends to the front, just back of the short upright post, shows the hollow character of its construction.

—Method of Manufacture.—

In the second illustration you can get some idea as to how the post is made. The view of the machine is not very clear, but it is simply an ordinary auger machine. After the post is cut off, as you see it in this picture, it passes on along the table, or belt, to the punch, a simple little machine not shown in the picture, which pierces the holes in it for the staples or wire fastenings, and then it is tipped out into a trough-shaped pallet to dry, which is stood up in very nearly a perpendicular position, or with just sufficient inclination to keep the post from falling out, or so that any side movement must be against the sides of the pallet. In this way the weight of the post presses its particles together as the shrinkage of the clay progresses, and the sides of the pallet keep it from bending out of shape. After the post is dry enough to go into the kiln, it can be handled without the pallet, like any other clay product.

The Noxall Clay Fence Posts.

Gardner, Pitney & Co., of Quincy, Ill., who control the patent rights in this post, state that the posts have been thoroughly tested, and prove equal to every demand.

It is the simplest and therefore the cheapest construction possible for a clay post. There certainly can be nothing simpler than a plain, straight post, and we cannot imagine how a clay post can be made any cheaper in construction than one like this, which is simply squeezed out of the die of an ordinary auger machine in one continuous stream of clay, and then cut up in the required lengths.

It is the strongest construction possible for a clay post. It is a scientific fact that a hollow column is stronger than a solid construction, and in a clay product of this character this fact is emphasized by another fact that clayworkers will appreciate—that a hollow pipe is better pressed in coming from a die than a solid piece of clay; and then the heat does not have to penetrate so far in burning a hollow post, and the result is a better cohesion of particles and a more uniform hardness than in a solid post. Then in the cylindrical form of construction we get the same advantage for the strains in a fence post that the arch in masonry gives over square construction.

It has the simplest and most practical method for attaching the fence wires. After these many years' experience with wire fencing the staple is still used for attaching the fence wires, and we think it fair to assume from this there is no simpler or better method possible with a wooden post, and if we can use the same simple method with a clay post and give more secure fastening, are we not entitled to make this claim?

Finally, that the post meets all of the requirements for a practical fence post for general farm and railroad use. It is of ample strength; it cannot be destroyed by fire; it will not rot like wood, nor rust like iron and steel; it is practically indestructible, and, once in the ground, should last forever; and it can be made cheap enough to enter into direct competition with the ordinary wooden fence post if necessary.

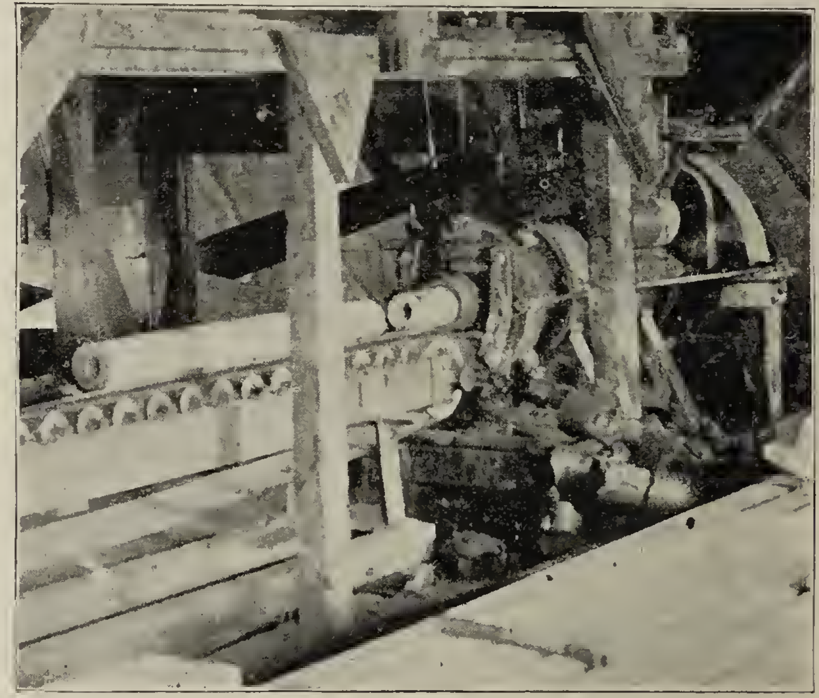
Written for the CLAY-WORKER.

PERFECT SETTING AND BURNING—BEST PROTECTION OF BRICKMAKERS, BOTH IN PRICE AND PROFIT.

BY J. W. CRARY, SR.

IN MY LAST ARTICLE in January Clay-Worker, I treated only of setting brick. It is common with writers on this subject to include both setting and burning in one article, and it is proper to do so, but I desire to call special attention to both parts of the work separately. Of course, every skilled brickmaker is competent to do any kind of work from the clay bed to the loading of brick on cars. A brickmaker that expects to order a man to do work on his yard and not be able to show the man just how he must do it is only a "quack," and that is just the trouble with many of our "soft-handed" brickmakers.

It is not expected that a good brick setter must necessarily be a good brick burner, but it would be difficult for a man to be a thoroughly skilled brick burner without a full, complete, practical knowledge of all work that is of prime necessity in making first-class brick. An active man of mechanical ingenuity can be soon taught to be an expert brick setter by a well-skilled brickmaker, but a good brick setter only could not teach a man the art of brickmaking.



How the Clay Fence Posts are Made.

Brick setting, with proper skill, is of prime necessity as an integral part of the whole business.

To be a good brick burner involves a knowledge of all pertaining to it. The brick burner must know the nature of his clay and the peculiar manufacture of it into brick. He must know the nature of his fuel and his kiln. What he could do successfully with a certain kind of clay would not suit a certain other kind of clay. If, for instance, a man becomes an expert brick burner in a clay that is infusible, then changes his position to clay that is easily fusible, he would very likely succeed with his first kiln until the "water smoke" was "off" and the "fires up." Then he would have to be student instead of teacher. The only way he could possibly succeed in making even a tolerable kiln would be to take, say, an outside arch and gradually raise the heat until the "overhangers" would begin to "drop" a little, then note the heat with perfect exactness, and be sure not to heat the other arches any hotter. With this precaution and vigilant care he might succeed in making a tolerable burn of his first kiln. So "vice versa." If the burner had been used only to clay that would fuse and shrink, and was to undertake to burn clay that would stand fire and not fuse, he would likely make a first-class "salmon burn."

—A Good Brick Setter Can Set Any Kind of Brick.—

Brick should be set uniformly the same, without reference to the kind of clay. As I said in the January article, any kiln of brick must be set so that a strong draft will be assured. There is a mistaken idea with many brick burners that if clay fuses at a low heat the brick should be set closer than if the clay is infusible, because, they say, "the strong draft makes the fire too hot." This reason has no force. If the furnaces make too much heat with a strong draft the truly expert burner will, of course, regulate the heat by his furnace doors, not by the fuel. If the draft in the kiln is equal to the power of the furnace, then the heat can be regulated by the furnace to suit the exact needs of the kiln; but if kiln be deficient in draft, then the power of the furnace is checked without remedy. The combustion of fuel is imperfect. The heat in the arches cannot freely pass up through the kiln, while the arch brick are fused, and all the lower part of the kiln is overburned and the upper part underburned. This is the certain effect of setting brick close, as is commonly done.

Fire clay or infusible clay brick can only be burned with great heat, which, in up-draft kilns, depends on a strong draft in furnace and the proper "dampering," with fine damp clay on top of kiln. Without the aid of top "dampering" it is impossible to equalize the heat or to regulate it in a brick kiln. If the brick be set so that there is free draft from bottom to top of kiln, the heat will naturally be greatest at bottom, and will try to make its escape out at top by the most open and direct channels, which will show in spots on top of kiln. It would be impossible to set or fire a brick kiln without dampering so that the heat would spread and come out on top with perfect uniformity. No matter how careful and regular the arches may be fixed, there will be unequal pressures of draft and fire in the arches and out through the kiln to top. It is said that the "platting" can be moved to prevent too much escape of heat to one place. I have tried that time and again, but not only found it a very disagreeable, hot job, but very ineffectual. If platting be moved from a cold to a hot place, the open space must be covered with cold brick as soon as the fire gets too strong in that open space, and when a man has to travel over a hot kiln and stand and catch brick and "plat" over a hot place he will not want to repeat the operation. Not only that, but it is impossible to move platting anywhere on a hot brick kiln so as to have the same efficiency as the proper spread of fine damp clay. The platting will be irregular, and the labor and trouble to make it a suitable damper is many times more than is required with clay. In fact, it is wholly impracticable to make a good job of dampering by platting. But it is said that only a little of that kind of work is needed. That is only where the fire comes out very strong, and the spot is settling too much. This, of course, ignores the whole theory of top dampering a brick kiln. I pity the stupidity of these "thick heads." They learn like a mule, and forget nothing that they learn, however useless and absurd.

No up-draft kiln of brick ever was or ever can be well burned without "dampering." If it be an up-draft kiln, when sufficient heat has been generated the tendency is to escape at the top, and if it be not checked by "dampering" the top of kiln must remain just as it was when the heat was greatest at bottom, and, though the bottom of kiln will get cool before the top, yet the heat at top is not increased by the escaping of greater heat from the bottom. Now it is plain to see that if the top of kiln be covered close all over the heat must equalize between top and bottom, and equally distribute itself in all directions. It can only pass off by radiation and not by force of draft, therefore the brick at top of kiln becomes thoroughly saturated with the same heat as at bottom, and the whole kiln is burned hard alike and annealed.

If the kiln be a down-draft kiln, there must be some way of "dampering" the bottom, or else the brick at bottom must be imperfectly burned, just the same as an up-draft kiln that is not properly "dampered." These principles are based on science and thorough experience, and cannot be disputed by any respectable authority.

Brick burning is a question of heat, not a question of kiln. There can be just as great heat made in a common "cased-up kiln" as in the best well-built kiln, provided that the furnaces are the same. Of course, there is a greater waste of heat in a kiln that is only "cased up" temporarily and "daubed" than in a well-built "clamp," yet the heat in the arches and in the main body of the two kilns is the same, and the notion that somehow or other brick cannot be well burned only in regular-built kilns is a mere "fad," so that kilns is only a question of economy in heat and labor.

Some one will say, "I wonder if old man Crary has tried all sorts of kilns?" No, I have not tried the down-draft kiln, because I never try anything that, to my mind, don't offer something better than I already have. I have no doubt but that good brick are burned in down-draft kilns, but to say that only down-draft kilns will burn brick perfectly is simply "ignorance on horseback." I have tried all sorts of kilns except down-draft, and could make first-class hard brick in all, and I think I could burn first rate brick in a down-draft kiln. As to kilns, it is not a matter of prime importance. Furnace, fuel and skill determine the quality and character of a brick. Within the last six weeks my sons have, for want of room in a regular kiln, been compelled to burn a kiln with only a common dry casing, "daubed" on the outside. The weather was quite cool and windy, but the kiln was burned in about a week. Of course, it was well covered, or "dampered," according to my system. It took a full week to get cool enough to open. The brick are hard alike from bottom to top and to the "heads," or outside course, all around. If this kiln had not been "dampered" on top it would have been impossible to have burned half of the brick hard. The clay does not shrink in burning, and requires a white heat, from bottom to top, to burn it to a first-rate hard brick. I mention all this to show that a proper system of "dampering" a brick kiln, so as to equalize the heat and retain it until it cools off by radiation, is absolutely necessary in order to make a perfect, well-burned brick.

—Price and Quality of Brick Depend on Uniform Setting and Burning.—

Until brickmakers arrive at that point of perfection in burning which will invariably produce perfect, uniform hardness and tenacity throughout the kiln, the price and quality of brick cannot be regulated or depended upon. The second or third course down from top of a kiln must be as hard as the brick at the bottom, and the kiln must be the same from "head" to "head" and from "outside" to "outside," excepting the outside course. This would, as a rule, leave about 2 per cent. of "salmon," 2 of second-class "hard" and 2 of "arch," in all 6 per cent. less than first-class brick. Now, if the manufacturer is making paving brick and can certainly count on 94 per cent. of his kiln, he will have not only a reliable profit, but also a reliable price.

As soon as the consumer of or dealer in an article finds that a certain "brand" of goods can be fully relied upon at all times as superior, his chief concern is to have his orders supplied. He don't higgle about price; that is "patent," and he simply says: "Please ship to me 100,000 pavers and send bill."

It is possible, but highly improbable, that all brickmakers will become so proficient and expert that they can be rated as first-class brickmakers, and when architects, builders and proprietors come to know a perfect from an imperfect brick, and to realize that a perfect brick is, in fact, the cheapest brick, then the second-rate brickmakers will have a hard time, and third-rate brickmakers will starve out. A competent, honest architect will tell his client that a perfectly good brick wall is better and cheaper at any price than a bad one. A nine-inch wall of first-class brick, put up by first-class skill, is better and stronger than a common eighteen-inch wall, filled in with bats and "salmon" brick. If whole, best hard brick are laid in proper "bond" and in best cement mortar, by a thoroughly skilled workman, in less than six months the wall will be as solid and strong as a good stone. Why, then, use "trashy" brick and materials to build an eighteen-inch wall, when a nine-inch wall of best materials is cheaper and stronger and saves nine inches of room? But it is said that "party walls" must be very thick, so as to stand fire without falling when adjacent buildings are burning.

—All "Party Walls" Should Be Built Hollow.—

An eighteen-inch wall, built hollow, with the best brick and skill, is stronger and more reliable than a twenty-seven-inch wall built in the common way, of all sorts of brick, and saves ground room.

As to the sale and use of the 6 per cent. of second quality of brick in well-burned kilns, they can be used in setting boilers or building chimneys and flues, and for any kind of light, cheap work, where strength and permanence are not important considerations. It would be well for all consumers of brick to give more special attention to the quality of brick and less to the price. As a rule, the cost of brick in building is about one-third the whole cost. Of course, this does not apply to heavy structures, but to dwellings generally, so that when a man builds a six-thousand-dollar dwelling house, and spoils the permanent value of his house by using cheap, bad brick, he makes a very fatal mistake. All kinds of work done in building a brick house, excepting the brick work, can be repaired, but it is a bad job when the brick work has to be replaced.

The paving brick industry has made a start for testing brick. The N. B. M. A. seems to have it in charge through a committee. When that committee shall have made its report we will have some correct data by which a street-paving brick can be known. But there remains one almost insuperable difficulty in the way to a regular practice of any known way of testing a paving brick, and that is the absence of a certainty that the whole lot of brick to be used are alike in all respects relative to the test. For instance, ten apparently fair samples from a certain kiln may be tested and approved. Now, unless the kiln be of perfect uniform make and burn, there will be some difference in the true value of the brick as pavers. There can be no way to provide against this defect but to make the burn of a kiln perfectly uniform, and then select samples for test from brick in the kiln that are evidently second quality, then reject these in the delivery.

A conventional test for building brick should be made, both as to durability and resistance to fire. First, the structural character of the brick should be known, then its ability to stand pressure, frost and fire. If "party walls" are built of brick that will "shell" and crumble after the building has been burned down, it is obvious that the architect made a mistake in not testing the brick before they were ordered. It is common to see the walls of burned-out buildings "shelled" and cracked so that they must be pulled down, but if a party wall happens to be well built of brick that stands fire without damage the cost of rebuilding is saved. Architects may take notice that when a party wall is built of good, first-rate, dry-pressed brick or soft-mud brick, the party wall stands fire, and can be rebuilt to; but if the brick are made by the "stiff-mud" process they will shell or laminate more or less. I have proved this time and again right here on my yard. I make brick by both stiff-mud and soft-mud process. I do not wish to discriminate against any particular machine or kiln. There is no machine that will make brick as cheap as the stiff-mud machine; yet facts are stubborn things, and all the stiff-mud machines that I know of have the above-named defect. If party walls built of "stiff-mud brick" be well plastered, the plastering will, to a sufficient extent, protect the brick, but the plastering should cover the entire surface, so that when "joists" are set the bricklayer should "parge" the spaces between.

SURE TO GET HIS MONEY'S WORTH.

Publishers Clay-Worker:

It is with pleasure that I renew my subscription to the Clay-Worker, as I consider it two dollars well invested, and allow me to say that I think the late Convention number to be worth the money, for the simple reason that it don't take much information to be worth $2.

I have been taking the Clay-Worker six years, and I think it is getting better right along; therefore I hope it will continue to be as interesting in the future as it has been in the past. It is rumored that a new brick plant is going to start operation here in the spring. Messrs. Grey and Cope are interested.

GEORGE DERRY

P. S.—You say your gold reserve is getting low. If that is the case, would not a little silver come in handy?

Written for the CLAY-WORKER.

"THE DEVELOPMENT OF THE AMERICAN BRICK."

IN TRACING DEVELOPMENT in the art of brickmaking, we find that progress has often been slow and uncertain; it has flourished in ages of prosperity with other arts, and, like them, it has been lost in ages of darkness. Machinery is doing much to lighten labor, but in all ages the work required to make bricks has been of the hardest kind, and many have been faint with toil in their production, in modern as well as in ancient times. The progress in America, however, has been sure and steady, until to-day we are enabled to produce brick in quality and quantity second to none. It was under Wouter Van Twiller, of Amsterdam, a Governor appointed by the Dutch West India Company, that the first brick buildings were erected in this country. In 1633, soon after his arrival in Manhattan Island, Governor Van Twiller erected for his own use a substantial brick house, which was the most elaborate private dwelling which had up to that time been attempted in America, and during the remainder of the Dutch dynasty this dwelling served for the residence of the successive chiefs of the colony. He also built several small brick dwellings for his officers, which, with his own, were erected within the walls of the fort. The bricks used in these dwellings were brought from Amsterdam, and were of such a good quality that but few were broken in the rough and lengthy voyage. The Dutch seem to have succeeded well in making a strong and very durable quality of bricks, which bricks have been famous from an early period for soundness, and specimens of them brought over by the early settlers from Holland are yet to be met with in some of the old Dutch houses of New York.

THE OLD STATE HOUSE, BOSTON.

Among the Puritan emigrants to New England money was very scarce, and under Winthrop, carpenters and bricklayers, whose services were in great demand and had a monopoly price, were forbidden to accept over 12d, and afterwards, in 1630, 2s per day, the penalty being 10s to giver and taker. The bricklayers were also the stone masons; they ranked under the first head, but a much larger amount of work was done in stone than brick in those days.

The earliest settlement in this country in which brickmakers are recorded as being a part of the population was the colony of New Haven, Conn. In this industrious and inventive little company it is probable that the first bricks made in this country were burned in 1650. They had no rich backers, willing to foot the bills for costly brick dwellings, as the Dutch West India Company had done for Governor Van Twiller in his building operations at New Amsterdam. They had made several attempts to produce bricks at earlier times, but had failed, and it is not probable that the very few which they did succeed in burning were of a very superior quality. But, like the building of their ship, which sailed from their ice-bound shore and was never again heard of, though faulty in many respects, their production was an evidence of great energy, and it is the inheritance of this same quality that has made all that section of country a great manufacturing and inventive district.

The Old South Church, Boston.

The Virginia colonists possessed clay of a far superior quality for brickmaking, but they do not seem to have made any attempt to utilize it. A few bricks were brought from England and used in the furnaces of an iron foundry and a glass-house, both of which were destroyed during the great massacre of March, 1622, and appear to have comprised the entire manufactures of the colony.

Brick has been a choice material for building purposes in the State of Pennsylvania from its primitive days. In a letter from William Penn to his agent, J. Harrison, at Pennsbury, written in 1685, in speaking of a lady who had purchased land and intended to emigrate, he said: "She wants a house of brick, like Hannah Psalter's, in Burlington, and she will give 40 pounds sterling in money and as much more in goods. It must have four rooms below about 18x36 feet large, the rooms 9 feet high, and two stories in height." Some idea of the great purchasing power of money in those days, as well as the price and value of buildings, can be seen from the above.

In 1705 the price of bricklayers' labor in Philadelphia was 3s 6d per day, and the price of bricks 22s per thousand. One of the oldest public buildings in this country constructed of brick was the old court house in the city of Philadelphia, commenced in the fall of 1705, and to these Pilgrim Fathers the erection of this building was a great undertaking and their largest endeavor. Gifts, fines, assessments and forfeitures were all combined to give it the amplitude of a "Great Towne House" or "Guild Hall," as it was sometimes called when first built. To modern ideas this building was small and ignoble, but in those days it was grand and imposing in the eyes of all the populace. The total expense of the structure was 616 pounds, the bricks costing 29s 6d per thousand. This primitive building was erected in the middle of High, or, as it is now called, Market street, at the corner of Second, and after being used for various purposes for one hundred and thirty years, it was demolished in the spring of 1837. For about twenty-eight years it was used as a court house, but its use for that purpose was superseded by the erection of "the new State House," or "Independence Hall," as it is now called, which was built of brick in 1733. Another primitive brick building in that city was the "Great Meeting House" of Friends, at the south of the "Great Towne House," on the corner of Second and High streets. This building and the surrounding brick walls which inclosed it were erected in 1695, the ground being given for the purpose by George Fox for "truth's and Friends' sake." Early in 1719 brick came into use for foot pavements in Philadelphia, and the great demand for them made the material very expensive.

Bricks do not appear to have been much used in the early buildings of Boston, as wood seems to have been the favorite material for building purposes with the Puritan emigrants, stone being sometimes employed. The first "Towne House" erected in Boston was constructed of wood; it was built about 1657, and stood at the head of State street, and was consumed in the great fire of 1711. Its successor was a brick edifice, erected in 1712 on the same spot, which in turn was destroyed by the fire of 1747. The "old State House" was built the next year, 1748, and as late as 1791 it was described as "an elegant brick building, 110 feet in length and 38 in breadth." The first Episcopal church in Boston was erected in 1689 of wood, and cost 284 pounds, and was at the corner of Tremont and School streets. The "Triangular Warehouse," which stood at the head of the "towne dock," was one of the earliest brick buildings erected in Boston; it was built by London merchants in 1700. Its foundation was of stone, and its walls of brick, which were of a larger size than the bricks of the country in later times.

R. N. BUELL.

THE MEDIUM.

An important subject for the consideration of every person who intends to advertise is the media. The immense increase in the number of publications gives food for thought. Many of them herald in rounded periods (of figures) their enormous circulations. But this is not the only thing to be considered. Is the medium one that is carefully perused by the family into which it goes, or by the business man to whom sent? In that case some one is very likely to see the advertisements.—Paper World.

A TEXAS SUBSCRIBER REPORTS PROGRESS.

Editor Clay-Worker:

Inclosed find $2, for which set my subscription peg up to 1897. The arrival of the Clay-Worker each month is like the clearing up of a bad spell of weather on the brickyard. It keeps our feet out of the miry clay. I am now making machine brick, after twenty years' experience on a hand yard. I have the largest machine of the "Leader" make. Am making twenty thousand per ten hours, but can make more if my demand increases. I have plenty of good clay, and my brick are as good as I ever saw on any yard. If the readers of the Clay-Worker would like to hear the experience of a Texas brickmaker, and space being allowed in the columns of your valuable journal, I might a tale unfold which might keep some poor "mud dauber" from digging his own grave. Wishing you success in the future as in the past, I am yours truly,

G. H. WILSON.

Written for the CLAY-WORKER.

PAVING BRICK—ITS MATERIAL, MANUFACTURE AND USE.*—Thirteenth Paper.

BY DANIEL W. MEAD.

THE APPLICATION OF FUELS.

IT IS NOT ONLY ESSENTIAL for economy that fuel of reasonable calorific value be secured, but it is also essential that such fuels be properly utilized, and that the heat developed by their combustion be applied to the use and purposes for which it is required.

With the most intelligent possible application of fuels, the proportion of heat wasted is very large. And with the total disregard of the principles of correct application, which too often characterizes the uses of fuel, the proportion of heat wasted is much greater than that utilized. The amount of heat utilized in any furnace depends on the following conditions: First, on the amount of heat developed by the fuel during combustion. Second, on the relative amount of air used. Third, on the radiation of heat into the atmosphere from the furnace walls. And fourth, on the temperature at which the furnace gases are discharged into the atmosphere.

Ordinary fuel in the ordinary furnace is in about the poorest possible condition for complete combustion. It lies in large lumps unevenly distributed over the grate and irregularly arranged as regards contact with the currents of incoming air. The air currents passing through the fuel are in one place superabundant, and a large proportion fails to unite with the fuel. In another the air is insufficient, and the combustion is incomplete. It is therefore necessary, under such conditions, to admit a large surplus of air in order to secure complete combustion. For complete combustion, only from 11 to 12 pounds of air are theoretically needed per pound of coal, while in practice 18 to 20 pounds are usually admitted into the furnace.

To secure the highest temperature in the combustion of any fuel, it is necessary (as was shown in the eleventh paper of this series) to avoid all surplus air and to furnish only such amount as may be needed in order to secure complete combustion. By the subdivision of fuel and its intimate mixture with the required amount of air, this result becomes possible. And by this means the intensity of combustion is greatly increased in actual practice.

With gaseous fuels this is readily accomplished by simple admixture of the gases and air just as the gas enters the furnace. With oil fuels the same thing is accomplished either by converting the oil to gas in a suitable gas machine or by atomizing. With solid fuel the same result has been accomplished by reducing the fuel to dust and burning it after admixture with a blast of air in a furnace arranged for this purpose.

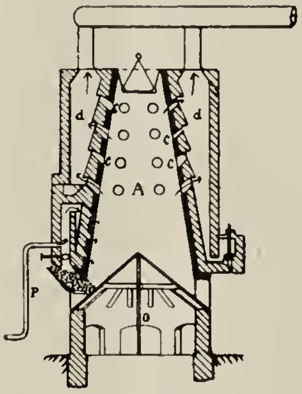


Fig. 1. The Dauber Gas Producer.

—Fuel Gases.—

The best results as regards perfect combustion, with only the theoretical amount of air, are obtained from gaseous fuels, and this fact sometimes gives fuel gas a higher rank as a fuel than its theoretical calorific value would indicate. Fuel gases are manufactured in what are known as gas-producers. These are made in many forms, which differ in details, but are quite similar in principle.

Fig. 1 represents a German gas-producer which may serve as a type of them all. The operation of the producer is as follows: A fire is built on the grate in chamber A, and when the chamber is heated it is filled nearly full of coal or such other fuel as may be used from which to manufacture the gas. The fuel is added at the top and sinks gradually to the bottom, being thus subject to gradually increasing heat in its passage. The ashes, etc., are removed from the openings at the bottom of the chamber, and the gas passes through the openings C, C, C, C, into the gas chamber d, d, and thence to the gas holder through the flue above. A blast pipe, P, is provided for the admission of an air current, and a steam pipe, O, is provided to introduce steam for producing water gas. Arrangements can also be made for enriching the gas if desired. In utilizing the gas as a fuel it is furnished to the furnace under a slight pressure and through a burner which allows of the regulation of the relative amounts of air and gas and their mixture just previous to ignition.

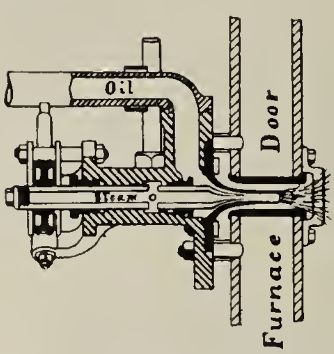


Fig. 2. Urquharts Atomizer.

—Fuel Oil.—

For atomizing and burning crude oil various patent burners are offered to the public. Most of these provide for the atomizing of the oil by a steam jet and the mixture of air just previous to ignition. One form of oil atomizer or burner which has been quite widely used in Europe is shown in Figure 2.

This form was adopted by Mr. Urquhart on the southern Russian railroads. It is attached to the center of each furnace door, and its method of operation is illustrated quite plainly by the cut. The steam pipe is adjustable and regulates the proportion of steam and oil which may be admitted.

Fig. 3 shows a home-made type of oil burner which has been used with very good results. It is made with common wrought iron pipe fittings, and with a little skill can be made to take the place of much more elaborate and expensive burners. A blast of air can be used to take the place of steam, if desired, but is usually more expensive to provide, as steam can be used from the boiler common to most power plants, while the blast of air requires special machinery.

—Subdivision of Solid Fuel.—

The mechanical subdivision of solid fuel, its intimate mixture in this condition with the theoretical amount of air needed for perfect combustion, and its utilization in the furnace by this method has been attempted with considerable success. One method of accomplishing this is shown in Fig. 4, which shows the general arrangement of Friedeberg's apparatus for burning powdered fuel. In the figure is shown the blast pipe which is furnished with an air blast from a blower or other arrangement. This blast pipe has two openings. The fuel hopper terminates in a box, in the upper half of which are two openings which communicate with the upper blast pipe. The blast from this pipe enters the box by nozzles around the base of the hopper. These nozzles are so arranged that the blast moves the powdered fuel and blows it away along a passage toward the furnace. Near the furnace the fuel blast encounters another blast of air which comes from the lower air passage, and this intimately mixes the air and fuel, and forces it into the furnaces through the conical opening shown in the cut. The air blasts through both openings are regulated by valves or dampers, so that the exact amount of air required can be furnished.

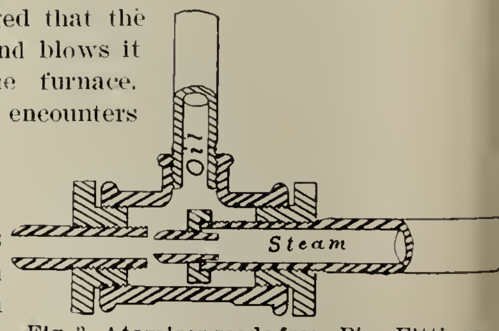


Fig. 3. Atomizer made from Pipe Fittings

It is stated that this apparatus can be so regulated that complete combustion can be obtained on 12 pounds of air. This apparatus has been installed in a number of places in Germany, but the results are perhaps best shown by a plant erected at Stoclan, near Berlin. This installation fed a boiler which was used for producing steam for a 50-horse-power engine, and the fuel consumption per twenty-four hours amounted with this apparatus to 5,610 pounds of fuel. Before this apparatus was fitted up it is stated that 6,930 pounds of fuel were used per day.

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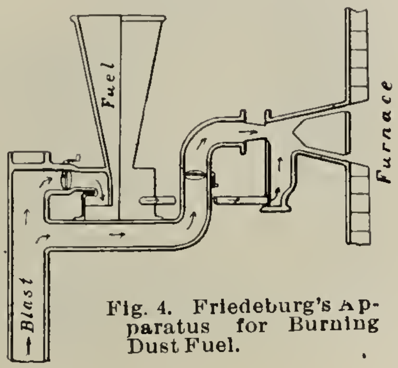


Fig. 4. Friedeburg's Apparatus for Burning Dust Fuel.

It has previously been mentioned (see foot-note eleventh paper) that the temperature of a furnace can probably never exceed 4000 degrees Fahrenheit (absolute), although this limit is not difinitely fixed on account of the difficulty of measuring high temperature with accuracy. With this fact in mind, it may not be at once apparent why an addition or surplus of air, which will not reduce the temperature of combustion below this temperature, will still reduce the furnace efficiency. The reason, however, will be apparent when it is considered that the unnecessary air will take up and carry away a certain proportion of heat, the amount of which will depend on the temperature at which the waste gases are discharged into the atmosphere.

—Reduction of the Final Temperature of the Waste Gases.—

The waste gases carry away heat in proportion both to their weight and to the temperature at which they are discharged into the atmosphere. We have already considered means of keeping their weight at a minium. The reduction of their final temperature is no less essential. The waste gases can never be reduced below the temperature of the atmosphere, which is therefore the limit at which we must aim, for economy, to approach. Another limit which may set a higher final temperature is the lowest temperature at which the gases can be utilized for the work at hand.

—Mechanical Draft.—

With boiler furnaces, by the use of economizers it is possible to reduce the temperature of the escape gases to a little above the temperature of the feed water, if mechanical draft is provided. In such cases mechanical draft is usually economical, especially as its application often saves a large expense in the construction of high chimneys. The following calculation will give an idea of the possible saving in this direction.

From Table III (eleventh paper) it will be seen that it will take about 12 pounds of air to consume 1 pound of coal, or in practice about 18 pounds will actually be used. At ordinary atmospheric temperature this weight of air will occupy 235 cubic feet of space, and from experiments on the pressure necessary to furnish good draft it is found that a pressure of about 5 pounds per square foot is needed. From this we see that the amount of work done in furnishing the air for 1 pound of fuel will be 235x5, equals 1175 foot pounds. This amount of work can be done by an engine and blower on from 25 to 100 B. T. U., according to the grade of the engine and efficiency of the blower. To do the same work by chimney draft the gases must escape at about 400 degrees Fahr., or 200 degrees above the temperature of the feed water in the economizer. The escape gases will weigh altogether 19 pounds, and their specific heat may be taken at that of the air as given in Table 1 (see eleventh paper), viz., .2375. The B. T. U. consumed will then equal 200x.2375x19, equals 902 B. T. U., which is from 9 to 36 times the amount of heat needed to produce mechanical draft. From this we see that mechanical draft is much more economical than chimney draft if the heat of the gases at the temperature necessary for creating the draft can be otherwise utilized.

In furnaces for other uses beside the generation of steam, and where economizers cannot be used, the waste heat may be utilized for heating the air before it enters the furnace, which will greatly aid combustion and add to the furnace efficiency. This is usually accomplished by what is known as the regenerating furnace. In this type of furnace the discharged gases, which are at a very high temperature, are passed through a chamber filled with fire brick or some other substance which will absorb the waste heat. The end of the chamber next to the furnace becomes highly heated, while the end farthest away remains comparatively cool, the heat working farther into the chamber as the blast is continued. After a time the blast is reversed, and the fuel gas or air or both is forced into the furnace through the heated chamber, passing out through another chamber of the same description. The entering gases take up from the heated fire brick the heat previously extracted from the waste gases, and hence a higher intensity of combustion is attained and a large percentage of the heat which would be otherwise wasted is saved. It is found that a saving of about 30 per cent. is effected by means of this arrangement.

Fig. 5 is the outline of a regenerative furnace for iron smelting. The regenerative chambers are marked R, R, R, R. The air and gas and water passages are marked, and the method of reversing the blast by a change in the dampers is quite plainly shown. The waste gases finally pass off through the flue, C, to the chimney. The iron ore is, of course, placed in the furnace, F.

When this class of furnace is not applicable, large saving can be effected in brick factories by conducting the hot waste gases from the furnaces to the dry floors or tunnel dryers, or utilizing them in the generation of steam for power purposes.

—Furnace Chimneys.—

Where chimneys are used, their correct proportion is necessary to utilize the maximum amount of the heat of the fuel consumed. The intensity of the draft depends on the relative weight of the heated column of waste gases within the chimney and that of an equal column of air without the chimney. This difference, of course, increases as the height of the chimney increases, so that the higher the chimney the stronger the draft. The expense, however, of building high chimneys increases much faster than their efficiency; hence the practical limit is soon reached.

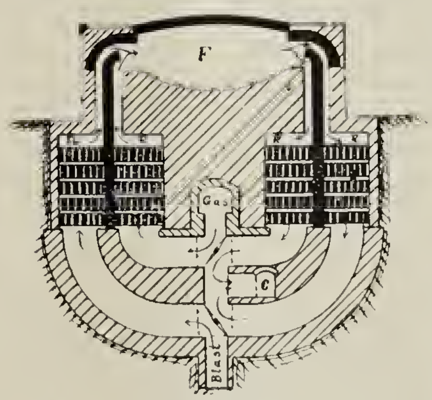


Fig. 5. Regenerative Furnace.

Most tabulated chimney calculations have been based on ordinary boiler practice. Where the fuels are used in a different manner, such calculations must be modified to meet such changes. Prof. De Volson Wood, in a discussion before the American Society of Mechanical Engineers (see Transactions, Vol. 9), gives a table of chimney heights for burning different amounts of coal per hour per square foot of grate surface, with chimney gases at different temperatures. The table is calculated on the basis of an outside air temperature of 59 degrees Fahr. In the following table the fractional feet of the calculated heights have been omitted, the nearest foot only being given:

CHIMNEY HEIGHTS FOR DIFFERENT COAL CONSUMPTIONS AND FOR VARIOUS TEMPERATURES OF WASTE GASES.

Temperature Chimney Gases.	Coal per square feet of grate surface per hour. 24 lbs.	20 lbs.	16 lbs.
239 deg. Fahr.	251	158	68
339 " "	172	116	56
539 " "	149	106	49
639 " "	149	99	48
739 " "	152	101	49
939 " "	160	106	51
1139 " "	169	111	53
1539 " "	206	132	63

It is usually found much more economical to provide a miniber of low chimneys for large furnace plants, rather than to attempt to unite all in a single chimney of a capacity sufficient to serve all furnaces. This is partially due to the fact that short and straight flues from the furnace to the chimney are essential to good draft. It must be noted, also, that different classes of fuels require different strengths of draft, and consequently different heights of chimneys. Wood is most open to the passage of the air, and therefore requires the least strength of draft, after which follows bituminous lump, bituminous nut, anthracite and, last in order, and requiring tne greatest strength of draft, are the finer grades of antharcite and bituminous slack. Mr. William Kent gives the following table of chimney sizes for different boiler horse-powers, estimating on a basis of five pounds of coal for each horse-power per hour:

SIZES OF CHIMNEYS, WITH APPROPRIATE HORSE-POWER BOILERS (Kent).

18	23	25	27	...	...	....	....	....	....	....	....	0.97	1.77	16
21	35	38	41	...	...	....	....	....	....	....	....	1.47	2.41	19
24	49	54	58	62	...	....	....	....	....	....	...	2.08	3.14	22
27	65	72	78	83	...	....	....	....	....	....	....	2.78	3.98	24
30	84	92	100	107	113	....	....	....	....	....	....	3.58	4.91	27
33	..	115	125	133	141	....	....	....	....	....	....	4.47	5.94	30
36	..	141	152	163	173	182	....	....	....	....	....	5.47	7.07	32
39	..	...	183	196	208	219	....	....	....	....	....	6.57	8.30	35
42	..	...	216	231	245	258	271	....	....	....	....	7.76	9.62	38
48	..	...	...	311	330	348	365	389	....	..	....	10.44	12.57	43
54	..	...	...	363	427	449	472	503	551	....	....	13.51	15.90	48
60	..	...	...	505	539	565	593	632	692	748	....	16.98	19.64	54
66	..	...	...	...	658	694	728	776	849	918	981	20.83	23.76	59
72	..	...	...	...	792	835	876	934	1023	1105	1181	25.08	28.27	64
78	..	...	...	...	...	995	1038	1107	1212	1310	1400	29.73	33.18	70
84	..	...	...	...	...	1163	1214	1294	1418	1531	1637	34.76	38.48	75
90	..	...	...	...	...	1344	1415	1496	1639	1770	1893	40.19	44.18	80
96	..	...	...	...	...	1537	1616	1720	1876	2027	2167	46.01	50.27	86

Written for the CLAY-WORKER.

IN DEUTSCHELAND. No. 2.

German Brick and How They are Made—Observations of a Clayworker Scribe in and About Berlin.

LEAVING THE TOWN of Freienwalde, we strolled along an idyllic valley, and after half an hour's walk we arrived at a manufacturing concern, which we soon found to be a brick factory, the Freienwalde Alaun und Thonwerke. Walking through the yard, between extensive piles of fine red brick and tiles, we came in sight of a neat office building (a brick building, of course), and were soon through with the business of introducing ourselves, and with the kind permission of the director, Mr. Busse, we commenced a tour of inspection. The works are situated in a hollow, the clay bank being about one hundred feet above the factory, the latter itself being built on a heavy slope. On the way up, our guide, who was one of the foremen of the concern, informed us that the capacity of the plant is about eight million per season, and that also large quantities of roofing tile are put out, besides terra cotta of all kinds and shapes.

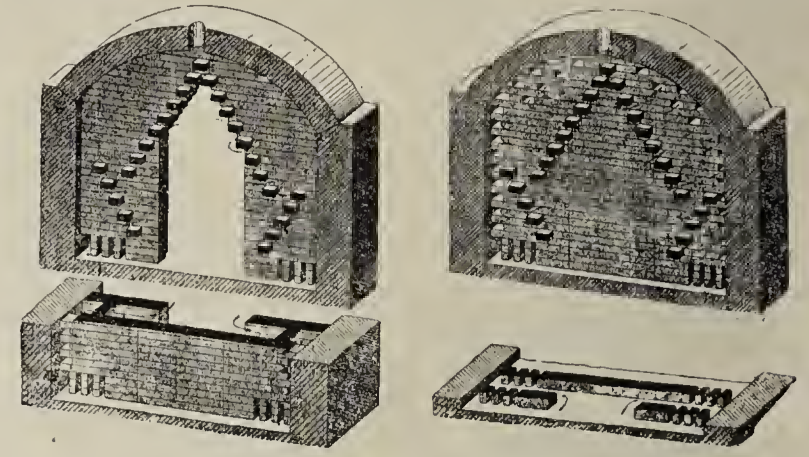
The clay is of a plastic, heavy kind. Below the clay lies a vein of fine sand, which is of great value, as the clay would be too difficult to work without it. How wonderfully does Mother Nature provide for the needs of her children!

The clay cars are attached to a continuous chain system, the loaded cars going down on one track, the empties returning on another. Having arrived at the factory, the clay is dumped on to a floor, which is on a level with a roller crusher. The clay is mixed by spading it over, watered and shoveled into the crushers. After passing through a series of crushers, one below the other, the clay drops into auger machines.

The brick are made in the usual way, cut with hand cutting tables, three at a time, and are put on tram cars to be conveyed to the drying sheds, where they are set on racks.

—How Roofing Tiles Are Made.—

The process of making roofing tiles is also very simple. The clay is run through an auger machine, the bar of clay being proportional to the thickness of the tile and its width, and is cut into slabs of the proper length. The clay is kept pretty soft. The slabs are now pressed into roofing tiles on a press with a revolving drum, which has five plaster molds, cast into iron boxes. At each fifth of a revolution of the drum one of the molds is placed under a plunger and the slab pressed into a roofing tile. As the drum revolves further on a lathe pallet is placed on top of the mold, and, when arrived at nearly its lowest position, the tile drops out of the mold on to the pallet. The roofing tiles made at this concern are of the interlocking pattern (Falzziegel), the different shapes and kinds of which we will consider later on. After leaving the press the tiles are trimmed; that is, the seams caused by the pressing are removed. Women and children do this work. The tiles are, of course, dried on racks.

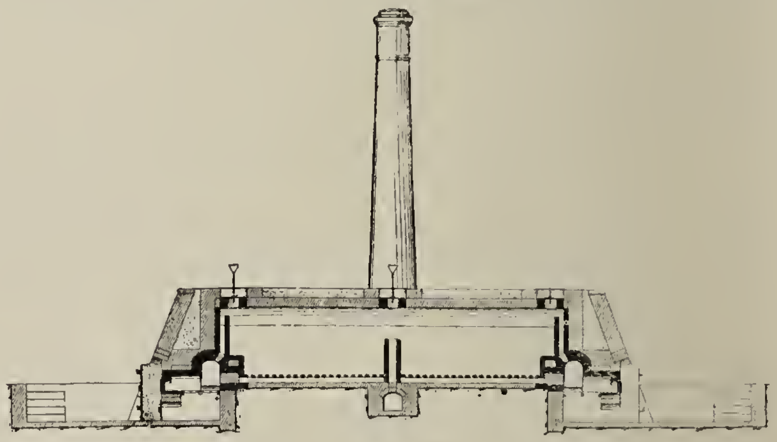


Arrangement of Brick in the Haedrich Fire wall.

The brick are burnt in continuous kilns having sixteen chambers, each having a capacity of thirteen thousand. The fuel is slack coal.

—The Haedrich Fire Walls.—

A peculiar feature was observed in these kilns, an arrangement which prevents the fuel from coming in contact with the brick. It is a well-known fact that in continuous kilns of the Hoffmann type the fuel is fired from the top, and, of course, the brick coming in direct contact with it are discolored and partly overburned. In order to prevent this loss in the Haedrich arrangement a double perforated wall is constructed under each row of fire holes and the fuel is thrown down into the inclosed space. Between these four-inch walls a so-called stair grate, as shown in the cut, is built up of fire brick. The air for combustion enters through a door-like opening at the back side of the wall, flows through the fuel on the grate and the flames escape through the apertures of the wall. This arrangement works to the satisfaction of the owners and improves the color of the ware considerably, compared with ware burned in kilns without these fire walls. The inventor is a Mr. Haedrich, of Eilenburg, Germany. But it is obvious that these walls require constant repairing, besides cramping

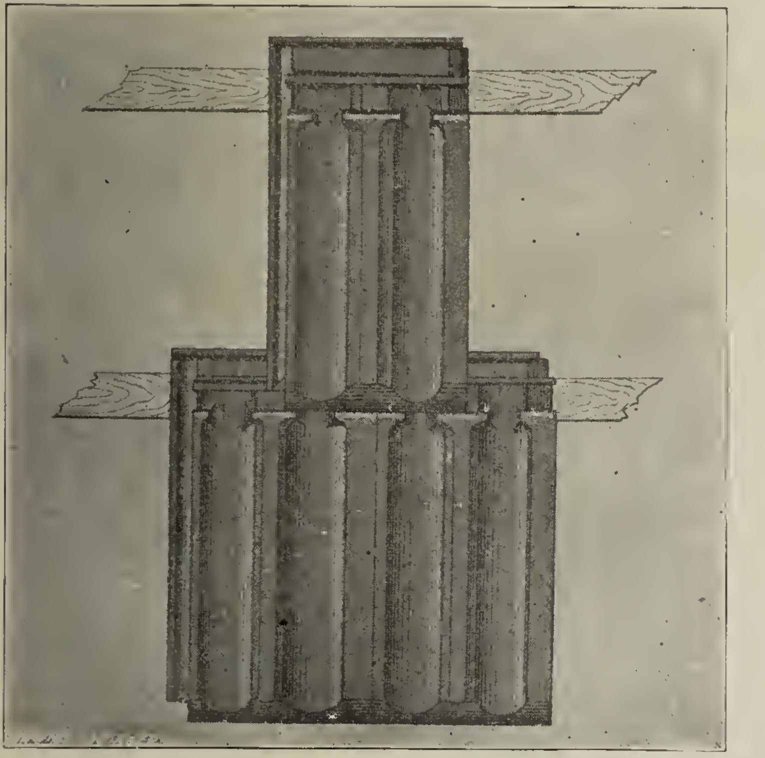


Section of a Blue Smoking Kiln.

the kiln space very inconveniently, so that their advantage for the coarser kinds of ware may be questioned.

—Blue Smoking of Roofing Tiles.—

The roofing tiles at this place go through an interesting process which, we believe, is not practiced in the United States. Carbon, in the form of hydrocarbons, as the refuse of oil refineries or tar, is introduced into the kiln at the finishing of a burn, with the kiln closed up as nearly air tight as possible. The chemical action involved consists in reducing the oxides of iron in the clay to the lower oxides, thus producing a dark color. The same time, owing to the large quantities of oil used, solid carbon is thrown down as graphite, which settles into the pores of the redhot ware. The first-class roofing tiles treated in such a manner have a peculiar silver-gray lustre; inferior grades vary in color from black to dirty blue and gray. The blue-smoking kilns are of small capacities, holding about 3,500 roofing tiles each. They are kept in good repair, every crevice showing itself being closed up directly. Great care is taken in setting. The roofing tiles are set on their long edges and carefully wedged to prevent them from tumbling during the burning. The burning proceeds as usual, until the time when the heat is about even all over the kiln and the temperature at its maximum point. At this time the burner, with his assistant, fills up the grates with fine slack coal, closes the damper, lutes all the fire doors and peep holes —in fact, shuts up the kiln as nearly air tight as possible. All this has to be done as quickly as possible, as delay is dangerous to the ware.



INTERLOCKING ROOFING TILES, CALLED DOUBLE-JOINTED PARALLEL TILES.

The kiln is now allowed to stand for an hour. Meanwhile buckets filled with oil, a refuse product of oil refineries, are carried up to the top of the kiln. When the proper time has arrived half a bucketful of oil is poured into the kiln at each end through gas pipes. The bucket holds three or four gallons. This operation is repeated every hour until the required quantity of oil has been poured into the kiln. While the oil is being put into the kiln water is poured on the arch. This is kept up for several days, thus accelerating the cooling.

It is of the greatest importance to keep the kiln closed up until it has cooled down sufficiently to admit of opening it. The contents of a whole kiln may be spoiled by opening it too soon. The burning of a blue-smoking kiln calls into play the highest skill of the burner. Sometimes he possesses both skill and diligence, and yet the burns are not satisfactory. Various are the causes that may be at fault. The coal may be of an inferior quality (it requires a kind of coal making a long flame); the kiln may have cracks the burner could not perceive, or the oil may contain impurities which are hurtful to blue smoking.

The average burn gives about 75 per cent. of A No. 1 tiles with the silver-gray gloss, while the remaining 25 per cent. are of somewhat uneven color, yet salable. The cost of fuel and oil per thousand roofing tiles varies from 12 to 15 marks ($3 to $3.75), fourteen tiles covering about a square yard.

Mr. Otto Bock, a well-known engineer, is the designer of these blue-smoking kilns. The accompanying cuts show a similar kiln by the same designer, holding six thousand large roofing tiles and taking fourteen days for a burn, including the setting, water smoking, burning, blue smoking, cooling and emptying.

A look at the watch warned us that now our limit of time had been reached, so we took our farewell from the friendly guide, and, after partaking of a hearty refreshment at a delightful little inn, we retraced our steps towards the town of Freienwalde, and soon a train carried us to the metropolis.

—A Visit to the Royal Porcelain Manufactory and Its Distinguished Chemist.—

While in Berlin it was our privilege to visit the royal porcelain manufactory and the director of the laboratory connected with it, Dr. Heinrich Hecht, whose name is one of the most prominent in German ceramic circles of to-day. We found Dr. Hecht busily at work in his laboratory and received a most hearty welcome. He immediately proceeded to guide us through the various departments of the institution. On the way the Doctor explained to us how the manufactory is not conducted upon a commercial basis, but is rather something like an experimental station for the china-ware industry, where the art is not only kept above the level of the mediocre, but also where advanced ideas are continually put forth.

The manufactory consists of a number of heavy brick buildings, with paved courts between them. On entering one of the buildings, Dr. Hecht warned us against expecting to find highly improved machinery, mechanical appliances being, in this case, of secondary importance. Stepping into the clay house, we took a look at the different kinds of kaolin, spar, flint, etc., stored up in compartments. Next we passed through

THE CLAY-WORKER.

DR. H. HECHT, Berlin, Germany.

the grinding rooms. The pulverizing is accomplished by means of dry pans, with buhr stones as rollers, and ball mills, the latter being used only for coarser clays. The clay mixtures for the porcelain bodies are ground in regular stone mills to a flour-like fineness. From the pulverizing machines the clay goes through the washing process, and is at last stored in tin-covered bins, where it lays for months, awaiting its use. The utmost cleanliness prevails throughout the establishment. The succeeding processes, molding, turning and casting, comprise all hand work. The chief charm, of course, lies in the artistic merit of the ware. A Mendheim continuous gas kiln is in successful use here. On inquiring about it, Dr. Hecht informed us that it is all that could be desired in every respect. We received this additional testimony in favor of the gas kiln with pleasure, for this kind of kiln has always been looked upon by us as the ideal kiln of the future.

Once more we stepped into the laboratory, the very place where one of the most zealous and generous teachers of the science of our art, Professor Seger, had worked so long and faithfully, and, accompanied by the kind words of Dr. Hecht, we took our departure.

—One More Clayworking Establishment.—

In Charlottenburg, this modern suburb of Berlin, it was our pleasure to visit the March terra cotta works, whose founder is the pioneer of architectural terra cotta for Northern Germany. Making a tour of the works, we deplored our ignorance of art and what pertains to it, for one need be a connoisseur to do the products justice. Every piece of work turned out, be it a small ornamental tile or a life-size statue, a flower pot or a fountain, bears the stamp of the highest kind of workmanship. Every piece is burnt to the highest degree of hardness, and the range of colors embraces every shade. Of course, hand work is the rule throughout the establishment, the preparing of the clay only being accomplished by machinery.

A Glimpse of Ceramic Art Products of the March Terra Cotta Works.

The art-loving spirit of the founder has created a most beautiful court along the office building, a charming spot, indeed, where gods and goddesses mingle with the utmost amiability.

To the founder of this great ceramic manufactory, Counciller March, belongs the credit of having secured for terra cotta, after hard struggles, the place it now occupies in the architecture of Northern Germany.

Mind your own business—don't try to disguise it;
You're in it for profit, whate'er it may be;
To make it a "go" you'll of course advertise it,
And push it along that the public may see.

—Fame.

"SWEET MARIE."

Befuddled by C. McD.

I have found just what I want,
Sweet Marie;
I'm going to buy a "Monarch,"
Love, for me,
That will make such perfect bricks
And put our rivals in a fix,
And make us jolly rich,
Sweet Marie;
They have given a low price,
Sweet Marie,
And won't it be just nice
For you and me!
My back number old machine
From the yard I'll quickly clean
Where no more it will be seen,
Sweet Marie.

Chorus:

List to me, Sweet Marie!
Sweet Marie, now you'll see
Why I've never got ahead—Oh, dear me!
Each few days machine would break,
And three days it then would take
Ere another brick we'd make,
Sweet Marie.

Yes, the "Monarch" is the name,
Sweet Marie,
And I thought you guessed the same,
Rogue you be;
For no matter where you go
All brickmakers praise it so,
And I'll have one quick, by Jo!
Sweet Marie;
Yes, I know you'll love me more,
Sweet Marie;
That is what I'm working for,
Don't you see?
And to Wellington I'll write,
Ord'ring them to ship to-night,
And to draw on me at sight,
Sweet Marie.

Chorus:

ENAMELED BRICK AT OAKS, PA.

NO SMARTER-LOOKING kilns and scarce better location could have been chosen by the Pennsylvania Enameled Brick Co. for the manufacture of these special brick than the above place. Situated between the junction of the Pennsylvania R. R. and the Philadelphia & Reading lines, it has the twofold advantage of shipping facilities east or west. And here stands the plant—a perfect monument of order and brightness. As will be seen from our reproduction, the series of five kilns, several stacks, ornamented with brick trimmings, blue and white enameled brick, cleanly pointed in a thorough and workmanlike manner, stand boldly out for the inspection of the railroad traveler, courting an examination, in strong contrast with those usually seen along the line.

The office and chemical laboratory and stacking rooms are seen in the well-built brick building, surmounted with a fine pitched slate roof, seen in the foreground of our illustration.

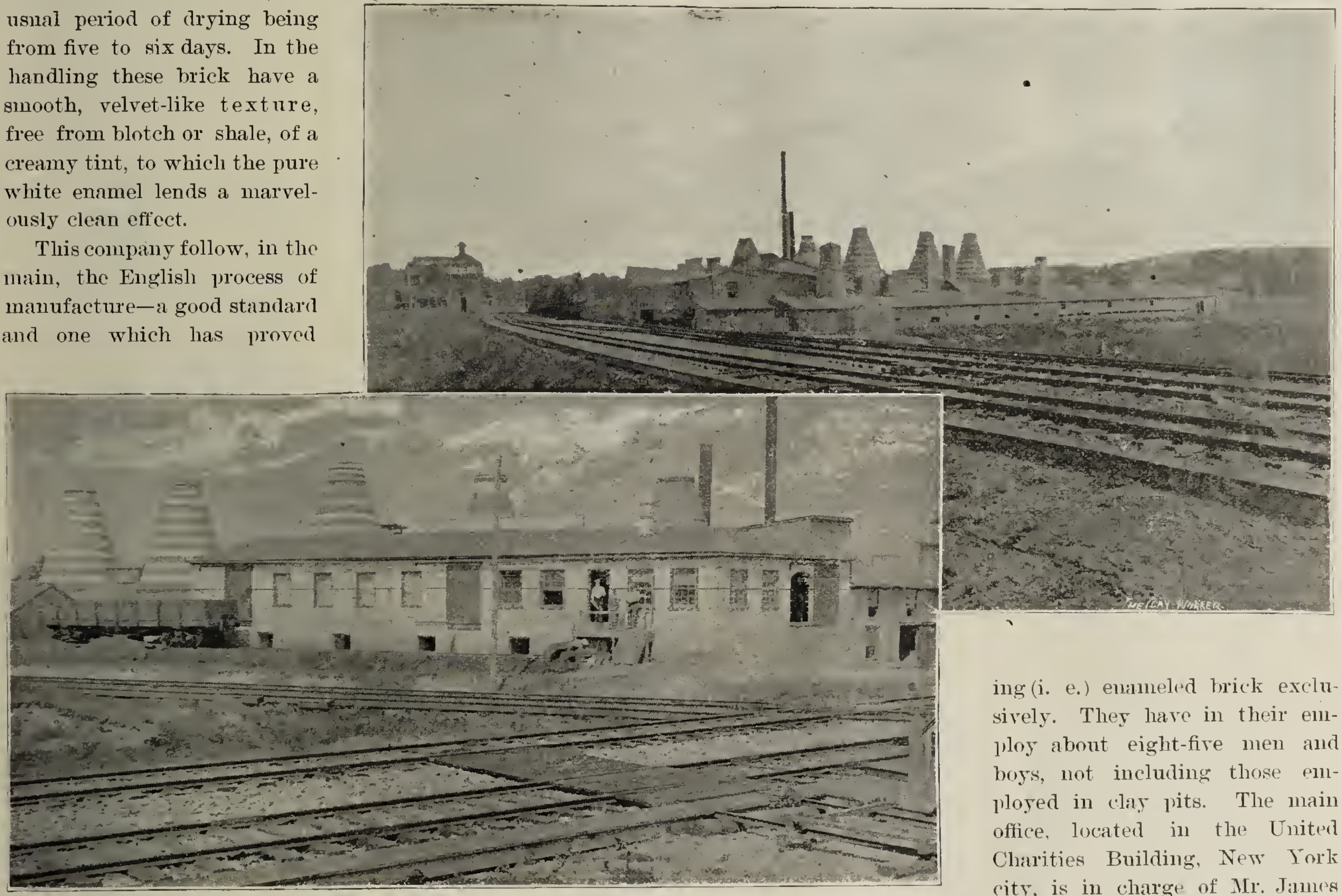
The interior is on a par with the exterior, excelling, if possible, the general sense of dignified order and cleanliness, and as the writer entered the office and laid upon the desk his insignia of office, Mr. A. E. Barnes, the genial and courteous general manager, looked up, smiled, and, extending a hand in which the sense of touch revealed sense of control, strength and order, with the curling grip of the student and hard thinker, said: "Ah, the Clay-Worker's representative! Well, I suppose you would like to look around?" and, turning in an easy manner, conducted me through the plant with that feeling of esprit that pertains to the educated host proud of his belongings, but happier in the attempt to entertain you.

We first inspected the Lewis & Lawton pottery kiln, and here was some good work in brick-setting and pointing, scientifically constructed, with up and down-draft, with inner chambers having a capacity for burning 20,000 each. The firing is completed at a temperature equal to that used for finishing the best fire brick, and regulated by a pyrometer in the earlier stages and the usual trial pieces in the later. The power for the plant is furnished by a Knowlson & Kelly 75-horse-power Corliss engine, bright and as clean as when bought, and the manufacturing department is equipped with a Wilkes dry pan and Frey-Sheckler Co. Centennial brick machine. Pullan & Mann (English) power presses are here used, which produce the panel brick, the universal form for most enameled and glazed brick, which, it is said, have the special merit of forming a uniform thickness to the soft mud tempered brick clot.

As the eye sweeps around the long range of tempering bins, numbering no less than eighty-four in all, to which the bricks are sent up very carefully, yet expeditiously, in crates, the sense of order and care marks you with an active pleasure.

This plant has its own system of clay-drying floors, tempering and drying bins, which is perfected by the introduction of steam heat for the latter, the usual period of drying being from five to six days. In the handling these brick have a smooth, velvet-like texture, free from blotch or shale, of a creamy tint, to which the pure white enamel lends a marvelously clean effect.

This company follow, in the main, the English process of manufacture—a good standard and one which has proved quite conclusively their superiority in resisting all the tests to which they are subjected by our atmospheric changes. The reason for the comparatively higher price which this product commands is not far to seek, when one measures the amount of labor necessary which the making of this particular kind of brick calls for. These are handled singly no less than thirty-five times before being placed on board the cars for delivery. Again, the number of errors are legion, and the men and superintendent must ever be on the alert to correct them—not observable to the ordinary spectator, but to those having an initial idea as they pass through the works. Of course, the secret lies in knowing the cause of these errors, and in the ability of the chief to obviate them as much as possible.



Office and Works of Pennsylvania Enameled Brick Co., Oaks, Pa.

The proper percentage at the kiln end is made trebly difficult to obtain by the multiplied chances to err, and by reason of the greater cost of the brick up to the burning stage, a small variation in this percentage means a goodly loss or gain.

I believe I am not wrong in my conviction that the past has experienced a strong degree to error and a great inclination to loss among enameled brick manufacturers, both in the "auld country" and here. Judging, however, from the product as seen by me in my peregrination through this respective plant, I should opine that they, the Pennsylvania Enameled Brick Co., have passed through their most troublesome period, and are now working as passively as the woman sleeps after having successively assisted her country's needs by making a handsome squalling contribution in the shape of quintuplets.

The plant has its own system of clay-drying floors, tempering and drying bins. In addition to their manufacturing laboratory for slips, enamels and glazes, they maintain an analytical chemical laboratory, and have two chemists in their employ.

This plant claims to be the largest in this country producing (i. e.) enameled brick exclusively. They have in their employ about eight-five men and boys, not including those employed in clay pits. The main office, located in the United Charities Building, New York city, is in charge of Mr. James L. Rankin, the President of the company, who also conducts the affairs of agencies in nearly all the larger cities of the East.

W. P. LOCKINGTON.

PROSPEROUS PENNSYLVANIANS.

Editor Clay-Worker:

All the clay works in this vicinity are not running at present, except the Fallston Fire Clay Co., and they are running full time on their specially fine front brick.

It is rumored that Archie Stewart will be back to run the Brandy Run paving brick plant the coming season. The present Superintendent, Thomas Gailey, has made enough to start a national bank in Beaver, to be called the Second National.

J. S. SHANE.

An advertisement is to business what light is to the sun. —Fame.

HOW IT ALL HAPPENED.

A TALE OF A NEW ENGLAND BRICK YARD.—Chapter Ninth.

"HELLO," said Ebenezer that day, seeing me come in with only one complete foot, and in rather an undress state generally. "What consarned trick ye bin up ter neow, and who so run ye across the swamp?"

"No one, Eben," replied we; "but where we just made another mistake is in thinking that we could run ourselves across it. The fellow that told us that 'pride goeth before a fall' never said what was left behind it, but there is where we know more than he did, for behind our fall can be found our boot.

"What we came over for, however, was to apologize for inducing you to go into the shipping business—sailing the organization—for we were afraid you might be angry at us and hold a—"

"Hold up, right thar," says Eben. "I'm mad at ye, sartin sure, but not bekase ye opened the door to sumthin' where I could go in and help make a fool of myself, but bekase ye so opened yer own door and helped take in what belongs to me."

We had just managed to get out "Why, Eben," when "Shut up," said he. "I've got this floor myself, and ye kin sot down and keep quiet until I've had my innin' in ther game. I've got three or four questions to ask ye, and yer can bottle yer ansers till I've got them out, and then let ther cork fly after'ards. Commencin' some time back, I've been missin' men offen my yard that there was no accountin' for, and didn't know whether to advertise for 'em as 'Lost, strayed or stolen,' but lately I hearn tell they're makin' brick over yer way, and what I want ter learn is whether ye kensider it more fair an' honest to steal men than brick, and whether yer built on ther principle that when ye find ye can steal a man's cloak that ye jist light out, not only on his coat, but his hul wardrobe? Consarn it, can't ye keep yer walkin' delegate a' hum? Can't ye larn how to make brick without importin' skilled labor from Rumstick to teach ye?"

"Didn't do it," we broke in.

"Yes, ye did," said Eben. "If ye didn't git yer help from here, jist show me ye raised them anywhere else and what they do for ye."

"All right," we replied. "Eben, here's a picture we had taken the other day of a whole group of them. They were raised in sunny Italy, and their business over with us is the raising of a crop of clay. Ocasionally they have to raise one another out of a quicksand hole, and a lot of the unwashed ones—few are otherwise—raise a healthy odor in the summer-time, but the only fellow who needs to object is the one who sleeps with them in the Italian hotel at the rear of the yard.

"Joking aside, however, Eben, we are pleased to have a chance to talk with you about the labor question, for, unless you and I can govern and control our men, and discover the right way in the latter part of this nineteenth century to do it, we shall very soon be 'looking backward' with Bellamy, and it will be upon a ruined brickyard and a busted brickmaker.

"Let us ask ourselves if there is really any radical difference in the labor conditions of to-day and half a century ago, and, if so, what they are and wherein they lie. Woman-like, we answer the last question first, and say we think that the all-overshadowing and important difference between the laborer of to-day and fifty years ago lies in his greatly advanced condition in general education, and somehow we have faith to believe that above all the good he will ever realize from his associations with trades-unions or the power of legislative action, the one thing that will eventually bring him to the millennium of his condition will be when he has reached the broadest possible knowledge of all the conditions of life. Perhaps, in rare cases, the old maxim that 'where ignorance is bliss 'tis folly to be wise' may prove true, but in nine cases out of ten, if it were not for lack of knowledge of the true conditions, either by the employer or employe, or both, the strike, which is fostered and carried into execution to the injury of all parties concerned, would never have occurred.

"It may not be as pleasant a fact as a true one, but muscle and brain are both a commodity to be bought and sold, exactly as mutton is in the shambles, or bonds and securities upon the floor of the stock exchange, and the law of supply and demand governs the price in either case. If, then, the law of supply and demand governs the price, just grant us the knowledge of how to govern that same law, so that the demand will always be greater than the supply, and the meridian of good times will be reached as far as profitable business is concerned, be he an employer or employe.

"Over the question of the supply of brains, Ebenezer," said we, "just at present, we need not worry ourselves, for the demand for the right kind is unlimited and the price fairly remunerative. As to muscle, it is different, and as common humanity towards our brother demands that each should help the other, we herein do our part by offering the following plan, and which, if carried out to the letter, we will guarantee will keep the quantity of labor to its proper minimum:

"We find, on studying the causes which produce surplus labor, that they are two-fold. One of these causes lies in promiscuous and extravagant immigration, and the remedy for which every thinking man can see must lie in restricting the admittance of the laboring class of men to a given number per year.

"The other cause runs in the same channel, and lies in promiscuous and extravagant production, and the remedy is also similar, i. e., restrict the number of marriages and births to a limited number per year."

"Haw! Haw! Haw!" says Ebenezer; "ye've hit her thar, sure; but how yer goin' to do it?"

"Well, Eben," we replied, "we will acknowledge that while we have a number of times thought we saw our way clear to a plan which would work out the problem all right, it has always been sat down on by two classes of the community, and they have been those who either were married or had quick expectations in that line. Only the other day one of our young fellows asked me for the loan of a few dollars, and stated that the case was urgent, as he was about to take unto himself a wife.

BAKER-RANDOLPH CO. INDPLS.

"We tried our best to show him the dangers of such a proceeding to a man in his financial condition, by pointing to an acquaintance of ours who was staggering under the burden of a small family of thirty-one boys and one girl, and stating that he was the father of them all.

"Our talk was virtually thrown away, however, as all we could get him to promise was that he would try and get along with a few less.

Baker-Randolph Co.

"When, for a few years in succession, a farmer finds that he has raised too many potatoes and that the market has become glutted and unprofitable, he generally becomes discouraged and turns his attention to something else, but for some unaccountable reason the same result does not follow similar conditions in his family affairs.

"Another problem which we have so far failed to solve is this: Why, when given a poor soil, if farming for potatoes, a man need look for but few in a hill, should he, when raising a family under poor conditions, expect the hills to be full of them?"

(Continued when spring opens.)

CHEMISTRY FOR CLAYWORKERS. No. 42.

BROWN HÆMATITE—CONTINUED.

IF WE COMPARE the formulae of red and brown hæmatites, we readily see that—aside from impurities—the only difference in composition is the combined water in the brown ore. For comparison the formulae are repeated side by side:

Red ore (Fe_2O_3)......Brown ore ($2Fe_2O_33H_2O$).

Or, to make it still easier:

Red ore ($2Fe_2O_3$)......Brown ore ($2Fe_2O_33H_2O$).

From this we can easily account for both the color in the clay and in the brick, for we have only to thoroughly deprive brown ore of its combined water to convert it into red ore.

The most extensive deposits of this ore with which I am acquainted are in Lincolnshire and Northamptonshire, England. Here it lies just underneath the soil, and a stranger would not know whether it was clay or ore he was digging. It varies from two to eight feet thick, and has the appearance of sandy, weak clay. Sometimes it assumes a rocky character, but even then it is easily worked. It is very low, or poor, in iron, and the iron produced from it is not good. Bog ore, or Limonite, belongs to this class. In France and Germany it is one of the principal ores smelted.

Brown hæmatite in its pure state contains about 60 per cent. of iron and about 14.5 of combined water. This combined water, I may mention, is only expelled by a heat much higher than 212 degrees, or boiling point; this, of course (212 degrees), is high enough to expel moisture and dry the ore, but even in its dry state it still retains the 14.5 per cent. of water of combination. Here again is brickyard analogy. Every clayworker is aware of the fact that ware may be "bone dry" and still there will be a large volume of water expelled by watersmoking. Not only does the coloring matter of the clay (iron ore) contain combined water, but the clay itself does, too. This water of combination, as it has been called, clings very tenaciously to both iron ore and clay. Experiments described in this journal have shown that water and clay are in combination at a temperature considerably above red heat, and it is everyday work to expel water from iron ore by "roasting" it in kilns previous to smelting it in the blast furnace.

Many substances that appear to be perfectly dry really are so if we rely solely on our senses, but this is just what we must not do; we are endowed with reason as well as the senses, and the proper course to pursue appears to be: let the senses have full swing, but let reason preside over them all. This is our only way to arrive at accurate knowledge. Many substances, I repeat, that appear to be perfectly dry really contain very large proportions of this combined water we are considering. Take, for example, common alum; 943 pounds of this substance contains 432 pounds of water. If we analyze it still further we find that this solid substance consists of 688 pounds of hydrogen and oxygen gases, and only 255 pounds of really solid matter. If you will go carefully over its formula, here given, you will find it is $Al_2K_2\,4SO_4 + 24H_2O$.

Take another well-known solid and dry substance—green vitriol. Its formula is $FeSO_4 + 7H_2O$. In every 278 pounds of this there are 126 pounds of combined water, or, carrying the analysis to the end, the result is 190 pounds of hydrogen and oxygen gases, 56 pounds of iron, and 32 pounds of sulphur. It is not uncommon for salts to contain more than half their weight of combined water; for instance, sulphate of soda (sodium sulphate), known in commerce as Glauber's salts, with the formula $Na_2SO_4 + 10H_2O$. It is very easy to see here that 322 pounds of this salt has in combination 180 pounds of water, or considerably more than half, while ordinary carbonate of soda (washing soda), $Na_2CO_3 + 10H_2O$, contains over two-thirds water, the proportions being 180 pounds of water in 286 pounds of soda.

It is an easy matter to make most salts yield up their water of crystallization—that is, their combined water. You need only put crystals of alum, green vitriol, Glauber's salts or washing soda on the top of a hot stove, and they immediately melt down into a watery little pool, which soon evaporates and leaves a small, fine powder, with a loss in weight of the proportions given above.

I have wandered somewhat from my subject—iron—because water of combination seems to be pretty much ignored by the bulk of clayworkers; and when I was on the subject of water of combination in iron ores I thought it quite apropos to bring in clays, because they require similar treatment to eliminate it, and it has occurred to me many times that if the subject were better understood we should have dryers worked with more skill and less waste of energy—fuel. Assuming, now, that it is impractical to expel in the dryer this combined water found in clay, etc.—and I think there is little doubt about it—what necessity is there to heat the dryer more than 220 or 230 degrees Fahr.? We can depend on all the mechanically mixed water leaving the brick if it is heated through to 212 or 215 degrees, and to attempt anything further in the dryer seems waste. I will now leave this for the consideration of the advocates of high-temperature dryers, and return to the subject in hand.

SPATHIC ORES.—Often called "sparry ore." This is the crystallized and purer form of carbonate of iron (ferrous carbonate), formulated thus: $FeCO_3$. This ore, in its purest and crystallized state, is known as "siderite," and contains 48.27 per cent. of iron. The impure carbonates of the coal measures are known as "clay ironstones," and if they contain much bituminous matter, as some do in Scotland, the ore is then called a "blackband ironstone."

Spathic or sparry ore varies very much in composition, oxide of manganese being nearly always present, sometimes in large proportions, in which case it is valuable and smelted for the production of that peculiar iron known as "spiegeleisen" (mirror or looking-glass iron), so much in demand in Bessemer and open-hearth steel works. Before the advent of these two processes for the production of steel, sparry ores with high percentages of manganese were of little or no account.

CLAY IRONSTONE AND BLACKBAND.—These ores are found in beds of considerable thickness and extent, or sometimes in detached nodules mixed with clay and shale. They are poor in iron, ranging from 28 to 36 per cent. They are, in all cases coming within my knowledge, "weathered" to clean them of the attached shale and clay, and afterwards roasted to expel their carbonic acid and water, previous to smelting. The roasting was sometimes effected in heaps on the ground, but in after years in calcining kilns, which saved both fuel and space. Twenty years ago or more kilns in the Middlesborough district, England, having a capacity of about 170 tons per 24 hours, and using one ton of slack coal to about 20 tons of ore, were not uncommon.

There are many other ores of iron which in many instances are only classifications of those mentioned above; for instance, Franklinite is magnetite mixed with oxides of zinc and manganese. This species of ore, found in New Jersey, is treated for the extraction of zinc at Bethlehem, Pa., and the residues are smelted by the Bethlehem Iron Co. for the production of spiegeleisen, or, rather, was so about twenty years ago. This ore is also treated in the same way at or near Newark, N. J.

Ores of iron may be oxides, carbonates, sulphides, etc., the two first being the most available and easily smelted. The sulphides are generally more valuable for the sulphur they contain than the iron, and are treated for the extraction of sulphur first at sulphuric acid works; the residue is then sent to the iron works for further treatment. This residue is known as "purple ore" or "blue billy," and is not much liked at the blast furnace, on account of its fine, powdered condition, besides containing a percentage of sulphur that is objectionable in the production of good pig iron. It is much used for "fix" in the puddling furnace, and is in no great favor there, either.

MAGNETIC OR BLACK OXIDE.—This is one of the most valuable of iron ores. In its native state it is known as the mineral "loadstone." The same oxide is formed when iron is oxidized at a high temperature in the air, or in oxygen. The formula for this oxide is Fe_3O_4. There is a corresponding sulphide, which is also magnetic; its formula is Fe_3S_4. The black scales which fall off at the blacksmith's anvil and the scale from the finishing rolls of a rolling mill have the same composition as the magnetic or black oxide. If the reader and chemically inclined clayworker will pay some attention to the chemical and physical properties of iron ores, he will soon begin to make deductions as to the change of color in the dried and burnt brick, and to satisfy himself as to how coaled bricks are so easily burnt, or, rather, how they are so easily colored as to pass for hard burnt, also the reason for overburnt bricks being black and glassy, and underburnt being light, or salmon; why some clays will take so much more heat than others, etc. It is in questions of this kind where chemistry tells in a brickyard or any other clayworking establishment. Knowing the why and wherefore is the key to improved processes, and a safeguard against the empiricism of the present and the past.

The clayworking chemical student cannot with much profit to himself confine his studies to silica and alumina (clay), because the other elements associated with them play very important parts. He must therefore, in studying up clay, embrace such elements as lime, iron, sulphur, potash, soda, etc., and a general knowledge of chemical laws. He will then soon perceive how crooked and devious are the ways of his less fortunate brethren, and will cease to accept without question the customs of his forefathers and colleagues simply because they are time-worn and established.

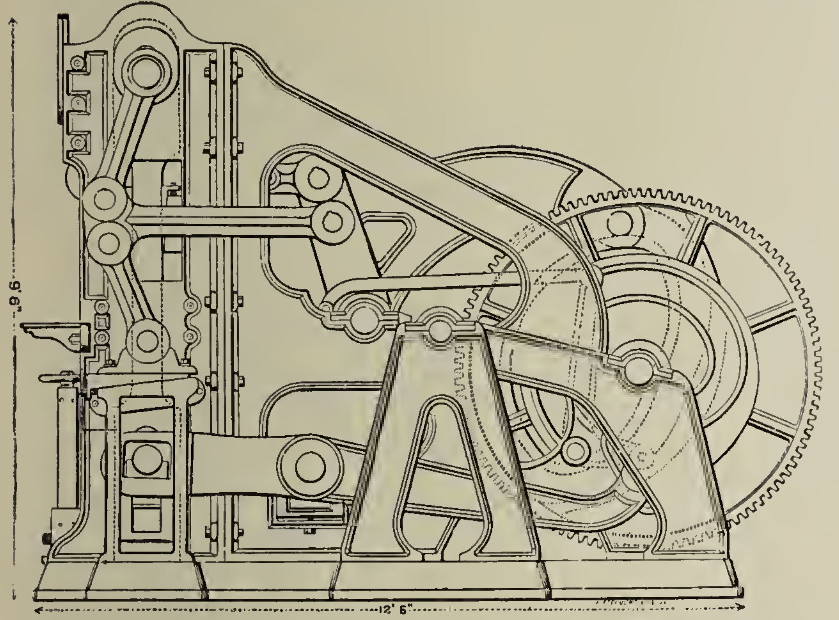
Returning now to iron, I have been very brief with the ores of iron, but perhaps have said enough for a general idea of them, so, without any preliminary remarks, we will at once proceed to the manufacture of wrought iron from pig or cast iron, the manufacture of which (the pig iron) was described in my last paper.

PUDDLING.—Wrought iron is produced by a process known by the name of puddling. The process consists in melting pig iron in a reverbatory furnace (reverberate means to throw back), which is so constructed that the flame rushing over the firebridge is made to curl down onto the bed of said furnace by means of a sharp deflection in the roof and a narrowing-in of the side walls. The flue-bridge is small, as is the flue also, the inlet for the flame being four or five times the area of the outlet. By this means the furnace can be kept full of flame of a quality known as reducing, or, nearer the mark, perhaps, neutral. The bed of a newly-fixed furnace is saucer-shaped, about 2 feet in diameter on the bottom, and 3½ feet at the top, and about 8 inches deep. This basin or saucer is formed of oxide of iron; the bottom is supported by thick iron plates, under which a current of air passes to keep them cool; the sides are made of hollow castings, through which air passes for cooling them; all these iron castings are protected from the fire by the oxide of iron mentioned above, and the whole inclosed by walls of fire brick and a roof of the same material. The smokestack is of fire brick, or iron with fire brick lining, and is from 40 to 50 feet high. The grate is from 10½ to 12 feet area, and consumes 3½ to 4 tons in 24 hours—a rate of consumption unknown at any kiln within my knowledge.

WILLIAM WAPLINGTON.

THE ROSS-KELLER IMPROVED BRICK PRESS.

It is an accepted theory that in material things we must either advance or retrograde, for there is no such thing as standing still in this age of the world. Perhaps this may be because of a universal disposition to improve and better everything. So it is in the mechanical world, at least. An exemplification of this is seen in the advance made each year by the manufacturers of dry-press-brick machinery. Names well known in this line are those of R. N. Ross and H. H. Keller. For many years they have labored together to perfect a brick press that should combine all the elements necessary to produce a uniformly high grade brick under the varying conditions that the brick business presents. Their success is well known, the Ross-Keller machine now having been on the market for several years, during which time they have continued to improve it in minor details, till with the 1896 model, which we illustrate on this and on page 327, they believe it is the nearest to a perfect brick press that has ever been produced. As the reader will readily see from the engravings, it is built for strength, but notwithstanding its great proportions, its mechanical construction is such that it runs without the least apparent strain or jar, or, as a gentleman who had watched it in operation said, "as easy as a sewing machine." No mean compliment, when it is considered that the press, complete, weighs from three to four tons, standing 12½ feet long and 9½ high. Beside it an ordinary press appears but a baby. This press has many good points, but the feature which gives it the greatest advantage is its peculiar movement of the top and bottom plungers, by which the clay is subjected to three distinct and separate pressures, the last and greatest pressure being held for a short time while the brick is being moved upward in the dies, thus preventing any granulation whatever.



The manufacturers, the Ross-Keller Brick Machine Company, St. Louis, who have had many years of experience in the manufacture of brick presses, say that they can work successfully with this press many clays and shales that cannot be handled by lighter presses. They will be pleased to correspond with interested parties.

HOW TO COLOR BRICK.

Many brick manufacturers, especially those making mottled brick, have found the use of manganese very profitable, as by it the desirable color effects can be obtained with little difficulty. The firm of Kendall & Flick, whose "ad." appears on page 385, are among the largest American dealers in this material. They own extensive mines, and produce not only the crude ore, but have special facilities for preparing it to suit the needs of brickmakers. They claim to be able to furnish, ready for use, the best preparation for coloring brick, at very moderate prices, and have a pamphlet treating on the subject which they will be pleased to mail to any of our readers who will write them for it.

Written for the CLAY-WORKER.

A "DAY OFF" IN CANTON.

Prof. Orton and His Class Take a Brief Respite From the Class Room and Inspect the Clay Manufactories and Enjoy a Chat with Governor McKinley.

ONE OF THE FEATURES of modern education is the vast amount of technical information which is put before one. The immense difficulty, by means of lecture, recitation or discussion, of either imparting or absorbing this array of important facts is very well known to all who have tried it in the capacity either of teacher or pupil. The most helpful means of making this wilderness of facts become vital realities to the average man is to let him see actual illustrations of it. On this account the teaching of to-day is becoming more and more akin to the object lessons of the kindergarten.

The members of the first class of the "clayworkers' school" have been undergoing a process of "cramming" until they were "dryer" than the products of their instructor's brain. It was a "kil-(li)-n" affair to introduce another idea, for it meant the forcible expulsion of one already in possession.

When the date of the third trip of our spring schedule came around it found us in this state of mind; all hands were ready and glad to lay down their books and board the cars, even if the train did start at 12:35 a. m. A hard night's ride, with uncomfortable changes and waits, brought us to Canton in time for a good breakfast at the Barnett House. In the enthusiasm of that moment the hardships of the night were soon forgotten.

On coming downstairs we were met with the smiling face of Otto Giessen, of the Royal Brick Company, who was waiting to escort the party out to his plant. The cordial greeting of this gentleman put all at their ease, and the start was made at once. The readers of the Clay-Worker may recollect that this company had the misfortune to lose its plant by fire, some time since, and it was especially the desire to see its reconstructed form which inspired our eagerness to be at once on the move. The features which actively commend themselves to notice at this point are numerous, especially to the student, whose business is not to champion one or the other plan, but to observe and to classify everything that he sees.

—A Fire-Proof Plant.—

The fire-proof construction here is one of the most progressive features of the new plant. Not a vestige of wood is used; all is brick and iron. The interior of the building is divided by a heavy brick wall, the grinding machinery being placed on one side, while the tempering and making machinery occupy the other. The same roof shelters the engine and boiler and extensive clay bins close behind the pans. Especially noteworthy, also, was the use of iron bridge work to hold the machinery and shafting in position. There is but one story. The pug mills, dust bins, screens, water tank, etc., are all supported on iron platforms, firmly held in position by massive trusses and posts. One can stand on the ground floor and see everything from the roof to the floor in one glance.

The dry house also attracted attention. The Cummer Dryer, of which not a little has been said of late in the press, was installed here. The theoretical correctness and desirability of the use of "direct heat," rather than radiated heat, had been made the subject of much class-room talk, and all were eager to see this pioneer dryer of its class. Very luckily for the students, the dryer was not in operation, but was undergoing a slight alteration in its interior arrangement, which made it possible for all to see its internal construction and to understand thoroughly every feature of its working. The significant fact brought out in this connection was that while direct heat was capable of satisfactory application to the work of drying, the use of the waste heat of the cooling kiln was the line in which future economies will find their readiest application.

The plant of Eudaly kilns, the loading dock and the yard facilities were next studied. The morning flew away all too soon, and the party next went over the hill to the plant of the Imperial Brick Company. The impressive appearance of this plant, with its forest of kiln chimneys, its towering dryer stacks and its large buildings, was duly noted by all as the party came in view around the bend of the road. The general manager, Mr. E. D. Keplinger, was on hand to welcome us, and here, also, fortune smiled on our side. Mr. Keplinger deplored the fact that they were not yet in operation this spring, and that they were torn up for repairs, etc., but under no other circumstances could a visit have been so profitable to such a body of visitors.

—Kiln Construction.—

Of the great array of kilns, a number were opened up for their spring cleaning of flues before beginning the season's continuous run. Of those thus exposed to our view, the various types of bottoms, the varied arrangement of flues, the various forms and dimensions of bags and fire holes, from the regular Eudaly, through a number of variations or gradations, to the new Gonder kiln, were completely made clear, and all could realize by actual inspection what a world of words would fail to convey. The buildings, machinery and dry house, built by the Bonnot Company, were each viewed in turn, and many special points were noticed.

The party were compelled to bid adieu to Mr. Keplinger and return to the city before they had nearly finished the inspection of his great establishment, as the day was rapidly passing away. A 2-o'clock dinner at a restaurant revived all again, and the factory of the Bonnot Company was next visited. Mr. H. H. Whiting, the Secretary, made us welcome, and, assisted by Mr. Harter, the President, and Mr. Ludlam, the master mechanic, made the time pass so instructively, and, withal, so pleasantly, as to break our afternoon schedule into small fragments.

The large variety of clayworking machinery made by this firm was of great interest to the class. The firm has had for years a specialty in pottery machinery, a specialty which they have in no way lost, though, of late, they have added to it a very considerable line of brickmaking machinery as well. With these two lines of work they are able to do a general engineering business in the erection and equipment of clayworking plants, and hence could not fail to be of prime interest to all of our party. Before going home to the hotel, a few moments were spent at the works of the Canton Steel Company, next door, to see them tap a heat of open-hearth spring steel. The temperature of these steel furnaces is very intense, and requires a line of refractory material suited to it, which is a point which cannot be too clearly impressed on the minds of those who are supposed to know what refractory materials are and what they can do. The environment is everything in fire bricks; in one place silica alone is used; in another, lime; in another, nothing surpasses good fire clay. In each place that material is chosen which is not fluxed by the materials with which it is to come in contact, and hence the range of raw materials used is by no means confined to clay.

—A Delightful Evening at Otto Giessen's Home.—

The object lessons of this day were so "filling," and afforded such material of reflection and discussion, that an antidote was considered necessary to bring the boys to their youth again. This was very pleasantly supplied by Mr. and Mrs. Otto Giessen, who entertained the class at dinner in honor of their son Carl, whose name was one of the first to be enrolled on the list of the ceramic department. Their generous hospitality, their beautiful home, on a knoll overlooking the bustling city, and last, but not least, the society of a number of Canton's fair daughters, whom Mrs. Giessen had induced to grace the occasion, conspired to make the evening one to be remembered as one of the pleasantest features of their lives.

Notwithstanding the hard work of the preceding day and the festivities of the preceding night, Saturday morning found the party on foot and bound for the works of the Canton Brick Company at an early hour. The walk of two and a half miles was just enough to put full vigor into each, and as the valley opened out ahead, with its busy hives of industry in view, our anticipations of the pleasure of the day were pleasantly excited. The first works visited were those of the Canton Brick Company, where Mr. J. L. Higley and Mr. James Miller did the honors. At this plant the following points were noted: First, the variety of kilns, comprising those of Eudaly, Rutter, Yates, Merley, and the ordinary down-draft. This gave all an opportunity to learn by observation the characteristics and differences of each. Second, the use of an automatic tempering device, made by the Bonnot Company, which adjusts the flow of water to the pug mill in direct proportion to the clay which passes into it. Third, the relative efficiency of the wooden frame vs. the iron frame dry pans; and, fourth, a new shaking screen.

From this plant to that of the Canton Press Brick Company was only across the road, and here Mr. Allen, the foreman, was kind enough to pilot us through the establishment. They make a rich, golden yellow, mottled brick by the dry process, using a Boyd machine. The most novel feature of this plant is the construction of their kiln floors. These are made solid, except where here and there a six-inch square hole opens into the flues underneath. These holes seem, at first glance, to be wholly inadequate to relieve the kiln of its gases, but a little calculation shows its theoretical correctness, and a view of their burns shows their practical success. It was a very useful lesson, after the vast excess of draft holes of the other types of kilns seen previously on this trip. The coloring of this clay is accomplished by a reduction or smoking period, ending with the tight sealing of the kiln until cool. This is similar to the process of making "blue smoked tiles" in Germany, only not so thorough or so long continued.

—From Brick to Stoneware.—

A hundred yards only intervene between this plant and that of the Canton Stoneware Company, which also manufactures fire and paving brick. The President, Mr. H. S. Belden, and the Secretary, Mr. Shanafelt, made us welcome, placing the entire works at our disposal, to come and go as we desired. This company is making a fine line of stoneware, not only of the ordinary salt glazed and black glazed types, but also of the new white and red glazed wares. It is interesting to know that they employ only such glazes as can be burnt in open kiln. White, black and red are burnt in one and the same kiln, absolutely unprotected from smoke or ashes. Of course, it goes without saying that only glazes of the porcelain type, free from lead or other easily reducible oxides, can stand such treatment.

The brick plant run in connection with this pottery is in possession of a novel feature, viz.: the Belden "up-and-down-draft" kiln. This kiln is reversible, and is actually made to change the direction of the currents of gases from down to up during the burn. The idea is a favorite one with all who have thought much on such topics, but has only been applied practically in one or two previous instances. Captain Belden has not yet perfected the kiln to his own mind, but has succeeded in effecting a marked saving of time and fuel in the work as now constructed, and thinks he sees his way to further steps ahead. One feature noticeable in the product is its bright red color, even when vitrified, while brick made from the same shale across the road and burnt in other kilns are dark brown. This is due to the facility with which all reducing gases are either combusted or swept out of the kiln, and while this is no advantage for paving brick, it may be worth noting for those who covet the production of an even red color for their wares.

—Great Natural Wealth.—

The most noteworthy thing, however, in all this veritable hive of industry, is the vast mineral wealth with which nature has endowed this portion of the State. Here, from one hillside, and in the compass of a few acres, are mined fire clay, coal, limestone, shale and red clay, and from these minerals are produced paving brick, fire brick, high grade building brick and stoneware pottery.

The afternoon was passed in a pleasant visit to the Cleveland Brick Company. This is a newly-equipped concern, with a most complete and orderly plant, lying a mile and a half south of town. The special features here were the Rutter and Renkert kilns, a whole battery of them, which, luckily, were opened for repairs, thus making the flue construction visible. The engine, also, was a model one, having been one of the admired exhibits in Machinery Hall, at Chicago, in 1893. It is a compound, with rope driving belt, and is capable of very high efficiency, with low consumption of fuel and water.

When we dry our brick in dry houses heated by the waste products of cooling kilns, and couple up our kilns so that the waste heat from burning brick in one is used in water-smoking the next, then this compound condensing engine will be a last step in the direction of fuel economy; but, as it is now conducted, the compound engine is only saving at the spigot, while the waste proceeds merrily at the bunghole.

The Cleveland Company has so far been selling its output as building material, but a view of its stock, in and out of kilns, makes it a wonder how they can afford to do so. Such uniform, hard and strong material is seldom furnished for this purpose elsewhere.

The last factory visited was that of the Canton Hollow-block Company, where the work of the Bucyrus Roller Die in making fancy building and foundation block was seen. The lateness of the hour prevented a thorough examination of this plant, but its products and the general outline of their manufacture were made clear.

—Entertained by Governor McKinley.—

Though the day had been a busy one, there remains still one feature of the excursion to chronicle, which will probably last the longest in the minds of all who participated in its pleasures. This was a visit to Governor McKinley at his home. It was during his term of office as Governor that the course for clayworkers was provided for and put into execution in the State University, and he expressed so kindly and so sincerely his interest in the work of the department, and in the great economic importance which this system of industrial and technical training will have on the future of our American industries, that all were delighted. One and all hoped to see him in the executive chair of this great Nation in the near future, and hoped to see him given the opportunity to carry out his broad gauge policy of development and education.

The last visit of the eventful trip was made while en route home. Leaving Canton at dusk, the electric cars carried us rapidly over to Massillon, ten miles across the country. Here a pleasant and instructive hour was spent at the home of Mr. H. H. Everhard, of the firm of Warthorst & Co. These people have recently gone into the manufacture of fine building brick, utilizing a clay which they have been stripping for years from a stone which they quarry largely for making grindstones, and also for crushing into glass sand. The bricks made from this otherwise dead work of clay stripping are of a very high quality, being of the colonial yellow and mottled varieties. The class was unable to see the works, but Mr. Everhard kindly explained the main features of his recent improvements along the line of kilns and fire holes. As he has a more than local reputation as an expert in fuel consumption and the construction of smokeless furnaces, his statements were most attentively received. The homeward trip was without incident, and at 2:15 a. m. Sunday we pulled into Columbus once more.

The great practical utility of such visits is readily seen. Every variety of clayworking appliance, every kind of product, every kind of clay is seen in turn. Bad methods are compared wtih good ones. Faults, failures and successes, generally a sprinkling of each, are found in every plant. After such a trip, things which were merely names and memorized paragraphs become living realities; principles become laws, whose operations become alive because they can be seen at work. As one of the boys naively remarked: "I tell you, I have learned more on this trip than you could tell me in a week of lecturing," a proposition which I was forced to admit as true. The remaining trips of this year's work will be to Akron, to visit the stoneware potteries and sewer-pipe works; to Zanesville, to visit the tile works and art pottery, and, lastly, to East Liverpool (the Staffordshire of America), to see the vast white ware and china industries of that place.

EDWARD ORTON, Jr.

MURPHYSBORO'S NEW PRESS-BRICK WORKS.

The press-brick plant that has been building at Murphysboro, Ill., for some months past has been completed, and the Daily News of that town devotes a column or more to the enterprise, which, it thinks, is destined to be one of the most important industries of that section.

The company, which will be known as the Murphysboro Shale Brick Company, has a modern dry-press plant, equipped by the Columbia Manufacturing Company, of St. Louis, and when the kilns now being built are completed and everything is in good working order, they will have a daily capacity of 30,000 brick. Mr. Hilgeman, secretary of the Columbia Manufacturing Company, who is well informed in such matters, having visited all of the clay centers in the Central and Western States, says their shale deposit is one of the finest and most extensive in the country, and that the Murphysboro brick will rank among the best, both for color and strength. It burns a beautiful dark red. In addition to ordinary pressed brick, they will make a large variety of ornamental brick. Mr. C. O. Pellett, one of Murphysboro's best known and most successful business men, will have the general management of the brick company, having been elected secretary and treasurer.

A WELL-KNOWN CLAYWORKER.

Among the many fire clay miners of the Woodbridge district, Middlesex county, New Jersey, none are more extensively known or have a better reputation than the Valentine Bros., or are more respected in all that pertains to their business career. Messrs. R. N. & H. Valentine own and mine very large fire-clay deposits, which is shipped over an extreme territory, and is very favorably known in all the States east of Ohio.

The fire clays, kaolin and sands shipped from their mines are very deservedly popular, and result in a very large output, which is very readily sold.

Howard Valentine was elected a Vice President at the last Convention of the National Association of Fire Brick Manufacturers, and was chosen to preside over the committee having in charge the care of all legislation affecting the welfare of the clay industries of America. His great experience, together with his pleasing personality, well fit him for the responsibility of that office, and his associates predict good results from the work of the committee under his leadership. He is still a young man, forty-eight years of age, and will, in all probability, make a broad mark in the annals of the National Association of Fire-brick Makers.

Howard Valentine.

FREIGHT RATES ON BRICK AND TILE.

Editor Clay-Worker:

Dear Sir—As a manufacturer in England I often wonder how the trade in your country gets along with the railway companies. Do the latter accept the consignments of brick and tile (for field drains, say) at computed weights? If so, how are these arrived at? What are your average rates for these goods per mile, and do owners of private sidings get any allowance by way of reduction for providing these sidings? This question is concerning private sidings owners here at present. Hoping some of your contributors will oblige me with their information. Yours faithfully,

AN ENGLISH CLAYWORKER.

CORRESPONDENCE.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

BUTTON-HOLE TALKS.

SAY, I WANT to congratulate you, old man. You really had an idea in your head in that talk of yours to-day, whenever or however you got it," said one of the patriarchs to me after the discussion on Manson's paper. "If it hadn't been for my weaknesses blamed if I wouldn't have talked myself; but it's no use, I can't do it. I am all right in the head, I guess, and my thinker keeps right on working all the time, but my knees won't work—just won't lift me up, you know; and anyway, I guess my tongue wouldn't work, even if my knees did. That idea is dead right, though. We ought to all of us fight to build up our business, that's sure. We all believe we have the best building material on earth. Why, we just know it for a fact, and when a man believes thoroughly what he is talking he can talk it so that no one can doubt it. The man he talks to has just got to believe it. Not like a man talking to kill time, or to earn a salary, or a phonograph, or a parrot, but there is something that goes with it. I don't know what it is, but it's there. It's like that salt Fiske was talking of with the potatoes. If the conviction isn't there the talk won't do any good, I don't care how much there is of it or how smooth it is spread. Then, again, if the talker knows what he is talking about and knows he is right, why, folks will believe him if his speech is so rough that it nettles. Now, all the other material men push their business, do missionary work and talk their business, and why should we just keep still and only take what comes in spite of us? We know we have the best material made in the fire or baptized, as you said, and with that finished skin surface that you told about, that won't take in water and dirt, while the stone, with its tool-fractured surface, catches everything. (Say, who put you on to that comparison, anyway? It ain't bad.) Why, I have been looking this thing over a little bit, and most all the stone I see that has been exposed a few years is wearing away with rain and frost. I tell you, this climate of ours will try most everything. Why, there's that what's her name's needle they brought from Egypt to New York. All right in Egypt till kingdom come, and been there from Lord knows when. What does our atmosphere do with it? Why, they have just been putting one patent preservative after another on to keep it from crumbling. Why, what's our real estate, anyway, our earth, our dirt that we raise our vegetables in, but rotten or ground-up rock? Just what it is. Took a long while to do it, and heat and cold, rain and snow, but it perished. You never found well-burned clay acting so. Not any! Nowhere!! Nohow!!! Nit!!!!"

GATES.

Vibrating Stacks.

Editor Clay-Worker:

I want to apologize for my extremely slow-working mind. I did not recognize our modern Galileo, and probably never should had he not been brought so forcibly to my notice in the March issue of your most valuable paper. My few remarks in the February number were not intended to deal with the vibration of stacks, but simply with the theory advanced by our modern Galileo as to why they vibrate. Before advancing his theory our modern Galileo distinctly states that it is not the wind that causes the vibration, and then goes on to state that the vibration may be due to a combination of the earth's motion, the inertia of the stack and its elasticity. Remember, the theory is founded on these three things, motion, resistance, elasticity. Wind has nothing to do with the theory, and is eliminated by his own statement. Our modern Galileo admits, in the March issue, that the earth's motion is uniform. I hardly think he will deny that the resistance or inertia of a given stack is also uniform. Nor is it probable that he will deny that the elasticity is constant during long periods of time. I therefore repeat my question, "Upon what law of motion or force does he found a theory that makes a uniform motion or force acting in one direction upon a body with a constant resistance produce a vibratory or intermittent motion?"

I did not merely deny or scoff without reasons, but practically gave my reasons for so doing when I asked the above question. If our modern Galileo has discovered a new law of mechanics let him advance it and hang his theory on it, but let him not attempt to put it on the old laws, upon which it is evidently a misfit. Nor is it a very Galilean method of logic to eliminate the wind as a factor and advance a theory based upon said elimination, and then, in defense of the theory, reintroduce the wind.

What did the ancient Galileo do? He found that certain facts did not agree with existing beliefs or so-called laws, so he readjusted his beliefs to conform with the facts as he found them, and some of his beliefs were finally accepted.

Our modern Galileo, however, tries to adjust an assumed fact to old laws, but the fact and laws do not fit together, and yet he claims to be a Galileo, or at least claims to possess equal greatness, and also claims immunity from criticism on that ground.

Had he, on the contrary, said: If we admit the vibration of stacks, independent of any wind action, and if these vibrations are always from east to west, there is no law of mechanics that will account for this phenomenon on the supposition of a uniform motion of the earth. Consequently, either mechanical laws are incorrect or incomplete, or Galileo's uniform motion of the earth is wrong. If mechanical laws are complete and correct the world must have an intermittent motion. Had he done this, we might have all hailed him, voluntarily, as our modern Galileo.

Think of the great comfort and consolation such a theory would be to the men he describes, that is, those men who have the world fly up and hit them in the face, or see the moon staggering and sidewalks swinging. All such men would rise up and call our modern Galileo blessed.

I have never thought much as to whether brick stacks vibrate, nor have I thought as to the direction of their vibration until after I had read the March issue of the Clay-Worker. Since then I think they must vibrate, and are all bowing toward the place of abode of our modern Galileo.

G. AMMON.

Enameling and Enamelers.

Editor Clay-Worker:

There comes a period in a man's life when something calls him up to stand still and consider, to examine himself, to see if all is right, or whether he has not made a mistake with regard to the ground or foundation of his confidence. This is my position just now. Though I am known to be a mild, quiet and inoffensive man, I know there is a possibility that I may have inadvertently hurt the feelings of some brother clayworker, and therefore I have thought it right to look over the manuscript of those papers I sent you for publication in your journal. It is now five years since the first of the series on enameled brick manufacture appeared in the Clay-Worker. I was at that time in England, and had not the remotest thought that I should ever set foot on American soil. I wrote those papers in the plainest and best English I knew of, without any embellishments of big words or scientific phrases, and I made it plain throughout that it was enameled bricks I was writing about, but, sir, I made one grave and serious error. I wrote from the standpoint that my old dad's countrymen engaged in the brick business were, like myself, illiterate men, and it naturally occurred to me that the brickmakers of this country were illiterate also, as a friend of mine, writing to me, said that none but a blank man would engage in such a business, but you will see later how easy it is for a man to reckon without his host. It was here I made the great mistake. True, when I came to this country I made the acquaintance of a few men it is a pleasure to me to know, and my visit to the Convention at Atlanta brought me into close contact with men, many of them Yankees, who it will ever be amongst my greatest pleasures to remember, but then (like myself) these were only the brickmakers of the baser sort, and therefore their kindness to me was just what I expected, for a fellow-feeling makes us wondrous kind. But the field has widened, and I have now gathered around me a set of scientists, men who have gathered fruit from the tree of knowledge. They have been into the house of the potter; they have studied the Roman and the Greek, and, in later centuries, the French literature on the ceramic art, and therefore are well qualified to determine what is pure enamel, and by their chemical and mathematical skill are able to differentiate the differential, and prove beyond a doubt that what is not pure enamel must of necessity be slip and glaze, as there is no middle course known to science, and, like all scientists, they like to have things called by their proper names, and so they gather round me, determined that I shall not rob the pure enamel of its good name. In this discussion I thought I was getting on pretty well, but after reading the paper in your issue for January by a new hand, I had to take a seat, for with his usual deftness he made my head and his scientific hammer connect, and I have felt bad ever since. The writer says his name has been brought in, and therefore he must follow, but it was not I who introduced his name into this discussion. I never mentioned his name in any of my writings, and if this be the reason for taking up his scientific hammer why did he not make the connection with the head of the other fellow? I have not had the educational advantages your correspondent lays claim to. If it were not for one little incident I should not remember that I had ever been at school. I was one amongst about ten other boys of tender age who were sent to a dame school. Our evident duty was to sit in a row on a form and keep quiet. We could not always do that, and the old dame, not being able to detect the principal, and wishing to make sure of the right one, thought it her duty (and it was her evident desire) to make each head and a hazel stick about three feet long connect, and she did it every time, with the result of a good deal of shivering and some peeling. I do not wish it to be understood that I underrate a college education; by no means. It was my misfortune, not my fault, I could not go there; but I am glad to be able to say there is in this and other countries illustrious examples of the fact that there are other avenues of knowledge outside college halls and universities. It will readily be seen that I can lay no claim to a scientific education. What have scientists, from time to time, in your journal, demonstrated to be the alternative? Is it not the rule of thumb? That must be so, for science demonstrates and I humbly accept the position. But, sir, shall I say anything in favor of this rule, a rule so despised and rejected of science? I don't know that I dare do it, but I will risk it. This rule and I have jogged along for many years together, and, besides that, my dad worked by it, and my dad's dad. He is a sort of old family friend that we old-time brickmakers cling to, being too old to take to science (this is my apology to science). By this rule (I suppose it is by this rule) I have just drawn from one kiln close to forty thousand enameled bricks, with only 2 per cent. of waste. Now, your correspondent, I believe, is a good mathematician, therefore he will be able to properly differentiate and integrate this scientific problem, and tell your readers how many kilns he would have to set (in saggers), burn and draw to get that number of bricks. Then he thinks he ought to apologize to me for his scientific education, or at least for his knowledge of the French language. None is needed to me, mon ami. I have not the least wish or desire to try to discredit the work he is doing. It is good in its class, and I will say very good, but how in the name of all that's great, he should wish to make it appear to your readers that a scientific education is needed to enable a man to use the brush, the sponge dabber and the sprinkler on a piece of unburnt clay, even if it should be seven hundred pounds in weight, is more than I can see through. Many a boy who has graduated from the school of a union workhouse, and bound apprentice by the parish, his indentures being signed by the relieving overseer, has by his own unaided efforts cut through his environments, and by the time he had reached the age of twenty-one years would not hesitate to take up the tools at whatever point your correspondent laid them down. That fine flash of sarcasm, rewallowing in a glaze tub, etc., etc., would lead one to suppose that he never did any preliminary work, but that he was predestinated to all those subsequent events which he has set out in his ticket of admission. Now, your correspondent either did some preliminary work or he did not. If he did, then he must have been wallowing somewhere, and possibly did not come out of it without some marks of such wallowing, and his keen reproof will fall short of making the connection he intended it to make, and will resolve itself into mere blatherskite, or, to put it into scientific form, the grand climax of a pyrotechnical display of rhetorical verbosity. The proper meaning of the term enamel has never been applied by me in its strict sense to enameled bricks. I know some little of the difference betwixt the two, and I thank your correspondent for the small concession made to me on this point. To answer the question he puts to me would prove nothing, but the question itself proves one thing—that with all his exceptional advantages, aided by his scientific education, he has not been able to discover the essential points connected with English enameled-brick manufacture (though he did it).

What shall I say about that last paragraph? Any words of mine will prove too feeble to do full justice to his athletic abilities. He is a master of the science of permutation. He can change one thing into another at will, and prove that is that isn't, and that isn't that is. He must be contemplating retiring from the business of coloring those large pieces of terra cotta. That paragraph would no doubt secure him a leading position on the editorial staff of Tit Bits, or Rare Bits, or possibly Great Thoughts. Verily, he is a peripolygonal, peripteral sort of man—a man having many sides, with columns all around. I would ask, What is the object of your correspondent in pushing his way into this discussion? It is not to criticise any method of mine, or anything I have said on the manufacture of enameled bricks, for he says that I. H. is undoubtedly right in claiming his bricks to be enameled. It cannot be to defend any method of his, as I have never named his name, nor have I contravened a word he has said. His object is, I think, to tell, as he says, what he has done and what he is doing, and to make it appear to your readers that a scientific education is necessary to the execution of the work he has in hand. In this he is not alone; he is in accord with the general and prevailing idea, and doubtless the next generation of clayworkers will all be scientists. For myself, I am the more ready to give him credit for his mental qualifications. He has a prescient mind—a sort of prophetic foreknowing. His penetration, acuteness, discernment and sagacity are fully established by the fact of his discovery that I was a typical Englishman before I said anything. In this he is undoubtedly right, and I think it just as well that I should right here make my confession. When I left the old country I left my home intact, with an attendant in charge to keep the fires burning in the grate. It will therefore be seen to be my evident purpose and desire to return, and I must confess to a little (malade du pays) homesickness. Yes, I love the cottage home—the hedge-rows decked with the honeysuckle and the gypsy rose, the meadows carpeted with the daisy and the buttercup, the wood and glade, where in rich profusion grows the bluebell and the cowslip, and to hear the lark as she rises from her nest to sing her song at heaven's gate—a true emblem of the boundless liberty and freedom of her people. Yes, yes; I am an Englishman; and I should say that your correspondent has made the further discovery that I am not a new hand.

Au revoir, mon ami; if I owe thee aught, call me up again. A typical Englishman is (toujours pret) always ready. I. H.

Enameling and Enamelers—A Reply to "I. H."

Editor Clay-Worker:

In the discussion in the Clay-Worker under this heading I am surprised to find that personality and self-biography have been called into play, when, as a matter of fact, they have nothing to do with the subject under discussion. The subject is, really, What is an enamel? Or was Clayton in the wrong in his description of an enamel, or is I. H. right in his, or is the contrary the case? I cannot imagine what under the sun I. H. means by referring to the Democratic or Republican parties in discussing a question which is not in any sense political. This is too wide of the mark, I think. Nor can I understand that Uncle Isaac's self-biography, however well written, can have anything to do with this question. It is only a vague attempt on his part to establish himself as "an authority to talk brick," as he says, without the scientific training so essential, but which he scorns. But for this, together with practical demonstration or experience, I am contending.

It matters not that he burned a kiln of brick at the tender age of twelve, nor does it make any difference that our friend, I. H., at a very early age, had "thoroughly mastered every detail of the business." These facts (?) are, indeed, very remarkable, but do not prove anything as to the main question of who has made the best financial success. But to discuss or debate a question with some one who practically ignores scientific training in a matter which is from beginning to end a chemical process, and who scorns good and acknowledged authorities, calling them "back numbers" or "tail-enders," etc., is not an easy matter.

It seems a little absurd to hear a sensible man refer to so learned and honored a man as Brogniart in such terms, suggesting that he might have helped to build the tower of Babel, etc. Now, while it is true that his father was an architect, it does not follow that either one had anything to do with any building 2,247 years before Christ. This great scientist and ceramist lived in our present century, and was not dead when our friend, I. H., was born, I believe, for he died in 1847. Now, how can he be a back number? And Mr. Salvetat is still alive, I believe. But it is in vain, I presume, to mention any more authorities, Professors Seger, Palissy and others, for example, or Wedgwood (although the latter was also an Englishman), for it seems that authorities "don't do," and what use is there, then, to try to prove anything. I. H. simply turns to the other side and says: "I was in those days trusting more to Uncle Isaac than to those ancient fathers," and it is evident that he does so yet.

Isaac H. Hardy, One of the Enamelers.

In looking over his so-called reply in the November issue, it is found that the real question is entirely dropped, and, in dodging it, some other "jolly matters" have bobbed up instead. But by dropping the subject in such a manner he admits, I suppose, that his point was not well taken from the beginning, or else why does he not "prove up his case?" This he has not done, wherefore it must be concluded that he admits that Mr. Clayton was right and that the contrary could not be proven. The answer then seems to be this: "An enamel is a vitrious, stanniferous coating or glaze, which, being stanniferous, must be opaque."

Now, "after the ball is over," in all kindness I would wish to call my friend's attention to a few remarks of which he has made use and has tried to be funny over. He quoted me as saying that I did not burn the brick in saggers, and then he is asking: "What did you burn them in? Kindly answer by return mail." Does I. H. wish the readers of the Clay-Worker to understand that he cannot burn enameled brick except in saggers? This is a give-away, when he has been talking of that "enamel which does not run off, never mind in what position it is placed in the kiln," etc. But even the question itself is so f—or childish: "What did you burn them in?" Well, I burned them in the kiln, without setting them in saggers. Is that plain enough?

I. H. also admits that he is an Englishman, and that he has not the remotest desire, purpose or intention of ever being anything else. Well, that is his right and privilege, but to any one else but him I would have said: Is this country not good enough for you, or why would you not become a citizen? Is this country good enough for you to make your living in, but not to defend, if need be?

As to my reading a paper before the Illinois Chapter of Architects and not before the N. B. M. A., I wish to say that I have not the honor of being a member of the latter body, while I am a member of the former and was invited to read it before them, and thought I had a right to read it wherever I pleased.

Friend I. H. takes it for granted that I am a graduate, either of some university or else a graduated fool, and he thinks the age of forty or forty-five is just about right for the latter graduation. Well, in this matter I cannot talk from experience, as I have not reached that period of life yet, so must take his word for it. I would be happier than I am if I was a university graduate, but I have not been so fortunate, and wish sincerely that I was in possession of more theoretical knowledge than I am.

Finally, our friend need not apologize for his English grammar, so long as he can be understood, and his Latin is perfect. I extend my hand to friend I. H. in thanks for this opportunity of exchange of thought on this perplexing subject. He invited some one to discuss this subject with him, and I hesitated to take up the glove, knowing, as I do, that if any one was unfit to take it up I was, especially as the weapon to be used was a language which is not my mother tongue. In this regard I should be the one to offer an apology, and not he. This I will gladly do.

With thanks to the editor for the space and to the readers for their indulgence, I am very truly yours, S. L. DE ROTH.

P. S.—Since the foregoing was written friend Griffen has taken up this interesting subject in his usually modest manner, calling himself "a new hand," although in this country he is an older hand than either I. H. or myself. In his definition of an enamel he is kind enough to try not to offend either side, and the attempt is as ingenious as it is kind and impartial. He thinks that both might be right in a certain sense, viz., one "strictly correct," and the other may be right if a liberal interpretation is accepted. He says: "It is quite customary, I believe, to call a ware enameled in which an enamel effect is produced, or where a body of one color is concealed and covered with a coating or coatings that give it an evenly-colored glaze face for another color. This is especially the case where the resulting glazed surface is white or a cream color. This is, of course, not strictly correct, but has been accepted without question for years. The resulting effect is what is sought for and desired. By accepting this distinction between enamel and glaze much discussion and dispute has been avoided, as no one with seeing eyes can well dispute a visible effect. In this latter view of the case I. H. is undoubtedly right in claiming his brick to be enameled, yet in the strict and proper meaning of the term I do not see how he can do so."

Well, this is encouraging. It is for "the strict and proper meaning of the term" that I have been contending, and not for what is only apparently so or which resembles the genuine more or less closely; in other words, an imitation. For why should it not be the high aim of Americans to be strictly correct, and not imitators? Mr. Griffen cannot see how I. H. can be right if the strictly correct and proper meaning of the term be accepted as the proper one (and there is no good reason why it shouldn't be). This must mean something from a man who was among the first to make glazed brick for America, even if he used a method which is similar to the one used by Uncle Isaac. However, having scientific as well as practical training, the fact that the engobe method had to be employed on the clay he was working with in order to make the best financial success did not so blind his vision but that he still knows which is which. At the N. B. M. A. Convention at Chicago I had a very pleasant interview with him. This was the first and only time I have had the pleasure of meeting this gentleman. Upon examination of exhibited samples he seemed to have no difficulty in determining which was and which was not an enamel or to give a proper definition, only he was probably a little more specific, as there was no one present who could feel offended, as might be the case now.

In this, as well as in other trades and professions, it is, indeed, gratifying to see and watch the strides taken by American artisans in the last decade. See how science is pushing to the front and the old "rule of the thumb" method is being relegated to the rear. How very interesting it is to read the Clay-Worker when a writer says: "The scientific reason for this is as follows," etc., instead of "I learned from the formula," or "my father told me to do so and so," but if this man does not succeed on account of changed conditions or different material he is lost, and does not know where to turn. Why? He learned his business in a mechanical way and lacks the knowledge to reason out or work out the result, which he could have done with a little scientific education, coupled with his practical knowledge of the trade. It is refreshing to see one institute of learning after the other established where our young men can obtain a thorough education in all branches without being compelled to "go abroad to finish their education."

Let the requirements even be raised from year to year, so that at last we can in truth boast of having schools fully up to the standard of continental European seats of learning, and let the coming generation apply their attained knowledge to the industries of the country, and the clay industry, being the second in importance, shall surely be greatly benefited, making such progress in all directions as may astonish even old Europe. Honor is due to Ohioans, who have acknowledged in a substantial and practical manner the importance of the kind of training I have referred to in regard to the clay industry. Much can be expected from this school, although existing as yet only in embryo, as compared to what we have reason to hope it will be. When a nation shall begin to realize the importance and see the fruit of such institutions, then the "rule of thumb" advocates shall not dare to set up any claim to any authority, but be considered to be what they are in fact—back numbers—and true science shall reign supreme. S. L. DE R.

Roofing Tile—How to Make Them.

Editor Clay-Worker:

Roofing tile has been made in Europe for more than three centuries, and the first known form that it took resembled a tapered, half drain tile, called in this country Spanish roll. This is still made and in use in the old Spanish colonies of South America. From this form, the half of a tapered pipe, we come to the Holland roofing tile, which combined the round and the hollow, and has, at the same time, a lug to hang the tile over a slat on the roof. It is the so-called S tile, or pan tile. This tile is still made in great quantities in northern and northwestern Europe. From this gradually came the better type that is now mostly in use, the flat, interlocking roofing tile. There are more than a hundred different patterns, but all have, with slight differences, the same principle of interlocking joint, as well as a lug to hang on. There is also a great difference in size, running from 130 to 400 tiles to a square. The smallest are mostly used for covering turrets, dormers and small outbuildings. The size which the tile should be made depends to a certain extent upon the qualities of clay found on the spot where the factory is to be located. I have often had occasion to give my opinion upon the necessity of vitrifying roofing tiles. I think this entirely unnecessary. I never saw a roofing tile in Europe that was intentionally vitrified. You will find them there only upon the bad pile. In fact, it is impossible to do it and at the same time preserve the form and shape of the big interlocking flat tiles. The slightest warping prevents the fitting into each other upon the roof. The reason why our architects and users believe that roofing tile must be vitrified is that they have the idea that the solidity of clay ware depends entirely upon the burning. This is so far wrong that in selecting a strong plastic clay and taking good care in the tempering it will make the body of the tile solid and dense before entering the kiln. After burning it will soak water, but not freeze to pieces, for the reason that there are no places in the tiles where sufficient water can gather to freeze and spoil the tile. At least 90 per cent. of the tiles made in Europe are provided with a lug to hang on the slats, instead of using nails to fasten the tiles. Experience teaches us that the moisture taken up by the capillarity between the two tiles very soon destroys the nails, and in a short time you don't know whether there is a nail there or not; that is to say, whether your roofing tile is fastened or not. Great care has to be taken to have the roofing tile, after burning, all of the same measure, and if it is not possible to burn them all alike, then sort them to the same measurements, because it is impossible to lay them so as to make a good roof when there is difference in size.

—Clay.—

The main thing, when selecting the site for a roofing tile factory, is to have suitable clay. The clay must be plastic, strong, with little sand and without impurities, and it is to be preferred if it burns a dark red color at not too great a heat, because red is for the present, and will be in the near future, the choice color for a roof; besides, this color is the best fitted for slipping or glazing. Clay fit for a large roofing tile, say from 130 to 180 to a square, shrinks from press to kiln 7 to 9 per cent. For smaller tiles it may be a little less, but it is better to consider it the same. The preparation of clay can be done in different ways. The old style and for small factories is to gather clay in the fall and winter, wheel or cart it into a pile close to the factory and let this freeze and weather. This, if well done, will render rolls, dry pan, screens and pug mill unnecessary. You can, if proper care is taken, use this clay right from the pile in the slab machine. If your clay cannot be worked this way, then you have to run it through a clay dryer, dry pan, screens and pug mill, or through rolls and pug mill, and to be sure to have an even-tempered clay put it for a week in a soak pit before using. I prefer dry pan and screens to rolls. It is more expensive, but rolls make sheets of clay, and this always causes laminations in the tiles, and is one reason for tiles upon the roof bursting in frost. The clay, prepared for use, should have the appearance and consistency of putty. The dimensions of the slab of clay depend upon the size of tile. For a tile of about 180 to a square 2x4x16 will be sufficient.

—Presses.—

The presses in use are of different size and patterns. The so-called S tile, or Spanish roll, is made with the plunger machine or the sewer-pipe press. From the first named the clay comes out of the die in a single stream, like the brick; is cut at the proper length, trimmed and provided with nail holes. Made with the sewer-pipe press, the die is somewhat like a triangle, each piece holding three tiles. After leaving the press they are cut half through at the joints, dried and burned, and, after burning, broken apart. The interlocking tile is made with the drop press or the screw press, for hand and steam power, and the revolving press, for steam power only. The dies of the first-named presses are from steel or plaster of paris. Of the revolving press the dies are from plaster. With the drop or screw press, by hand power, double acting, after the men get trained, you can make two thousand pieces a day. A revolving press delivers five thousand tiles a day. Using steel dies, you have to grease your slabs and the clay has to be stiffer. The grease used is generally a mixture of linseed oil and kerosene. The just proportion you have to find out with a little experimenting, it depending upon your clay. Plaster dies are made of the very best kind of plaster, mixed with not too much water. It takes some experience to make them smooth, without pin holes, but it is soon learned. In using plaster you do not have to grease your slabs. After the tiles are taken from the press upon pallets, one for each tile, they are laid upon a rack, and the surplus clay at the brims, all around, is taken off by boys or girls with a little iron-wire tool called the "trimmer." The tile is then laid upon a car or rack wheelbarrow designed for this purpose and put into the dryer.

To dry tiles there are different ways, as in drying brick—air drying, in sheds upon racks; tunnel dryers, hot floor dryers and hot room dryers. For small factories having no boilers or engines, air drying in sheds upon racks is the best way, and the drying space necessary is about ten times the daily output. For larger factories, equipped with steam power, the steam tunnel or hot floor and hot room dryer is the best. Drying in these cases should take not less than three days and nights, or longer, according to the clay and the size of tiles you are making. In using good, strong, plastic clay, however, the drying should take that long. Never, in drying, forget that you are drying roofing tile, and not clay. Don't hurry your dryer beyond the limit. It will save you many cracked and warped tiles. Look upon the dryer more as upon the brick machine. If you don't feed the latter clay, you don't expect brick. Then don't expect sound tiles when you do not keep your dryer full. Three days' drying, with a temperature of 115 to 120 degrees Fahr. at the discharge end, will make your tiles hard, bone dry and just fit for the kiln. Never put a tile into the kiln that is not absolutely dry. It will surely be spoiled in burning.

—Slipping and Glazing—

To change the color that burns natural to the clay where roofing tile is made from there are different ways—slipping and glazing, before burning, salt glazing and blue smoking, after burning, when the tiles are at their highest temperature. Slip is composed of clays and water that burn a different color than your own, and is put on the tiles after they are dried. Be careful to use this slip at the right thickness, for, if too thick, it will crack in drying, while, if too thin, it will not cover the tiles.

Glazes are mostly composed of metals fluxing at a lower temperature than your clay. Those mixtures are mixed with clay, sand and different colors, ground fine, with water, in a mill, and then put on the tiles like the slip.

—Fuel.—

Any kind of fuel will burn roofing tile, and that kind will be preferred that is the most convenient and cheapest at the spot where you need it. Coal, fuel oil, gas and wood are the principal fuels. Where there is choice I should prefer gas and fuel oil. In burning glazes you have to use the muffle kiln or up-draft kiln on account of the ashes that stick to the glaze when it fluxes. For different fuels you need different arrangements in your fire box.

—Burning and Kilns.—

The kilns in use for burning roofing tiles are many, different in size and pattern, including up-draft, down-draft, continuous, muffle, and kilns where the fire box is at one end and the stack at the other end. The last named and the up-draft are old patterns, and have to give way to the more modern down-draft and continuous kiln. I believe the continuous kiln to be the kiln of the future to burn roofing tile, because you find therein the principle of using waste heat perfected, the only drawback being the first expense and the necessity of having a pretty big factory to give employment to the kiln. It is not only continuous in burning, but also in setting and drawing. A combined down-draft and continuous kiln, from which the chambers can be burned separate or in combination, is better for a smaller factory to start with, because you do not have to build all the chambers at once. A kiln holding from seventy to ninety squares is about the best size and easiest to manage. The next important thing for burning is the setting of a kiln. To vitrify tiles and getting the best chance for not warping is to use pigeon holes of fire-clay slabs. The unvitrified tiles (like they are all in use in Europe, and I saw them there more than one hundred years old, and can show them here in this country that have been laying the last three winters upon a roof about 350 square, without any damage from frost) are set one on top of the other, six feet high, upon a perforated floor, and then burned as hard as your clay can stand without warping the tiles. The settling of a kiln with tile must not be over two inches. Good, strong draft is the first necessity; in fact, have your draft stronger than you think you need, and temper, if necessary, with strong wind, and the last hours of burning with dampers. A good kiln has to be burned in thirty or thirty-six hours. The continuous kiln is not adapted to burn tiles with the silver luster, so generally in use in the north and northwest of Europe.

—About Starting a Roofing Tile Yard.—

In the near future roofing-tile manufacturing will attract the attention of the clayworkers. All other branches of the clay industry are pretty well cared for, and it is surprising there has not been an earlier call upon this business. In the last eight years, however, there have been many efforts to introduce the best roof covering in the world, and it is a pleasure to see the fair start roofing-tile manufacturing has obtained. It shows that this article has come to stay, as well as did paving brick. It is more a question of not knowing the new roof covering well than a question of its necessity and durability. Once used to it, so that roofers agree with manufacturers that tiles are the best material for a roof, there will be no more doubt about its general use. The architects have already shown in more than one specification that they are ready for tiles and have tested their superiority. One side of the question is the price charged per square of roofing tile at present. No doubt the factories that are located need the high price on account of the experimenting they had to go through before producing a salable article. It should be the purpose of manufacturers to make the price of tiles in reach of everybody wanting them, so they may be used on a small cottage as well as on a courthouse or church. I know of the time in Holland when we sold tiles as cheap as $1.25 to $1.75 a square, and considered this a fair price. Low wages and other considerations had much to do with this, but when you can make roofing tiles for $1.75 to $2.25 a square, f. o. b. cars, which, I think, it is possible to do, then there will be a nice profit in selling from $4 to $4.50 a square, and that price will make it a common article and will open a large field for the clay industry. To come to such a low price, and, at the same time, have a fairly good profit for the manufacturers, first of all treat business in a business-like way.

As I was saying before, there are many different patterns of tiles in use. Each pattern differs from the other somewhat in the manufacturing—making, drying, setting, burning—so when one factory handles two or three different tiles it has all it can do, and work, at the same time, cheaply and to an advantage. In selling don't try to meet the different wishes and fancies of everybody, but stick to your own tile as being the best in the market. Different patterns require experimenting and plenty of time, wherein two-thirds of your factory is not running, and a year is very short when there has to be an accounting at the end. Besides, it is very difficult to explain to stockholders, who are generally not clay men, how it is that your experimenting prevented interest or profit making.

Sell your tiles as close to home as possible. You then have a better chance to look up your trade and business and not depend entirely upon agents to look after your trade, and, at the same time, collect from you the first profit. Of course, I don't want to say do nothing with the help of other men, but try not to give it entirely out of your hands.

Select your clay very carefully, and avoid impurities in it. Use as little machinery as you can. The wear and tear thereof take away a good deal of your profits, and, besides, don't start on too big a scale. The interest on capital and running expenses of the first two years are many times the reason of a flat failure, just at the moment when profits should commence. You can start a roofing-tile plant on a very small scale, provided your clay is just right, and about $5,000 invested in the whole outfit, not counting the ground, will start a factory of about 1,800 squares of tiles capacity a year, besides the fittings. As soon as your business requires it build an addition, and if it should prove later on that your trade is big enough to need a big factory, build one. In stating the above, I want it understood that I am not against a factory equipped with the best improved machinery, but I don't want to start before I know whether I can reach the end. I only want to make it clear that to make roofing tile you don't need such a big capital to start with. Many times I read in the clay industry papers that on account of competition and consequent cutting of prices in brick there was no profit left. I would suggest that the brickmakers in places where there is good roofing-tile clay join hands, select the brick factory that is the best fitted for making roofing tile and start together in this branch. They will reach more than one point in this way. They will make the list of brick factories smaller and will be manufacturing an article that promises better profit. Being already interested in the clay industry, they will have an easier and cheaper way of selling the tiles to the same people that use their brick.

CHAS. STOLP.

Chicago Heights, Ill.

The New York Market.

—Getting Ready for Another Season.—

With this kind of weather prevailing, by the time this number is placed before your readers some of our Hackensack yards will be molding. One of the yards has been pumping out their clay bank for the past week, another started on the 25th of March, and it will take them about three weeks, with two six and one ten-inch pump running night and day, except Sundays, to free the bank from the accumulation of water as the result of leakage and winter rains. The leakage in the bottom is of some moment, but the pressure that is now on it from the quantity of water that has entered from the surface holds it back. During the summer the engineer will turn on steam for the one, six and ten-inch pumps about 2 o'clock in the morning, and keep them both going till the pits are out, about 10 in the forenoon, so that if they wish to put in any bottom clay they will have no water to interfere with them. Last summer they did not use bottom clay and had no pumping to do on Sunday, thereby saving the cost of the engineer's wages for half a day. During the best of weather it is disagreeable to travel around a clay hole when the frost is coming out of the ground. During the past week it would seem as if the weather meant to show those who were pumping how disagreeable it could be—rain, snow and blow, and, still worse, freeze, and so hard that if the pump was stopped for any length of time it would freeze fast. On one of the yards they laid still one night. It took them all next day to get the pump thawed out and repaired.

—There Will Be One Less—

Brickyard on the Hackensack river this year, the result of competition and a poor grade of clay. The yard lies between the river and the S. W. R. R., with switch to shed, and the only yard there that was directly connected with the railroad, which placed it within seven miles of Paterson, N. J., a city of sixty thousand inhabitants. When first built, about eight years ago, it was the best located plant in this section, and was a large dividend payer, as anything went at that time in the shape of brick. The party who built it was one of the "know it all" kind, so often met in the trade. If, after the yard was running, he had left it in charge of the foreman and went fishing, he would have made money, but he was not content to do that. During the time the yard was in operation he had several good foremen in charge, who, when left to burn a kiln according to their own judgment, would do so successfully, but the very next burn the boss would have to have his say, for fear the people would think he did not know how to burn brick, which, as the result showed, he did not. It is no doubt the only yard in the State that can show the record of not keeping a foreman the season through, from the first season till the last, and there were some good men in charge. Some of them have forgotten more about burning brick than he will ever know. In one of the cases the burner was an advertiser in the Clay-Worker.

He did good work; in fact, the public opinion and observation was too good, and it caused his discharge in July without any warning. Just so in the location of the yard. The best of the clay is covered by the yard. The rest is stony, and the pits are so near the track that there is no room to put in a crusher. All of these facts were brought to his notice when building, to be met with the reply that he knew what he was doing. He now has time to think while he works for others. The shed is to be removed and the ground sold for a factory site.

—Consolidation,—

Political and financial, will both start off this season. Of the one, the consolidation of New York city and Brooklyn is of no moment to the brickmaker, as it will not cause any more use for brick than at present. The consolidation of the brickmakers is. Ah! Think of it! He is going to throw off the yoke of the agent and be "free," and we will get a paying price for brick, is the cry. Such is the tenor of the talk heard from some, and one who is not acquainted with the trade would at once believe that the agent runs the business to suit himself; that the manufacturer was not in it, only as a maker. Now, there is only one way in which such a state of things could possibly come to pass, and that is by the manufacturer being a large borrower from the agent, and thereby controlled by him to the extent that he had to ship and sell, no matter at what price. If some may be so situated, all are not, consequently the agent cannot be the supreme power that they would have you believe, if he was not helped in his course by the manufacturers themselves. It does not seem right that the agent should be called on to bear the blame of low rates when the cause is plainly with the maker.

—A Surplus of Stock—

Is certainly a strong factor toward lower rates, and to keep dumping that surplus on a market at a rate far in excess of the demand is only to court financial ruin. The course that has been pursued in the past has been to load the barges according to the size of the yard and send them to market, with a full crew of five men, and when she reaches there pay 50 cents per day wharfage and the same rate for the watchman each night, besides the expense of the crew. After laying a few days the orders will be to sell. Is that the fault of the agent? Would it not have shown good business judgment if the manufacturer had loaded his boat or boats to make room, let them lie alongside the dock and discharge the crew? Then the boats would not be under any expense. Stop a machine so that his shed would not fill up so fast and try to help the market; but no, do just the opposite, and then expect to get a paying price for his stock.

—The Agent, or Middleman,—

Has to bear the blame of all that is bad in the trade. It would certainly be expected that when the organization was formed the manufacturers would be so eager to join an association that promises to let them have control of their own business that they would be unanimous. The 30th of March will be the test of the sincerity of the signers, as they are to meet in Newburg that day and pay their assessments on their subscriptions.

The claim is made that they have signers to the extent of six hundred million, and the assessment is $50 per million, or $50 per share. If they all hold together it will be a good investment to the stockholders, as the rate they expect to charge for selling is 12 cents per thousand. The commission men are no doubt patiently waiting for the company to commence, if for no other reason than to see how the thing will work. When the market is dull and there are members who want help, and say, "Sell my brick," and the rate that the company has fixed is rather more than the brick will bring, what will be done? Will the manufacturer still keep his old tactics of sending them in? The result will show who has been at fault, the manufacturer or the agent.

—"Why Do They Not All Join?"—

I asked a leading member of the movement. "I give it up," he replied. "I can only guess." There is one universal guess, whether right or wrong, and that is if a man sticks to the agent he can get financial help, and if the other parties force brick up, the agent will get as much for them. As near as can be found out, there is no help to come from the company as a body. Only as individuals may they assist a member, and there is no great extent of such fellowship existing among manufacturers, except something more than common should occur, as did a few days ago. One of the trustees of the company, it seems, was debtor to his agent to the extent of several thousand dollars. The agent said he should not be a member, and called for his money. One of his fellow-members helped him out by lending him the money. Such cases do not happen every day, and in the agent's case he will see his mistake.

A similar movement was formed in the seventies, but on different lines, and was a costly experience to many, and no doubt will be of help in this case, so that there will be no danger of a repetition of what happened at that time. Then, as now, all did not join, but many who did were dead wood, but the company lent them their paper, with the result that the profits of the first year were but a small portion of what the solvent members were called on to make up for the defaulted ones. In one case a manufacturer received as profit from his stock about one thousand dollars, and paid out seven to help some who failed. In the present movement this may have some bearing on not all signing. Certainly if it was unanimous, and they could control the output, it would be a money-making movement that—well, there would be so many new yards that the goose that laid the golden egg would be crushed.

—Another Abuse—

To be corrected by this movement, and a very needful one, came through the large manufacturers letting the buyers use their boats as storage. It is not uncommon for barges to lie, discharging cargo, after being sold, two, three and sometimes four weeks, and get no demurrage. Four years ago, when the brick handlers' strike was on, the owners set a limit that all barges must be unloaded in four days, but, like many other agreements among brickmakers, it became a dead letter. Why a boat should be kept as a storehouse and not be paid for seems to have at last awakened them to the fact that they are losers. That is one thing that cannot be laid to the agent.

—The Market—

Has receded since last month, and not from shipments, as the rivers have been closed with ice. Bad weather has kept outside work back so that what stock was on hand and what came in from South Jersey and Long Island was enough to supply all wants. With the return of good weather there will be an increased demand for brick, and if the present organization gets started an improvement in price may be reported. Top, $5.50 and $4.75.

A. N. OLDTIMER.

Status of the Brickmaking Industry at El Paso, Tex.

Editor Clay-Worker:

The following description is a portion of a letter received by the writer from Thos. Sullivan, one of the Sullivan boys operating the well-known brickyard on Fifty-second and Market streets, Philadelphia, and sons of the late Patrick Sullivan, so well known and respected by his brother craftsmen and all who knew him. It is very gratifying to see the boys treading in the path of an honored and worthy father. Thomas, or "Tommy," as we familiarly call him, has been obliged to move to El Paso on account of the health of his wife. He is far from being at home amongst the Mexicans, yet he writes a very interesting letter. This is what he says of brickmaking out there: "This morning I visited a brickyard on the Rio Grande, about a mile below this town. I will endeavor to give you an idea of it, but you would have to see it to give you an adequate conception of its crudeness. The stuff out of which they make what they call bricks is a black sand. It runs or averages about four feet in depth. It is taken to soak pits. There are two of them, and they are used on alternate days. In connection with each pit there is an old-fashioned pug mill, operated by horse power. Here the stuff is ground until it resembles the mud on the streets of Philadelphia after a spring thaw; then it is loaded on a barrow and wheeled up the floor and a gangway and dumped right on the table.

"In each gang there are three men and two boys—the brickmaker, his helper, the clay wheeler and two offbearers. The molds used are the ordinary three-brick hand molds. The brickmolder stands at one side and pulls down two handfuls of the slush, throws it in, repeats the operation, and now has two of the spaces in the mold filled. The assistant, in the meantime, has made the brick on his side and pushed the plane (a bow strung with wire) across his brick, where it is seized by the molder and drawn across his two bricks. Each man then throws his after pieces in the pile and the full mold is ready for the offbearer, who takes it and dumps them on the floor much after the style in our country. He now comes back to the table with the empty mold, sands it in a box and puts it on the table, leaning it so that when he takes the full mold away the empty one drops in its place.

"Each gang makes eight thousand for a day's work, and, even if they were all Mexicans, they had a neat and quick way of working.

"The bricks are burned (or half burned, I should say) in clamps, with wood for fuel, and have a dirty gray tint. They had about 200,000 on hand, and I am under the impression there is not much demand for them at present.

"There are in the town four or five splendid buildings, built with red pressed brick, but I have not yet been able to find out where they came from. The balance of the town is built of the half-burned article, described above, and the Mexican parts of it with a raw one, called 'adobes.' "

CENTER PUNCH.

Perth Amboy Notes.

Editor Clay-Worker:

We note a quiet feeling in the terra cotta industry of Perth Amboy at present. Of all the factories here, the Standard is the only one now making full time.

During a trip to the Standard Hollow-brick Works of Penfield & Co. we noticed a foundation going in for a 150-horse-power engine of the Erie City Iron Works make. Three wet pans are already set up, and an immense steam press is on the foundation (a double-ender) for hollow brick. All this latter machinery is, of course, of J. W. Penfield & Son make. The Radford Continuous Kiln is now undergoing its first round of firing, with fair results.

An immense slip of clay has taken place at this company's plant, thousands of tons having fallen or slipped down, owing to the inclement weather. R. C. Penfield is a frequent visitor to this city during the improvements to this plant.

A foot of snow on St. Patrick's day has now passed away, with heavy rains, and this county is now becoming a sea of mud.

A scheme is now on foot to organize a Board of Trade to induce capitalists to come here to locate. No better locality can be found for clayworkers, as the deposits are practically inexhaustible. Any person desiring information upon this subject will be answered cheerfully if they will send word to the writer.

Peter Hansen, a Danish laborer, was killed at the Perth Amboy Terra Cotta Works, March 20, by being caught in revolving shaft. This is the first fatal accident we have ever heard of at this plant.

Mr. Philip Gibson, lately with the Pocahontas Clay Company, of Richmond, Va., is now recovering his usual good health by resting on his oars in this city, a too close application to his work having injured his health. He expects to rest for at least a year.

Mr. Wm. Weir, for two years Superintendent of the sewer-pipe department of C. Pardee's works, this city, has severed his connection. We hope Mr. Weir will not leave our growing city, as we need all good clayworkers, and Mr. W. is conceded to be one of the best pipemakers in the country.

W. R. O.

THE CLAY-WORKER

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THIRTEENTH YEAR OF PUBLICATION.

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5 Monument Place.] T. A. RANDALL & CO, Indianapolis.

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CURRENT COMMENT.

The writer is a "Buckeye," and is proud of it, for Ohio is a great State. Her sons are leaders in many things. The lawmakers of Columbus made it possible for Professor Orton to establish the first school for clayworkers in America. More recently they have decreed that her daughters shall not wear big hats at theaters. It is good to be a Buckeye.

* * *

The Port Huron (Mich.) Times makes the startling announcement that the Port Huron Petrified Brick Company, a new firm, with a capital of $50,000, has been established in that city, and will manufacture petrified brick in large quantities. At first glance we thought the petrified feature an amusing typographical error, but on investigation find that the term is used correctly, the brick (?) being made of sand and cement, forming an artificial stone, such as has been produced with varying degrees of success along the southern shores of Lake Michigan for several years past.

* * *

It is this sand brick scheme that is said to have attracted Electrician Edison's attention. If he goes at it in earnest, we may soon hear of his abandoning Menlo Park and establishing headquarters in the sand dunes that crown our Northern border. From the clays of Jersey to the sands of Michigan is a long jump, and we fear Mr. Edison will find it an expensive one. Better stick to electricity, Professor; but if you must make brick, Jersey clay is hard to beat.

* * *

This is moving time. Those who are permanently located do the next best (or worse) thing, and clean house. After the brickyard has been overhauled and the necessary repairs made in a thorough manner, the wise manager will see to it that the driftwood is cleared away. In this may be included various machines and appliances which have been thrown out to make way for those of larger capacity. If they are still fit for service, don't leave them on the dump to rust and rot, but sell them to some smaller manufacturer. It's easy; just advertise them in our "Wanted," "For Sale," etc., columns. If they are worn out, send them to a foundry or have a bonfire. Don't leave them to encumber the yard. A brickyard is none too sightly at best.

BUSINESS METHODS PAY.

In a city of more than 100,000 inhabitants there were a number of brickmakers. They had been having their own way for a good many years. They made brick by devices none too modern, and of a quality none too good, and because there was no great competition they made no serious effort to keep down expenses. Their practical independence made them a little careless about keeping promises. The brick promised for to-morrow might get there, and they might not.

A new concern, distantly removed from this market, came in as competitors. Their brick were quite as good as any that had been made in the community alluded to, and their business methods and delivery were much more satisfactory, and, as a result, they, at the present time, have the cream of the business; that is, they get most of the big jobs and supply a number of our most reliable contractors regularly. The moral to this is not hard to discern.

BRICK PAVEMENTS BEST AND CHEAPEST IN THE LONG RUN.

A ride over the asphalt streets of our city indicates clearly enough that the guarantee period of five years will no more than have passed until many of the streets are dilapidations, and the remainder will be in a condition to require very expensive care. And all this in the face of the fact that the great fight that has been made by the asphalt people has been on the basis not only of a guarantee, but upon the low cost of maintaining a pavement made of this material.

On the other hand, nearly all of the brick pavements laid at the same time are in good condition. Many of our brick paved streets are as good as when first put down, and will undoubtedly wear for several years without any repairs at all. Those put down during the past two or three years are, almost without exception, splendid driveways, showing no perceptible wear. These conditions are going to make hard times for the asphalt interests in this quarter when the taxpayers feel the burden of costly repairs. Brick paved streets are going to be very popular hereabouts in the near future.

BUILDING PROSPECTS.

With the present low rate of interest and the facilities for producing building material at a low cost, and cheap labor, with no depression in business to actually discourage retail trade, there is no reason why the volume of business should not be greater at this time than it appears to be.

In this community an investor would have no trouble whatever in securing money for proper building purposes at a rate not exceeding 5 per cent. With the very best of security and a demand for a large sum of money, 4½ per cent. might be hoped for as a possible rate of interest. With money so plenty and labor and material as cheap as they are, this would appear a most excellent time to build. There are few sections of the country where the people are largely in debt, and with a low cost building—of course, well built—one might expect tenants from less satisfactory structures which are occupied at this time. There are no fairly good unoccupied rental structures in this community. The writer has seen buildings put up in some country towns where it would appear that the demand for stores and offices was fully satisfied, and has had the satisfaction of seeing the less worthy buildings brought into competition in such a way as made it necessary to rebuild them, while the new structure was occupied at a profitable rental.

One could never put up a better building for a given sum of money than at the present time, and, while the volume of building business is large, it is nothing like what it should be. Hence we naturally look for improvement in this line, which means an increased demand for brick, terra cotta, etc.

GOOD ROADS CHEAP AT ANY COST.

The concerted movement for good roads is working wonders. Massachusetts spent last year $400,000 in road building, and thirty good roads were made in Connecticut, the township paying one-third, the county one-third and the State one-third. At a meeting in Baltimore, a few weeks ago, in the interest of good roads, it was stated that sixteen million dumb and patient horses were standing in farm stables waiting for the mud to dry up, which, it was argued, was a bad business investment, but a road reformer in Pennsylvania made even a stronger plea when he said a maximum load for two horses on a sandy road was thirty bushels of grain, while on a pike road they might haul fifty, on a macadam a hundred, while on the best grades of Telford roads they could haul two hundred bushels. There may be a grain of exaggeration in this statement, but the value of good roads can hardly be overestimated, and none appreciate this more than brickmakers.

DISPLAY OF FRONT BRICK—A GOOD ADVERTISEMENT.

At the Builders' Exchange, in this city, is an exhibit of all of the different kinds of pressed brick made by the Hydraulic Press Brick Company, of St. Louis. A large amount of wall surface is covered with bricks of varying form, color and arrangement. The same brick have been laid up in different colored joints in a way to afford an interested observer the various effects which may be secured in this way.

No architect's office has a sufficient amount of room to justify an exhibition sufficient to suit the ordinary demands of his clients, and at this time, when a large number of people want to use party-colored brick, an exhibition of this kind is of great value, and should reflect profit and credit to those who have a sufficient amount of enterprise to maintain it. It is a very substantial kind of advertising, and thus far has attracted not a little attention. The architect can take his client to the rooms containing this exhibit, and, in a short time, make a better showing to him than would be possible without days of travel and great expense.

Brickmakers are not disposed to advertise liberally. In one form or another, however, advertising has to be done by all business institutions or professional workers. The brick manufacturer must either advertise in the way mentioned above, or he must, by hook or crook, get some of his brick used and get people to see them and come to him. This is a slow method, but it is the only one that is now pursued by many brickmakers. The one who advertises in a more energetic way will do a very much larger volume of business in a short time than his less ambitious neighbor.

DISCOLORATION OF LIGHT BRICK.

In the March number of the Brickbuilder there is a statement that "the extended use, during the past decade, of extremely light-colored brick and terra cotta, which, while by no means unknown before, are at present most unpleasantly manifest. It seems to be pretty well settled that, with few exceptions, all of our light-colored clay products are liable to be covered very shortly after exposure to the weather with a green fungus growth, which is not only unsightly, but, in some cases, destroys the material itself. * * * There are very few manufacturers who boldly assert that their bricks are warranted not to turn green. * * * It goes without saying that this green disfigurement is anything but desirable, and architects and manufacturers would welcome any means of effectually preventing it. It has been observed that most of the English brick are not so affected, and a correspondent has made the statement that this is due to the fact that in England the practice is for the clay to be stacked in the yard and allowed to season in the open for several years before being worked up and burned. * * * A dealer tried some English brick of a brand which, in the past, had never shown any signs of growth, but this particular lot, on being built into a wall, speedily developed an unsightly appearance. Inquiry at the home office in England revealed the fact that the yard had been greatly overcrowded with orders, and the particular delivery complained of had been made from clay which was not seasoned. An interesting series of experiments is shortly to be conducted with a view to determine whether the trouble is inherent in the clay or mortar, or whether the tendency to fungus growth can be stopped by the weathering of the crude clay."

The above condition does not exist in this section. The writer has in mind a church which was built in which a large number of very light brick was used. This was about the close of the war, and it is only a few months ago that the church walls were painted as an expression of the execrable taste of the surviving members of the congregation. At that time the brick were entirely without a green or fungus growth, or any discoloration which would not come from time. The female prison, near this city, which was built twenty or twenty-five years ago, was trimmed with very light-colored brick. It remains in good condition to-day.

During recent years light brick of various shades, some quite as light as it is possible to make brick, have been used here, with a result by no means unsatisfactory. In the city of Milwaukee and in the country surrounding, a large portion of the brick used are of light color, and we have yet to observe any symptom of the trouble named. It is certainly a fortunate condition to be absolved from troubles of the kind mentioned in the Brickbuilder.

SOME OF OUR VISITORS.

Mr. W. R. Cunningham, of the Wallace Manufacturing Company, Frankfort, Ind., looked in on us the 14th inst. "Will" admits that he is not being overworked just now, but is satisfied that they have had their full share of trade, and is consequently as happy as circumstances will allow. He has been putting in some spare time lately on an improved brick machine, which will be submitted to our readers in the near future.

Mr. E. M. Pike, of Chenoa, Ill., spent a couple of April days in the Hoosier capital, and says he likes it. He viewed with special delight our beautiful Soldiers' Monument, pronouncing it the finest shaft in the world. Father Pike saw nearly four years of hard service during the late unpleasantness, and very naturally appreciates such evidences of the affectionate remembrance of our "silent victors." He is now waging a war of peace, and incidentally, as it were, supplying the brick and tilemakers of this and other countries with plans and specifications for his "New Discovery" Kilns. He has had a satisfactory trade this spring.

Mr. W. J. Woolley, proprietor of the Woolley Foundry and Machine Works, Anderson, Ind., shed the light of his jovial countenance in upon us recently. He says with characteristic candor that the brick machine business is not brisk, but that he has installed a few "Iron Kings" (see cut on page 406) in established yards this spring, where they will attract attention and make records that will insure an increased demand for them next season. Mr. Woolley has an improved slip pump and clay press for potters and manufacturers of art tile, etc., that will do more and better work, with less labor, than those now in use. He appreciates the importance of simplicity and strength in clayworking machinery, and being an excellent mechanic, with an abnormally large bump of "inventiveness," whatever he does he does well, and therefore deserves a large measure of success.

Mr. Warren E. Keplinger, of the Shale Brick Exchange, Canton, O., was one of our many welcome visitors this month. He reports the paving brick business quiet at present, with prospects for a better demand later in the season.

THE SURVIVAL OF THE FITTEST.

"How much have we done to increase the use of stone, while the use of terra cotta, iron and other materials in the construction of buildings have increased?" pathetically, though ungrammatically, asks a correspondent of our valued contemporary, "Stone." We give it up, but will venture that, regardless of any effort the stone men may put forth, the use of terra cotta and other architectural clay products will continue to increase simply because of their intrinsic merit. As a building material terra cotta is superior to stone in several particulars, and inferior in none.

BETTER PRICES.

A call for better prices comes from every quarter. This is not strange. Farmers are receiving little more than half the former prices for wheat and potatoes and many other articles of produce, but, in return, they are paying little more than half the former prices for goods and groceries. Rents in towns and cities are little over half as high as they were once, and the same is true of interest. Almost the only thing that is high and getting higher is taxes and insurance. Perhaps the least sufferers from these depreciations are unskilled laborers and domestic help. Only in a few cases have their wages been materially reduced, while they enjoy to the full the lower prices of rent and clothing and provisions. Skilled labor, notwithstanding the strong combinations formed to protect its interests, has suffered in many instances, because its output has had to go on to the market at greatly reduced prices or not go at all. All this is especially hard on manufacturers who have built expensive plants, largely on borrowed money, relying upon the prices goods were realizing at the time of building.

* * *

These are painful facts, about which there can be no controversy, but when we come to account for them or suggest relief we are almost sure to provoke discussion. That is not in our line. While we may have decided views both as to cause and cure, we are not set for the defense or promulgation of any economic theory, though we are sure the colored merchant, soon after the emancipation, understood the law of money making. Being asked what per cent. he made on his goods, he answered: "I know noth'n about per cent., but I'm sure, if I buy anything for a dollar and sells him for two dollars, I's safe." There are a few economic propositions we are sure of. We believe that if a man buys more than he sells he will get in debt and see hard times, while if he sells more than he buys he will have something left. We believe that if an article of prime necessity, such as bread and meat, is phenomenally scarce, the price will advance almost endlessly, but, if not of prime necessity, people will do without rather than pay artificial or exorbitant prices, hence there is a limit to high prices on mere luxuries. We believe, therefore, that prices that are forced above the average level by combines will sooner or later react on all articles that can be dispensed with. There is a wonderful solidarity in society. The Board of Trade cannot fix the price of wheat or pork. They may bull or bear the market within a very narrow limit, just enough to fleece the lamb, but the omnipotent law of supply and demand will rule in the end.

* * *

Incidentally, we may express the belief that it is unwise for a free people to allow the output of a community of slaves or serfs, who work for little or nothing, to thrust their produce upon the market in competition with the labor of freemen. For instance, brick can be made in some countries at less than half the cost of making where employes wear good clothes and eat wholesome food, and plenty of it, and send their children to school, and a cargo of brick can be shipped three thousand miles for little more than it can be hauled for three miles. We dare not say how this can be prevented, but it can and ought to be. Better prices will obtain legitimately when it is done, but we cannot force prices up permanently by any arbitrary measure. If the price of brick, for instance, is relatively higher than the price of lumber, or corn, or wheat, or groceries, boots or shoes, there will be a limited demand, and the prices must come down again. We want higher prices, but they must grow; they cannot be made, and they will grow as the business of the country regains its former volume and elasticity. Even the latter condition will not insure good prices for brick in localities where there is no concert of action among local manufacturers, for there are, unfortunately, for all concerned, a good many manufacturers who do not know what their product really costs, and when competition is unrestrained they sell their brick for less than they actually cost, this, too, in the face of the bold fact that just as many brick would be used at a reasonably higher price. How to get and maintain better prices is now the vital question. With brickmakers the rational answer is local organization.

TRADE LITERATURE.

"FACTS OF HISTORY" is the title of a new catalogue issued by the Eastern Machinery Company, New Haven, Conn., giving the record of their "New Haven" Stock Brick Machine, not one of which, they say, has ever worn out, been thrown out, sold second-handed or failed to please, and each and every one of which is working satisfactorily. This is good history. The catalogue contains considerable corroborative testimony that will prove interesting to those looking for soft-clay machinery. A copy can be had for the asking.

THE LEADER MANUFACTURING COMPANY, Decatur, Ill., are sending out a four-page pamphlet, enumerating the various clayworking machines they have ready for shipment. There is included a list of second-hand brick and tile machines, cut-off tables, represses, tempering machinery, etc., which they have put in good repair, and offer at "bargain counter" prices.

"THE NEW SOUTH BRICK MACHINERY" is illustrated and described briefly in a circular received from J. C. Steele & Son, Statesville, N. C., the manufacturers, who also offer the trade a full line of brickyard supplies. Their patent portable brick hake and truck, for stiff or tempered clay brick, has gained for them a wide acquaintance. Write them for particulars.

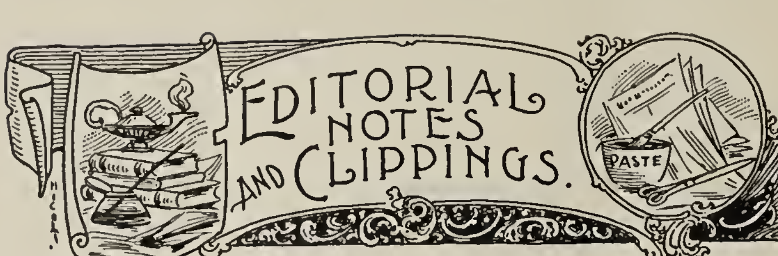
JEFFREY LABOR-SAVING APPLIANCES, in the line of clay conveyors, elevators, chain belting, and all manner of power-transmission machinery, are handsomely illustrated in a catalogue being sent out by the Jeffrey Manufacturing Company, Columbus, O. If you write for a copy, please mention the Clay-Worker.

THE UNIVERSAL CONTINUOUS KILN is the subject of J. W. Penfield & Sons' latest circular. This is the kiln so successfully operated by Harvey Haigh at Galesburg and other points, and which is now controlled by the Penfields, who have erected an immense one on their paving brick plant at Catskill on the Hudson. They claim it to be the most economical system of burning brick yet introduced, and will gladly tell the readers of the Clay-Worker all about it, if asked.

AN INJUNCTION has been served on us, and the American clayworking fraternity in general, by the American Blower Company, Detroit, for the purpose of centering attention on their "A B C" Hot-blast Heater, which, they state, is a brand new invention and far superior to the very best of such apparatus now being sold to the public. The injunction is a formidable appearing document, being drawn "in due and ancient form," legally executed and sealed with the seal of the Public Court of the State of Michigan. Attached to and a part of the injunction is a full description of the "A B C" Heater, fully illustrated. It is the most novel advertisement that has come to our attention for lo! these many moons. We presume a copy can be had on request.

FINE FACE BRICK, in buff, gray and mahogany colors, Roman and standard shapes, are now being manufactured by Evens & Howard, St. Louis, who own and operate one of the largest fire-brick and sewer-pipe works in America. They have issued a booklet devoted to their building brick, to which they are giving especial attention, making a great variety of ornamental patterns, also special shapes to suit architects. Their facilities are such that they can execute orders for almost any sort of structural terra cotta, even glazed and enameled work. The title page of their pamphlet is embellished with colored print of their office, which is built of party-colored brick, hollow blocks and terra cotta, the products of their kilns. If interested, write them for a copy.

"ARNOLD'S ILLUSTRATED CATALOGUE and Price List of Brick and Tile-yard Supplies for 1896" is a neat little book of fifty pages, which should find its way to every brick and tilemaker's office. In it is listed almost every device used about a brickyard, from a dump cart to a kiln door.



EDITORIAL NOTES AND CLIPPINGS.

Suffolk, Va., is to have a new brick plant.

Masardis, Aroostook county, Maine, wants a brickyard.

Mr. Shouldel will start a small brickyard at Fairfield, Ia.

A new brick plant is to be put in operation at Angleton, Tex.

G. Coffey, Woodstock, O., wants a horse-power tile machine.

Reeder & Burke are starting a new brickyard at La Belle, Mo.

The brickmaking season in Aroostook, Me., is of less than four months' duration.

Isaac and Elias Jensen will start a brick plant at Bingham City, Utah, early in May.

W. E. Reeves has purchased the brickyard of Cicero McCluer, at Waynetown, Ind.

Lawyer Peter Charles Keegan says that his town, Van Buren, Me., wants a brickyard.

J. A. Darnell, Lockbourne, O., is in the market for a soft-mud horse-power brick machine.

J. M. Richardson, Southern Pines, N. C., advises us that he is in the market for brick machinery.

W. R. Barrett is making arrangements to operate a new brickyard at Northwest Medford, Ore.

Cyrus Knapp, of Terre Haute, Ind., will, in all probability, establish a brick plant at Princeton, Ind.

Lawyer Fred G. Dunn, of Ashland, Me., will equip a brickyard, and make 400,000 bricks this season.

Oscar Dougherty has leased the brickyard at Christy Park, Pa., and will begin operations immediately.

The death of Edwin T. Howard, of the firm of Evens & Howard, of St. Louis, Mo., occurred last month.

Ground has been broken for an immense brick plant at Axtell, Tex., in which Dr. J. C. Cavender is interested.

Mr. Burk, of Brewer, Me., is considering the feasibility of manufacturing fancy front bricks on an extensive scale.

The Novelty Tile and Terra Cotta Works, at Stoutsville, O., near Circleville, was totally destroyed by fire last month.

M. B. Dunn, Manager of Leen's brick plant, Braggsville, Me., proposes to alter and increase the output of the plant.

Mr. Haag, formerly of Illinois, has purchased land at Centerville, Miss., on which he will erect a brick and tile factory.

W. P. Alsip, of Grand Forks, S. D., has secured the contract for making 250,000 brick for the Rosebud Indian Agency.

The St. Charles (Mo.) Brick Company has been incorporated, with a capital stock of $15,000. Alph Aymond is interested.

The firm of Jones & Clemens, brick manufacturers, of Anderson, Ind., has been dissolved. Mr. Clemens will continue in the business.

Capt. M. H. Insley is making an effort to interest Leavenworth (Kan.) capitalists in a scheme to establish a large brick plant at that place.

J. I. D. Woodruff, Dickson, Tenn., in a recent letter, says he is looking for a good location for a pressed brick plant of 26,000 daily capacity.

The Jamestown (N. Y.) Shale Paving Brick Plant will make extensive improvements in their plant, with a view of doubling their present capacity.

H. A. Bright has purchased the Halcyon brick plant, at Black River Falls, Wis., and is putting the same in condition to be operated this spring.

We are advised that there is a good opening for a paving brick plant at Minneapolis, Minn. J. K. Caldwell can give more specific information.

The O. K. Interlocking Brick Company, of St. Louis, Mo., has been incorporated. The incorporators are Oscar K. Leinberger, J. D. Goldman and Julius Lesser.

The Morrison Brick Company, of which Wm. Morrison, Washington, D. C., is President, has been incorporated at Alexandria, Va., to manufacture brick and tile.

The Morris, Ill., brickyards are making preparations to open up for the season. Steep & Washburn and the Morris Tile Company still have a large stock on hand from last year, which they hope to dispose of in addition to this season's output. Buck Bros., however, have but a small stock of holdover brick on hand.

Luther V. Hartford, an aged resident of St. John, New Brunswick, died at his home in that city March 19. Mr. Hartford had been in the brick business for many years.

I. Frey & Co. are making preparations to begin work at the brick plant at York, Pa. They have a large number of orders on hand, and expect to run full handed all season.

Judge Herter has ordered the plant of the New Albany (Ind.) Ornamental Brick Company sold at auction. Thirty days' notice of the sale will be given by Receiver Hammersmith.

Norcross Bros., brick manufacturers, of Worcester, Mass., have purchased twenty-eight acres of land in New Brittain, Conn., on which they will at once erect a large brick plant.

Nicholson & Reilly have leased the brick plant at Haverstraw, N. Y., formerly operated by A. Donnelly & Son, and the latter firm will take charge of the one run last season by Theodore Fredericks.

David Schroeder, a brick manufacturer of Reading, Pa., died at his home in that city the 31st ult. Mr. Schroeder was seventy-nine years old, and had been engaged in the brick business for twenty-five years.

Henry Besler is preparing to open up a large brick plant at Cedar Rapids, Ia. Mr. Besler intends to fit up the works with the most modern and improved machinery, with a view of turning out a high grade of building brick.

Wells Bros., brick manufacturers, of Chattanooga, Tenn., are making extensive improvements in the old Chandler Brick Works, which they purchased recently. They expect to commence operating the same in the near future.

The brick manufacturers of Akron, O., have caught the fever of organization, six of the largest firms having organized under the name of the Akron Brick Association. John McCausland is President and Wm. Cooper Secretary.

R. W. Sumsal, Shubuta, Miss., writes for a sample copy of the Clay-Worker, and adds: "I anticipate going into the brick business, and desire to become posted." Mr. S. starts out in the right direction, at any rate. May success attend his efforts.

J. H. Thompson writes that he has his new plant at San Antonio, Tex., well under way—in fact, expects to make brick before the close of the month. He has equipped the plant with Ross-Keller machines and one of M. F. Williams & Co.'s pulverizers.

Iowa capitalists have been investigating the clays of Edgemont, S. D., with the result that they will establish a plant there for the manufacture of pressed and paving brick and sewer pipe. A. B. Noble, of Hamburg, Ia., can give detailed information.

The Hannibal (Mo.) Pressed Brick Plant, which has been shut down since last November, will commence operations the middle of this month. Mr. Fielder, the Superintendent, says the prospects are bright for the best season the company has ever known.

The Hamburg Vitrified Brick Company has been incorporated to manufacture brick at Wenonah, N. J., Hamburg and Reading, Pa., with a capital stock of $50,000. A. Howard Merritt, Reading, Pa., J. M. Mack, Philadelphia, and Jas. W. Cary, Wenonah, N. J., are the incorporators.

T. W. Carmichael, Wellsburg, W. Va., has patented a clay steamer, without which, he says, no dry-press plant is complete. A full description of the same will be given in the next number of the Clay-Worker. In the meantime Mr. Carmichael will be pleased to correspond with those desiring information in regard to same.

The Grand Rapids Brick and Tiling Company, Collins Brick Company and Grand Rapids Brick Company, of Grand Rapids, Mich., have formed an organization, to be known as the Grand Rapids Brick Association, which has for its object the advancing of prices to a more remunerative standard. Chas. Baxter was elected President.

Alfred Bowman has discovered a large bed of clay at Santa Cruz, Cal., which, he says, is suitable for most any character of clay products, including brick, common and pressed, and ornamental terra cotta, sewer pipe, fire brick, etc. Mr. Bowman says prospective manufacturers would do well to locate there, as Santa Cruz has, in addition to this splendid clay deposit, unexcelled shipping facilities, so that the product could be marketed over the entire State.

The Detroit and Cleveland Steam Navigation Company's steamers are now running daily (except Sunday) between Detroit and Cleveland. When traveling East or West, North or South, try to arrange to take advantage of these luxurious

[CONTINUED ON PAGE 378.]

IN AND ABOUT PHILADELPHIA.

The coming season with the brick manufacturers in and around Philadelphia bids fair to be a good one, particularly west of the Schuylkill river, where there will be built two large factories and between five and seven hundred two and three-story dwelling houses. H. C. Carroll & Sons have contracts on hand to serve about three hundred houses. They have been running right along all winter, and have been delivering to builders about 25,000 daily since November of last year. The Messrs. Carroll will add one of Martin's latest machines and the Cummer Dryer to their already extensive plant.

The Equitable Brick Company and Mr. Wm. Conway's yards, Sixtieth and Walnut streets, are now running and turning out about 60,000 each daily.

Murtha & Early, Seventeenth and Butler streets, report business good in the northern section of the city. They have a complete plant all through, and make a specialty of a pressed stretcher brick, and they repress by hand, but have a steam-power press standing idle. Mr. Murtha says the hand press is cheaper and that better results are obtained.

Who is there among the readers of the Clay-Worker who are acquainted with Harry Webster and the Gillespie brothers that did not sympathize with them in their late trouble? Two years ago Webster, Gillespie & Co. equipped a plant at Twenty-second street and Passyunk avenue with the very best machinery, kilns and dryer, and it was conceded to be the neatest, best arranged yard in or around Philadelphia. Early last fall they shut down. The plant passed into the hands of a receiver. A short time since the entire plant was sold at something like $10,000, and the sale has been confirmed by the court. The yard will probably be started up in six weeks. Neither Mr. Webster nor the Gillespies, however, will be interested.

Mr. Jas. Dingee is rebuilding his plant, lately destroyed by fire, and, I think, before this reaches you he will have "steam up" and be turning out first-class brick again. Mr. Dingee lost a valuable "trotter" last week, and I know his many friends will sympathize with him.

Mr. Chas. E. Webster, brick manufacturer, of Frankford, died March 28. He was in his fifty-eighth year, and was well known and very much respected, and, a short time since, was elected to represent his ward in Select Council. It is probable that his younger brother, Mr. Harry Webster, will assume charge of the business. H. U. N.

THE BUCK-NEWTON PATENT SUIT.

The long-drawn-out litigation between Jas. A. Buck and A. H. Newton, of New York, over their brick mold sander patents, has at last reached final decision, the United States Court giving Mr. Newton a verdict and judgment against Buck, as will be seen by the announcement in the former's ad. on page 387. Mr. Newton has issued a pamphlet, giving the full particulars, and will gladly send a copy to any one sufficiently interested to address him.

SANDING REPRESSED BRICK.

We are informed that Messrs. Converse and Underwood, of the Springfield Paving Brick Company, Springfield, Ill., have recently patented a brick sander, to be used in connection with represses after the repressing of paving brick. The device is exceedingly simple, and does its work remarkably well. Since using their sander they have had no trouble with stuck brick in their kilns. Their brick are greatly improved in both appearance and quality, and the expense of sanding is reduced at least 60 per cent.

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SHERIFF'S SALE.

Of Ruby Pressed Brick Plant located at Lockland, Ohio, will take place at 2 p. m., May 14th on the premises. Ten acres of fine clay, first-class machinery; located ten miles north of Cincinnati on Cincinnati, Hamilton & Dayton Road; switch in yard, good market. A splendid opportunity for a practical Pressed Brick manufacturer with small means. Plant will be sold cheap. Address,

A. M. STEARNS, Lockland, Ohio.

Books for Brickmakers.

"BRICKMAKER'S MANUAL."—Morrison and Reep............................$3.00
"BRICKMAKING and BURNING."—J. W. Crary, Sr.............................. 2.50
"TABLE OF ANALYSES OF CLAYS." Alfred Crossley........................ 1.00
"VITRIFIED PAVING BRICK."—H. A. Wheeler, E. M......................... 1.00

Mailed, postage free, on receipt of price. All of them to one address for $6.00. Address

T. A. RANDALL & CO., Indianapolis, Ind.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER, Telephone Building, ST. LOUIS, MO.

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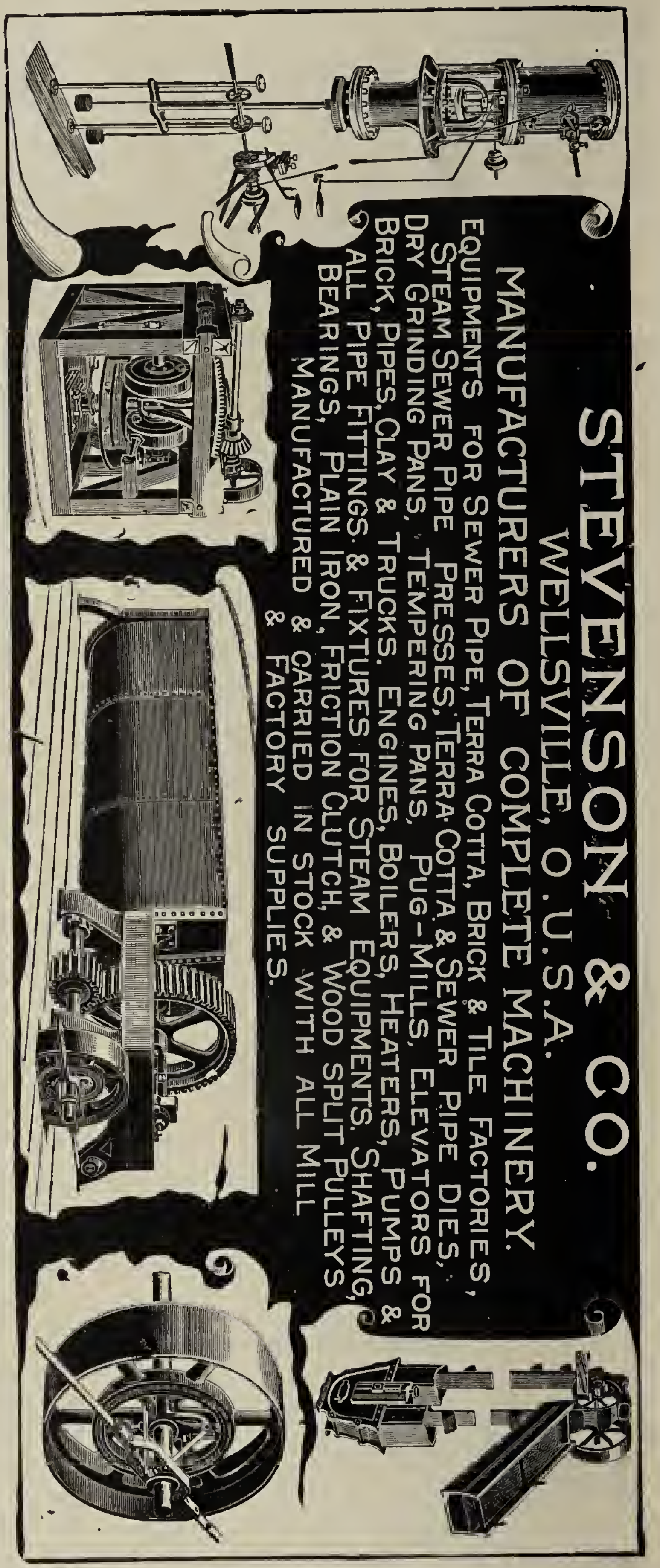

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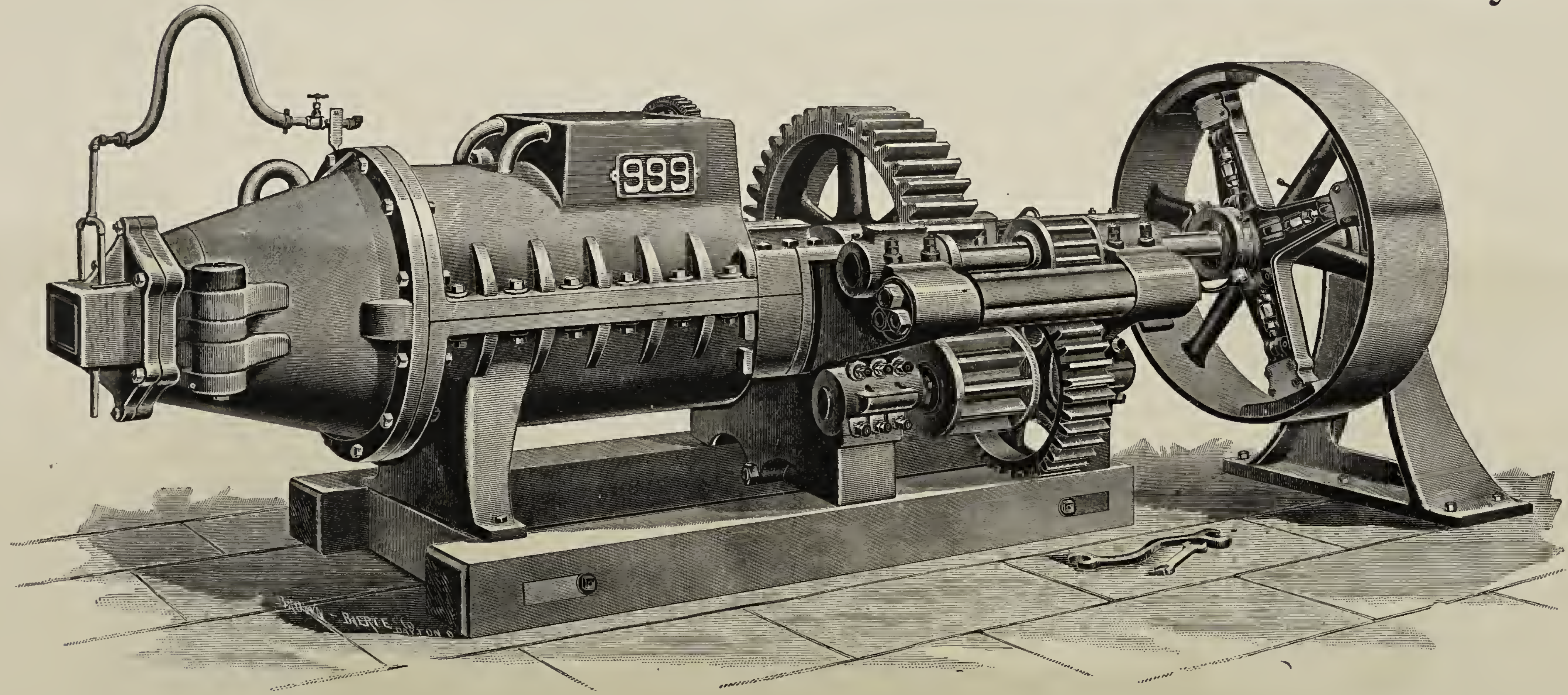
WELLSVILLE, O. U.S.A.
MANUFACTURERS OF COMPLETE MACHINERY.
EQUIPMENTS FOR SEWER PIPE, TERRA COTTA, BRICK & TILE FACTORIES, STEAM SEWER PIPE PRESSES, TERRA COTTA, & SEWER PIPE DIES, DRY GRINDING PANS, TEMPERING PANS, PUG-MILLS, ELEVATORS FOR BRICK, PIPES, CLAY & TRUCKS. ENGINES, BOILERS, HEATERS, PUMPS & ALL PIPE FITTINGS & FIXTURES FOR STEAM EQUIPMENTS. SHAFTING, BEARINGS, PLAIN IRON, FRICTION CLUTCH, & WOOD SPLIT PULLEYS MANUFACTURED & CARRIED IN STOCK WITH ALL MILL & FACTORY SUPPLIES.

Speculation May be a Better Sounding Name than Gambling,

But it Costs Just as much; Don't Speculate in Inferior Brick Machinery.



Buy the **999** and you will get one that is **a Dead Sure thing every time.**

C. W. RAYMOND & CO., OF

DAYTON, OHIO, make it.

They also make some other things. Send for their Catalogue.

EDITORIAL NOTES and CLIPPINGS—Continued.

steamers between Michigan and Ohio. If you are contemplating a summer outing, write A. A. Schantz, G. P. A., Detroit, Mich., for illustrated pamphlet, which gives full information of a trip to Mackinac, via the coast line.

The Sherman (Tex.) Iron and Machine Works advise us that that city wants a pressed-brick plant. They have a fine bed of clay, samples of which have been tested and found to be of the very best quality, and local capitalists will take from $15,000 to $20,000 worth of stock in the plant. Besides all this, the demand for brick is unlimited. The above-named company solicits correspondence with parties wishing either to remove or establish a first-class brick plant.

F. E. Loose, Newton, N. J., in a recent letter inclosing subscription, says: "We have had a very successful year, so far as sales are concerned. Besides our usual demands, there has been a large silk mill put up by the Board of Trade for the Sterling Silk Company, of Paterson, N. J., which used about 550,000 brick, all of which we furnished. There is nothing new with us, except we set and reburned another kiln of soft brick that had accumulated at the yard, and made a success of it. Accept my best wishes for the success of the Clay-Worker."

A gas explosion at the Alumina Shale Brick Works, Lewis Run, Pa., knocked one man senseless and burned C. A. Peterson, the foreman, quite seriously about the hands and face. The local papers are full of praise for Mr. Peterson, who, they say, while suffering from burns that would send most men home, had a kiln of burning brick at a point where he deemed it unsafe to trust it to any one else, and had his burns bandaged and stayed by the kiln until the burn was finished. There is no doubt the Alumina Shale Company appreciates such an employe.

The Evansville (Ind.) Brick Manufacturers' Association is now a permanent organization, which includes all of the brick manufacturers of Evansville, and has for its object "the mutual advancement and protection of its members." A scale of prices has been agreed upon, and will be strictly adhered to for the next three years. The following officers were elected for one year: Henry Hogge, President; Chas. Weiddeking, Vice President; Herman Klause, Secretary, and John Suhrhemy, Treasurer. We congratulate the Evansville craftsmen on their good start.

J. C. Steele & Son, manufacturers of brick machinery at Statesville, N. C., in a recent letter, say: "We are glad to report to you that our business has surpassed our expectations, and the indications now are that our trade will be double that of last year. Our big 'extra' machine is booming for sure. 'Bees in a tar bucket' may be busy, but we think they are having a great deal of leisure, compared to ourselves. Money is close, but we think collections are improving. We attribute our increased trade partly to having increased our 'ad.' in the Clay-Worker. Hope you will have a successful year."

In a recent communication, W. Alsip, of the firm of W. & S. H. Alsip, owners and builders of the Alsip down and updraft kiln, says: "I severed my connection with the Menard (Ill.) Pressed Brick Company the first of the year, having just completed four of our kilns before leaving, which makes eight Alsip kilns they now have. Have sold kilns to E. L. Hathaway & Co., which are now under construction, and our prospects are encouraging. I have taken the superintendency of the Day Brick Company, of Belleville, Ill., and would be very glad to have you call on me. Accept my best wishes for the Clay-Worker."

Messrs. W. H. Fizer, J. R. McCallum, M. R. Grace, D. G. Fuller and J. F. Scott have filed an application for a charter for the Knoxville (Tenn.) Brick Exchange. The organization is for the purpose of consolidating the interests of the brick manufacturers in the exchange. The entire output of each plant is to be bought by the Knoxville Brick Exchange, and they will place them upon the market and sell to the consumers rather than having the consumer buy direct from the manufacturers, as heretofore. After the arrival of the charter the members of the company will hold a meeting for the purpose of electing officers and effecting a permanent organization.

It is with deep regret that we announce the death of Philip Kells, which occurred at his home in Adrian, Mich., March 10. Mr. Kells was one of the pioneers in the clay machinery business, having been at the head of the firm of Kells & Sons, brick and tile machine manufacturers at Adrian, since 1882. He was a mechanic of no mean ability, having invented the second successful mower ever made in the United States, and for some years previous to embarking in the brick machine line he was engaged in the manufacture of threshing and reaping machines at New Albany, Ind. His life has been one of continual activity and usefulness, and he leaves behind a large circle of friends, who, with the family, mourn the death of a true, noble man.

OHIO VALLEY NEWS.

There will be a general resumption of the sewer-pipe and brick works in this valley on April 1. There has been comparatively little work at these plants since last October, and all the yards yet have immense stocks of sewer pipe and brick on hand. Never in the history of the clay business in this region has there been so long and continued a suspension of the manufacture of clay products. The plants are now rapidly decreasing their stocks, as there is a good demand this spring for brick and sewer pipe, and the prospects are bright for a long and steady run and a prosperous year.

On March 1, T. H. Montgomery, receiver for the Markle Fire Clay Company, paid off the men who had been employed during the three months previous to the failure of this company. The management decided that they could only allow the claims of those men for labor for the three months, and offered them 30 per cent. of the amount of their claims to square accounts, which was accepted.

The two plants of the American Fire Clay Company located at Freeman's Landing, W. Va., were sold at trustee's sale, March 24, to the Washington and Jefferson College, of Washington, Pa., and John Atkinson, of New Cumberland, W. Va., who held mortgages on the property. This is probably the oldest brick plant along the Ohio valley, and has been good paying property until the panicky times prevailing for the last two years.

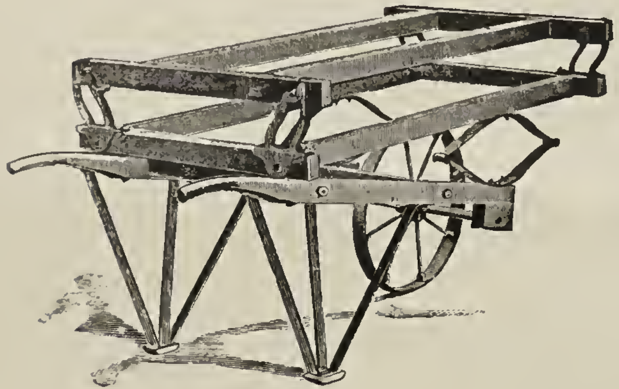
The Hancock county grand jury, in session in New Cumberland, W. Va., on March 23, returned a true bill against Geo. Lambert, the Secretary for McMahan, Porter & Co., operating the Black Horse Sewer-pipe Works, at New Cumberland, W. Va., for embezzlement. Lambert is charged with defrauding the company of $12,000 during his connection with them. He was a trusted employe, and experts, in looking over the books for the last five years, find this amount unaccounted for. Mr. Lambert had the reputation of being one of the best sewer-pipe men in the valley, and had the confidence and respect of the whole community. The latest sensation in regard to the case was the sudden departure of Mr. Lambert, after the indictment by the grand jury became known. He has left for parts unknown, leaving his wife and family behind. Mr. Lambert defrauded the company by "padding" the pay rolls.

The Lone Star Paving Brick Works, located at New Cumberland, W. Va., has changed hands. Messrs. Miller & Sloane, who have been operating the works for some time, made an assignment about March 1, and the plant is now being operated by Thos. B. Vickers, of Toronto, O.

The long-drawn-out litigation between John Porter, of New Cumberland, and the Mack Manufacturing Company, of the same place, has ended, the United States Supreme Court affirming the decision of the West Virginia courts. John Porter was the original owner of the many brick and sewer-pipe works now operated by the Mack Manufacturing Company at New Cumberland, W. Va. He transferred his interests to the Mack Company, and the latter, in mining clay, injured a clay mine still owned by Mr. Porter, and he sued for heavy damages, and the courts allowed him $11,000, which judgment has just been affirmed by the United States Supreme Court.

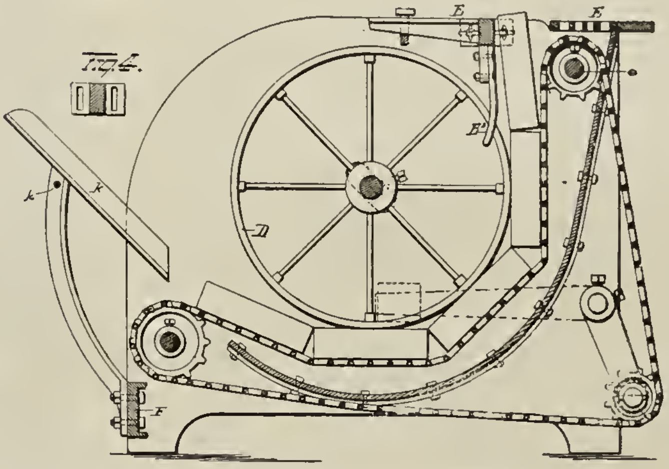
Few people outside of river and rail transportation circles have any idea or stop to think of the immense freight tonnage furnished by that section known to all rivermen as the Brickyard Bend, being that part of the river near Toronto, O., and New Cumberland, W. Va. This name, that for half a century has struck terror to the hearts of all Ohio river steamer roustabouts, on account of the hard and laborious work incident to the loading of brick, tile and sewer pipe, is synonymous with the great fire-clay region of the Upper Ohio Valley, of which that place is the center. The region proper has a river frontage of about six miles, embracing both sides of the Ohio, the opposite shore being known as the Toronto district. The following figures will give a fair idea of the importance of "Brickyard Bend" as an industrial and tonnage-producing region: In the New Cumberland district there are the following fire-clay works, etc., with their daily capacity of manufactured products for shipment: Nine brickyards, 1,160 tons; five sewer-pipe works, 395 tons; four coal mines, 510 tons; stone quarry, 450 tons; miscellaneous, 35 tons; total, New Cumberland district, 2,550 tons. In the Toronto district: Three brickyards, 250 tons; ten sewer-pipe works, 1,115 tons; coal mines and miscellaneous, 325 tons; total, Toronto district, 1,700 tons, making the grand total of the "Bend" 4,250 tons daily, or 1,329,250 tons annually, sufficient to load 1,329 steamboats of 1,000 tons each, or over 44,000 freight cars of 50 tons each, making 1,100 trains of 40 cars each.

BUCKEYE.



Double Deck Truck.

PRICE and QUALITY



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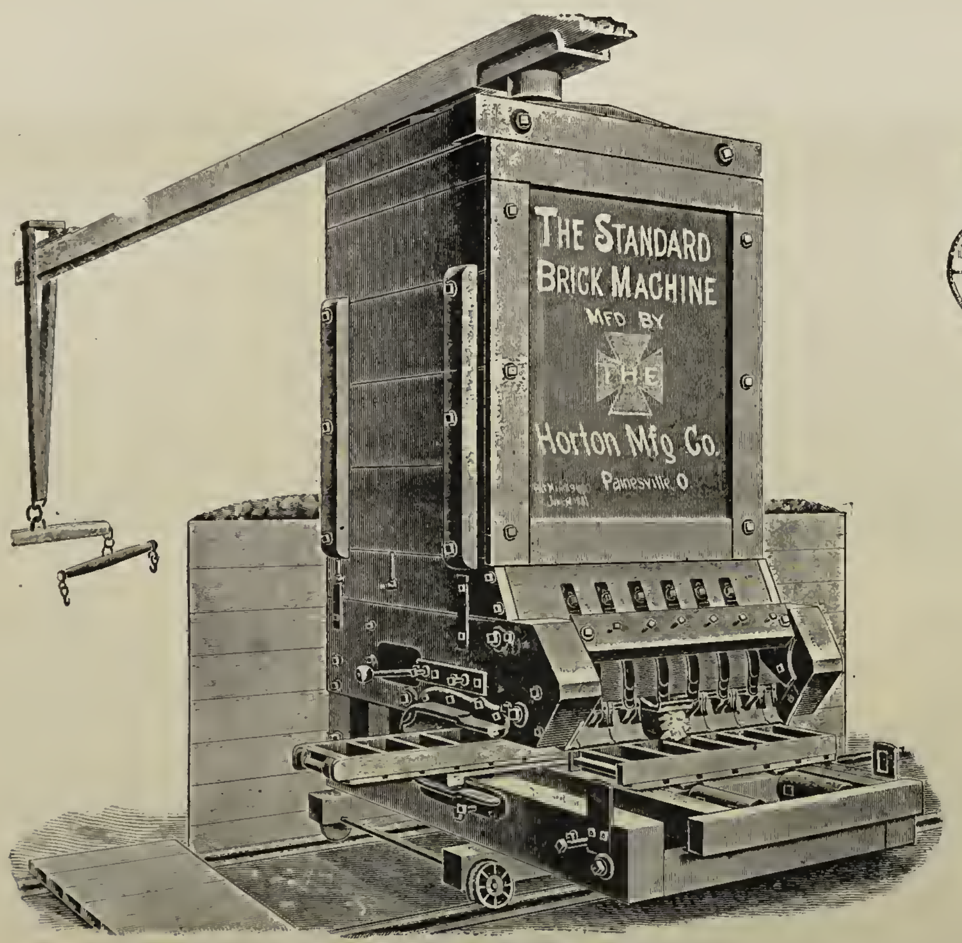
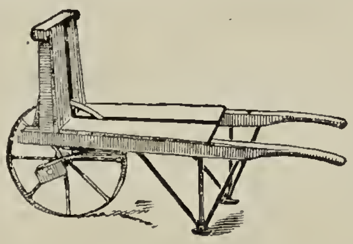


The Standard Brick Machine. (Horse Power.)



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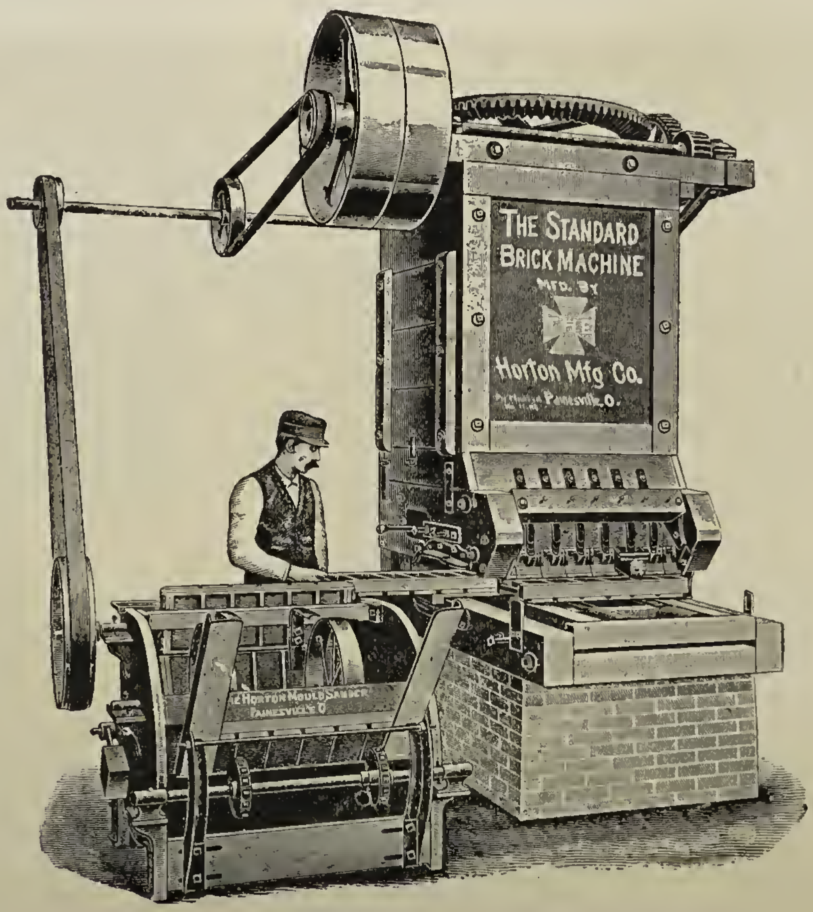
First-Class Supplies Furnished on Short Notice.



The Standard Brick Machine. (Steam Power.)

The HORTON MANUFACTURING CO., = Painesville, Ohio.

JEFFREY ROLLER PAN CONVEYOR.

As the problem of handling the clay, as well as the finished product, is a matter of special importance to all clay-workers, their attention is directed to the illustration given herewith, which is a partial view of the Jeffrey Roller Pan Conveyor, manufactured by the Jeffrey Manufacturing Company, of Columbus, O., and erected by it at the plant of the Fultonham Brick and Tile Company, Fultonham, O., for the handling of clay and shale from the bank to the pan. The conveyor, as will be clearly seen from the illustration, consists of a single strand of steel chain with suitable attachments, to which interlapping pans are bolted; this forms a tight, endless, open trough, to which are attached axles and rollers, which serve to support both loaded and return pans.

THE JEFFREY ROLLER PAN CONVEYOR.

The roller carriers reduce the friction and wear of the conveyor to a minimum, consuming a very small amount of power, and makes it possible to extend the conveyor to great distances. The axles which are bolted to the chain attachments at regular intervals are protected with removable sleeves, upon which the truck wheels or rollers revolve; these sleeves take the principal wear and are so arranged that they can be replaced when worn, quickly and at a comparatively small expense, without disturbing the main construction of the conveyor. The Jeffrey Roller Pan Conveyor is built in various sizes and lengths, thus adapting it to the handling of many kinds of abrasive material, such as clay, shale, rock, ore, gravel, sand and the like, and wherever introduced it has proven to be an economical, efficient and durable labor-saving device. The Jeffrey . Manufacturing Company also build bucket elevators for elevating clay, also tray elevators for handling tile, brick, pottery, etc., and it will be pleased to furnish printed matter relating to this class of machinery, upon application, to all interested parties.

BETTER TIMES IN NEBRASKA.

Editor Clay-Worker:

We are being blessed with some good rains here, which have been needed to improve and encourage business in this section. Some of the old yards are being reorganized, repaired and remodeled to make brick in the cheapest possible manner, namely, the Continuous Kiln Co., Kritenbrink Bros. and Herman Diess. If we get our Trans-Mississippi exposition and Congress gives a fair appropriation for a national exhibit, and each State has given its willingness to encourage it, with the assurance of good crops, Nebraska will be all right, and the brick manufacturers will be able to again call their soul their own. R. E. LIVESEY.

Omaha, Neb., April 13.

WANTS TO KNOW HOW BEST TO DRY TENDER CLAY.

Editor Clay-Worker:

Enclosed find P. O. money order for $2 to pay my subscription to the Clay-Worker for 1896. I am in great need of a brick and tile dryer, and have been in correspondence with some of the dryer people. My clay cracks very easily, and I have to keep it shut up for three or four days from the wind and sun after the brick are made. I use an Adrian stiff mud machine. Will appreciate any advice that any of the Clay-Worker writers may be kind enough to offer.

West Point, Miss. J. H. M'CORD.

THE EDITOR'S DREAM.

I've just awakened from a dream—
  Oh, such a crazy vision!
I dare not tell it to my wife—
  She'd greet me with derision.
It serves me right to have nightmare,
  I'm such a thoughtless humpkin,
To eat, when bedtime's drawing nigh,
  A pie made out of pumpkin.
But, oh! that dream—that dreadful dream!
  It fills me with cold shivers;
I feel the chills run down my back
  Like small, frost-bitten rivers!
I dreamed—now, this is the gospel truth,
  And I am no imbiber—
I dreamed I got two dollars from
  The man called "Old Subscriber."

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE—One second-hand Chambers Brick Machine, 25,000 daily capacity. Repaired by us and in good order.
CHAMBERS BROS. CO.,
53d and Media Sts.,
4 4 d Philadelphia, Pa.

FOR SALE—Forty "Reid" Oil Burners for brick burning; also, a 13,000-gallon oil storage tank and a quantity of valves, piping, etc., all in good order. Reason for selling, going out of business. Address,
3 1 d R. & C., Care Clay-Worker.

WANTED—Situation as superintendent or foreman of hrick cr sewer-pipe works; ten years' experience with good companies; understand handling all kinds of machinery. Address,
PENNSYLVANIA,
4 1 cm Care Clay-Worker.

WANTED—Position as superintendent of roofing tile factory. American or European style of tiles, steel or plaster dies. Can build and operate same in all details. First-class references.
ROOFING TILE,
4 1 c Care Clay-Worker.

WANTED—A plunger brick and tile machine, second hand, in good order; wet pan, screen and cut-off table; no stone or lumps in the brick or tile. Address,
JOHN C. SCHROEDER,
4 2 c Onekama, Mich.

FOR SALE—About 2½ acres of good clay land, with good sand and gravel pit, brick house and barn, good dry sheds, Henry-Martin machine, in good order, etc. Prospects for next season good. No other yards within twenty-five miles. For further particulars write
THE LE MARS BRICK AND TILE CO.,
4 1 d LeMars, Ia.

FOR SALE—Eight acres of good clay and sand for brick or tile yard, in the heart of the city; streets paved to cars and docks; can be reached in ten minutes; bricks can be delivered to all parts of the city; thousands of tons of slip clay can be sold to potteries. Experienced brick or tile man for partnership, or to rent. Address,
ROMAN,
4 1 cm Care Clay-Worker.

FOR SALE OR RENT ON LEASE—Very desirable brick plant in northern section of Philadelphia, containing 60 acres of fine red clay, kilns, dryers and storage sheds, complete. With some additional machinery, could easily produce 15,000,000 annually. Excellent market; salmon, $5.50 to $6; hard, $7.50 to $8; stretchers, $9 to $13; press, $18.
P. S. HORTZ,
4 1 c 1324 S. 5th St., Philadelphia, Pa.

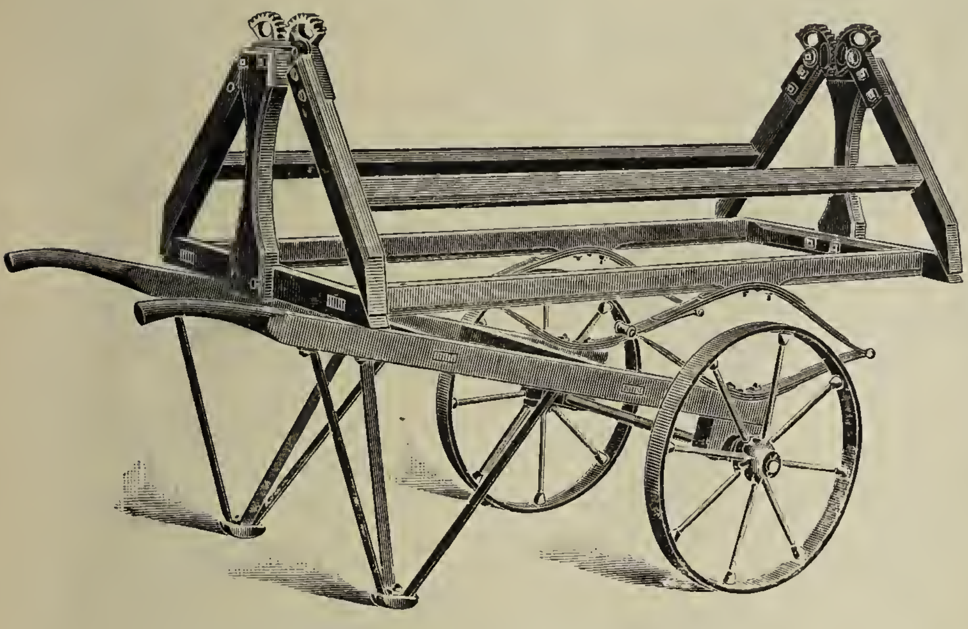
PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

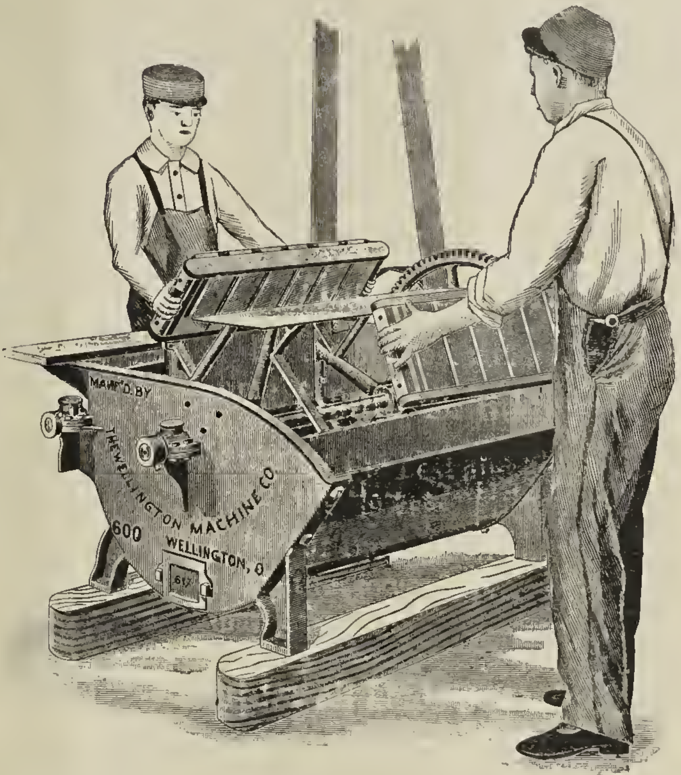
(Continued on Page 382.)

LIES

Are Not Liked by Anybody.
(But our Supp=LIES are Liked
by All who Try Them.)

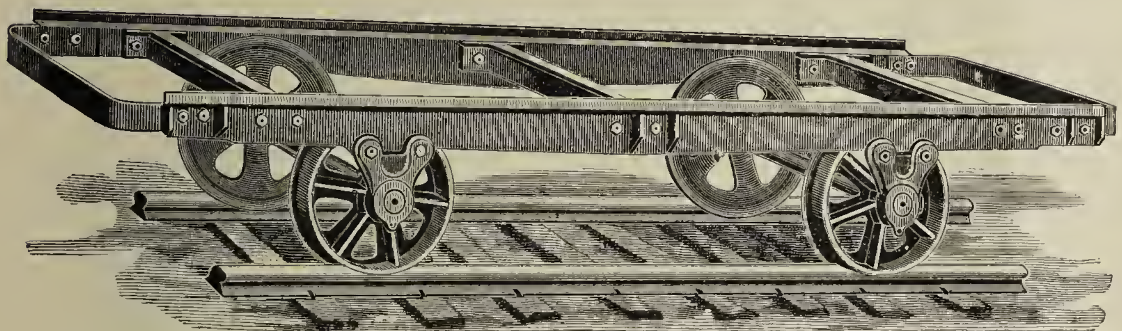


Double Deck Pallet Trucks.
(One or Two Wheels.)

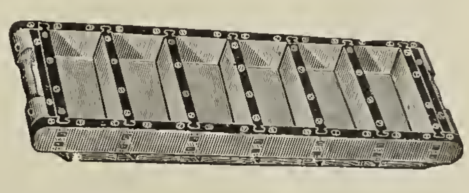


Mould Sander.

By far the best and at the same time the lowest priced on the market.



Cast Iron Tunnel Dryer Cars.



Moulds: all kinds and sizes.

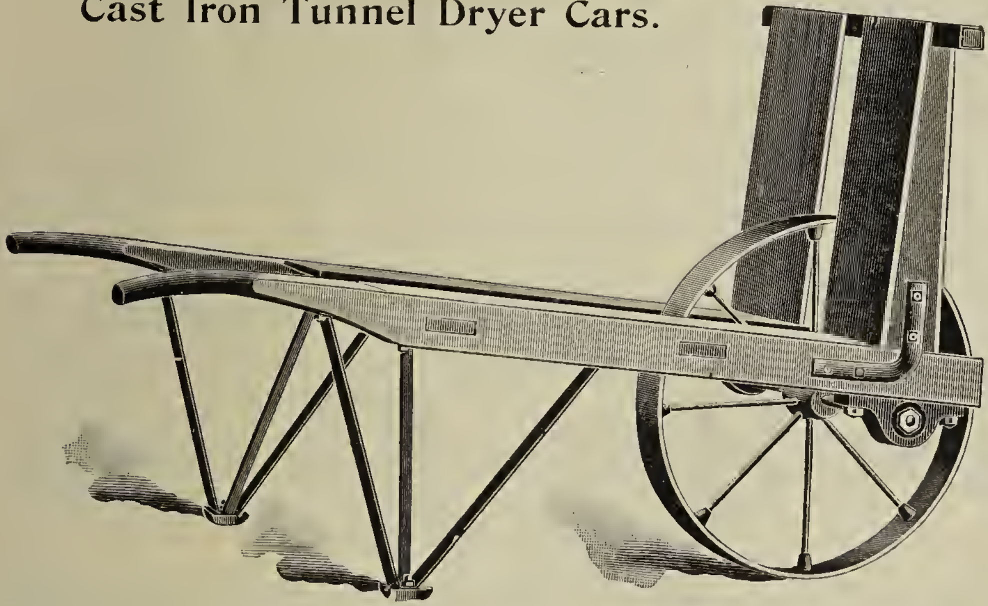
* * *

Dump Tables, Sand Barrows, Dump Carts, Elevators, Kiln Castings, etc., etc.

* * *

GOODS PERFECT. PRICES LOW.

* * *



Ball=Bearing Brick Barrows.

The immense sales of this article testify that a good improvement is appreciated by the trade.

The Wellington Machine Co.,

Wellington,
Ohio.

(See Page 408.)

FOR SALE CHEAP—Chambers C. C. D. Brick Machine, with crusher. Best of order. Address,
ROSS,
41 cm Care Clay-Worker.

WANTED—A good second-hand steam shovel; ¾ bucket preferred. Address,
PARRY BROS. & CO.,
41 d 10 Broad St., Boston, Mass.

FOR SALE—One Miller hand press, in good order and cheap. 5,000 good pressed brick can be made daily. Address
W. B. HARRIS & BROS.,
3 tf d Zanesville, O.

FOR SALE—One Edinburg soft mud brick Machine, 2 trucks, 16 molds, all good as new; made about 40 M brick; only $50. Address
33 c "HOLD," care Clay-Worker.

FOR SALE—Or will rent—Brick and tile works, in good condition. Good clay and market. Address,
D. W. TOWNSEND,
41 c Cherokee, Ia.

FOR SALE—J. W. Penfield & Son's (Willoughby, O.) latest improved dry press. Has been used about four months; in good order. Address,
LORAIN,
41 c Care Clay-Worker.

WANTED—Brickmakers to investigate the Carmichael Clay Steamer, which, for simplicity and effectiveness, is unequaled. Address,
T. W. C.,
41 d Care Clay-Worker.

FOR SALE—One Henry-Martin Brick Machine, good as new; only used short time; cost $1,000; will sell for $500. Address,
ROME BRICK CO.,
44 d Rome, Ga.

WANTED—Situation as foreman, setter and burner on a good, steady brickyard. Thoroughly understands the business. Best of references.
FULTON,
42 d Care of Clay-Worker.

FOR SALE—One No. 4 Cummer Dryer, been in use about a year; is practically as good as new. Object in selling, wish to put in a larger one. Address,
BOX 99,
44 d Care Clay-Worker.

WANTED—A situation as superintendent or foreman of general brickmaking. Have an experience of thirty years; give good reference if needed.
41 d L. W. B., care Clay-Worker.

WANTED—A good, reliable man desires a situation as superintendent of good stiff-mud or dry-press brick plant. References given and required. Address,
42 d JUST, care Clay-Worker.

FOR SALE—One C. C. D. Chambers End-cut Brick Machine, one automatic edger and one disintegrator, all in first-class order, and can be had cheap.
SAN ANTONIO,
43 c Care Clay-Worker.

FOR SALE CHEAP—Complete outfit for making soft-mud brick; 2 upright machines, engine, boiler, shafting, etc., all in good order. Address,
CHASE BRICK CO.,
41 d Milwaukee, Wis.

WANTED—Good, experienced brick setter and burner, for face brick, dry-press works; also, a thoroughly experienced man with dry press and other brick machinery. State age and reference, also terms, to
41 d SWITZER, Care Clay-Worker.

FOR SALE—Brick plant of ten acres; machinery in good order; 50-horse-power boiler and engine; Penfield Auger Machine and Disintegrator. Address,
AYRES BROS.,
41 c Toms River, N. J.

WANTED—Situation on dry clay, stiff clay or vitrified street-paver works. Practical in all branches. Handling men and machinery, setting, burning, also kiln builder; can build up or down-draft, round or square kilns. Best of references where required. Address,
PRACTICAL,
41 c Care of Clay-Worker.

WANTED—Position as superintendent by a practical tile and brickmaker; has had fifteen years' experience; understands the making and burning of common and fire brick, drain tile and dry-pressed brick; also, the handling of down-draft kilns and all kinds of brick and tile machinery, boilers, engines, etc. Can give the best of references from well-known firm in Illinois. Address,
41 c BOX 463, Dekalb, Ill.

FOR SALE—Forty wood-bodied brick dryer cars for steam brick dryer. Also a brick and drain tile plant, with modern equipments, in good running order; 150 acres land, sand and timber on premises. Plant sold separate from land for removal, if desired.
G. P. ORENDORFF,
8 tf 5p Lacon, Morgan County, Ala.

FOR SALE—Odd sizes of molds. Have not been used:

5 Molds, 8¾ x 4¼ x 2⅜.
12 Molds, 9¼ x 4½ x 2¾.
6 Molds, 8 11-16 x 4⅜ x 2¾.
20 Molds, 8 13-16 x 4 3-16 x 2 7-16.
19 Molds, 9¼ x 4½ x 2½.

Second-hand, but used a few days only:

7 Standards, 8¾ x 4¼ x 2½.
19 Molds, 9½ x 4⅝ x 2 9-16.
10 Molds, 9½ x 4⅝ x 2¾.

All six-brick molds, with 9-16 partitions.

THE WELLINGTON MACHINE CO.,
2 tf 1 Wellington, O.

FOR SALE—Great Snaps in Clay Works—Controlling interest in the Denver Terra Cotta Lumber Co., at Denver, Col., at about half cost. These works are located near the heart of the city, with best of shipping facilities and everything necessary for a large business. Has done a business of nearly half a million dollars in the past five years, and will do as well in the next five. Above interest is owned by New York and Chicago parties, who have all the business they can attend to at home. Terms to suit. Address
R. A. YOUNG, Sec., 601 Equitable Bldg.,
31 d Denver, Col.

WANTED—A job as Superintendent of brick plant. Thirty years' experience in the manufacture of brick; had charge of yards of from 1,000,000 to 10,000,000 per annum capacity. Qualifications: Can make money for employer where he has good clay, good machinery and ready sale for product at reasonable rates; am acquainted with soft and stiff-mud machinery, up-draft, down-draft and continuous kilns; can either build, set or burn them; can manage men profitably. If I know any more you do not need me. Address,
R. H.,
41 d Care Clay-Worker.

FOR SALE—The Tennessee Brick Company, of Memphis, Tenn., offers its entire plant for sale, consisting of eighteen acres of land, with average clay bed of twelve feet; dry press and mud machines, with capacity of 80,000 brick per day. Everything in good order and ready for operating. Two lines of railroad pass the property, one on either side, thus landing fuel in front of kilns. The yard lies just on the southern limits of the city; well-paved streets afford excellent facilities for deliveries. This is considered a rare opportunity for any one wishing to invest in this class of business. Competition little; in fact, this is the only yard having a supply of clay to carry beyond a few years. For particulars and price apply to
C. W. EDMONDS,
41 d 336 Front St., Memphis, Tenn.

FOR SALE—At $450 on board cars, one Chisholm, Boyd & White Co. dry pan, seven feet in diameter, repaired by us and in good order.
CHAMBERS BROTHERS CO.,
341 Philadelphia.

WANTED—By practical brickmaker of many years' experience, position as superintendent and burner. Can furnish references if required. Address
L. M. F.,
180 Tremont St., Room 36,
32 c Boston, Mass.

FOR SALE—$7,000 buys the only brick and tile plant in town of 2,000, with machinery, dry houses and buildings complete to make 30,000 brick per day. Three Eudaly kilns, two round kilns, about four acres best quality paving brick clay, an abundance of water. If not sold in 60 days, will lease. Address
32 cm KNOXVILLE, care Clay-Worker.

FOR SALE—Second-hand brick machinery. One Eureka dry press, capacity 25,000, with conveyor, disintegrator, etc. Two Creiger's grand automatic, capacity 35,000 each, with crushers, conveyors, pug mills, etc. One Raymond hand press, with outfit; capacity, 3,500. Sixty thousand good wood pallets, 2 feet 9 inches by 10 inches. Address.
33 cm GRAHAM, care Clay-Worker.

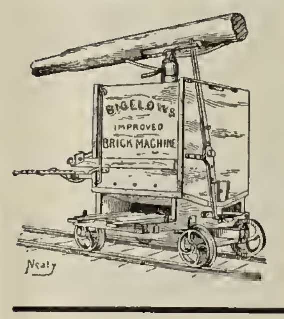
FOR SALE—One Sword machine; one upright Hilton sand brick machine, an excellent No. 1 machine, all of iron and very little used; molds, good engine and boiler, shafting, pulleys, wheelbarrows, trucks, pallets, racks, lumber, two good carts and harness, two Yankee endless chain hoists with hods, one Daso double platform elevator with horse power. Address
32 d OMAHA, care Clay-Worker.

FOR SALE—A controlling interest in a very desirable brickyard property in Houston, Tex., equipped for manufacture of dry press front brick and stiff mud common brick, and produces a fine article of both. Location as to local market and railroad facilities unexcelled. Houston is a rapidly growing city and best distributing point in the South. Good business reasons for selling. Will take other property in part payment.
C. J. BROWN, Topeka, Kan.,
Or E. A. McMATH, 1009½ Congress st.,
23 d Houston, Tex.

FOR SALE—One Penfield all-iron stock brick machine, with horizontal pug mill attached, used one year, but thoroughly overhauled. One Penfield 10 S plunger machine, with one board delivery cutting table arranged to cut Roman and front brick. Two Carnell hand represses, 13¼x4⅜ inches. Two ditto, 8⅞x4¼ inches. Two Kueny hand represses, 8⅞x4¼ inches. Two Tapline & Rice chaser mills, very little used. All above will be put in thorough good order and delivered on car. Write for prices.
R. E. FARNHAM,
33 c Metuchen, N. J.

(Continued on Page 384.)

BRICK MACHINERY.



One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

A. E. BIGELOW, Spaulding, Ill.

FIRE BRICK, FIRE CLAY and FIRE CLAY TILES.

Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years. Write for prices.

EVENS & HOWARD,

920 Market Street, - - - - ST. LOUIS, MO.

Unbiased Testimony.

BRICKMAKERS:—We are well aware that the majority of you do not take kindly to letters of reference that are usually published in clay magazines and catalogues, feeling that many times they do not express the exact opinions of the writer, whose judgement is influenced by friendship or other motives. Therefore, unsolicited endorsement from Mr. D. V. Purington, the largest brickmaker in the United States, who is not using our machinery, should have weight. In a recent letter to a friend, he expresses his views of the **Wonder Machine** as follows.

> "While I do not use any other machine but the Chambers, I keep tab on the others. It has seemed to me that the Wallace **"Wonder" Machine** has some merit not possessed in the others, notably in the preparation of the clay. * * At Galesburg I have been closely watching the **Big Wonder** operated by the Galesburg Paving Brick Co., and I have come to the conclusion that they make as good a brick, and so far as the brick machine goes, make them as profitably as we do with the Chambers, or the Galesburg Brick and Terra Cotta Co., do on the Frey-Sheckler. Indeed, I am about certain that the **Big Wonder** makes a brick with less lamination than any other auger machine. [Signed] D. V. PURINGTON.
>
> Chicago, November 7, 1895.

This expression coming unsolicited and unbiased should have its weight, and should prove conslusively that we are not misrepresenting the merits of the **Wonder Machines.**

For further particulars, address

The Wallace Mfg. Co.,

FRANKFORT, INDIANA.

CATALOGUE FREE.
See back Inside Cover Page

WANTED—To serve somebody who is in need of a vigorous man, capable of assuming full control of soft or stiff-mud brick plant. Drilled in every department. Twelve years' experience. Best of references as to character and ability. Address,

YOUNG GRIMES,
43 L Care Clay-Worker.

FOR SALE—A pressed brick plant, located in an Indiana town of 10,000, on a direct line to Chicago, 145 miles distant, with low freight rates. Plant consists of factory building and residence for superintendent, ten acres of shale of the depth of 100 feet, an inexhaustible quantity; one four-mold Simpson Brick Press, boilers, engines, crushers, rock breakers, and all machinery pertaining to a No. 1 plant; one up-draft kiln, 275,000 capacity; one Alsip down-draft, 152,000 capacity, with stack for four kilns, built of best material; stock sheds; private railway switch in yard. Brick are beautiful red in color; cannot be equaled. Fuel very cheap. Ready market for entire output. Reason for selling, failure in health of proprietor. This plant, if sold at once, can be bought at a low figure. Address,

CRAWFORD,
41 c Care Clay-Worker.

FOR SALE—A bank of iron shale, consisting of eighty acres, and forty feet and over in thickness, same being of the very best quality for the manufacture of vitrified street-paving brick; same has only a few feet of red loamy earth on the surface. Immediately under the shale there are three feet of good limestone rock, two feet of coal and six to seven feet of fire clay. This fire clay is suitable for either fire brick or repressed modeled building brick. The shale is equally as well suited for the making of vitrified sewer pipe. The location is a few hundred yards from a railroad, with first-class shipping facilities, and an eighth of a mile from Canton, O., thus being an excellent opportunity for the establishment of an extensive street-paving brick or sewer-pipe plant, or both. Address,

TYLER,
41 c Care Clay-Worker.

NOTICE.

Parties wishing formulas for the manufacture of enameled or glaze brick (once or twice burning), either on clay or burnt brick, with full instructions; also, pure white dull enamel, or other colors, for terra cotta, new process, can obtain same by inclosing five dollars. Parties ordering must state nature and quality of clay they wish to enamel or glaze. In such cases, if instructions sent are strictly followed, a guarantee given that results will be obtained equal to anything manufactured, or money refunded. Address,

4 tf L EUREKA, care Clay-Worker.

FIRE BRICK MANUFACTURER.

Advertiser who is accustomed to the management of large fire-brick works and is thoroughly experienced in every detail of the business is open to re-engagement, either at the present time or in the spring, as manager or superintendent. The best of testimonials as to character, ability and successful management. Address

31 d W. G. T., Care Clay-Worker.

EXPERT IN ROOFING TILE.

Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address

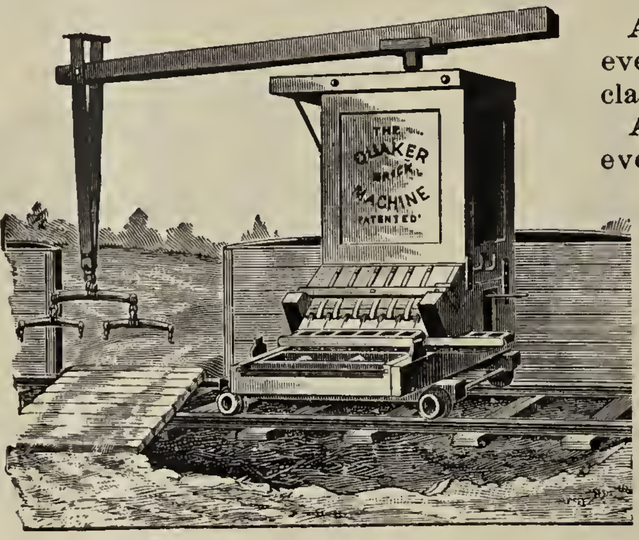
CHARLES STOLP, Cott. 166,
3 tf 1 5p Chicago Heights, Ill.

BRICK MACHINERY FOR SALE.

One 2-mold Whittaker dry-press brick machine.
One 2-mold Whittaker semi-dry-press brick machine.
One 1-mold ornamental Whittaker brick machine.
One 4-mold dry-press brick machine, Simpson make.
One 4-mold dry-press Eureka brick machine.
Two repress brick machines.
One stiff-mud brick machine.
One brick and tile machine combined.
One dryer.
Also disintegrators, breakers, screens, trucks, etc.

SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

The New Model Quaker and Monarch Brick Machines


THE QUAKER BRICK MACHINE PATENTED

Also supplies and machinery of every character pertaining to the clayworking business.

A simple, practical, reliable every day, all round Brick Machine, either steam or horse power, at a reasonable living price to suit the times. We have it. No experiment. Over 1,000 in use all over the country.

We cannot give testimonials and particulars in a small advertisement, we simply ask you to write us for catalogue, prices, facts, etc. It will cost you nothing.

S. K. FLETCHER, General Agent,

Successor to Fletcher & Thomas.

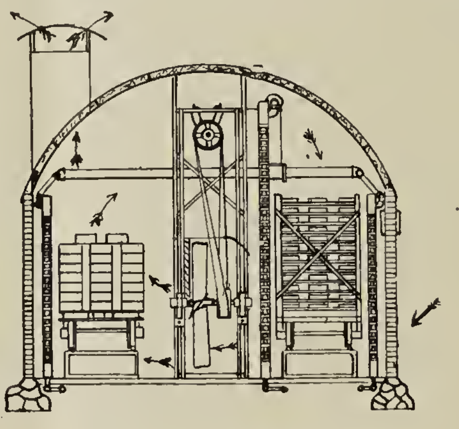
INDIANAPOLIS, IND

The Safety Dryer,

Made absolutely **Fire Proof**, at but little, or **no greater cost** than of wood erection.

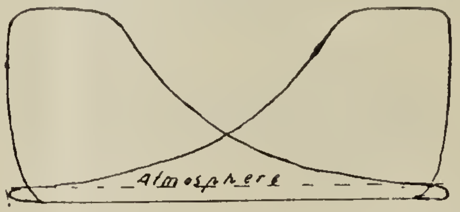
Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.

U. S. Pat. Aug. 16, 1881. No. 245,742.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.

MR. S. G. PHILLIPS, Woodbridge, N J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformily without cracks.

Yours respectfully,
CHAMBERS BROTHERS Co ,
J. H. Chambers, Gen'l Mgr.

SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr.

WASHINGTON BRICK AND TERRA COTTA CO.

WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

WASHINGTON, D. C., June 7th, 1895.

S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our ——

You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw "

FORDS, N. J., April 9th, 1894.

MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

S. G. PHILLIPS.

Agent and Patentee,

161 Grand Street,

Rahway, N. J.

DO NOT BUY A

FOUNDED 1879.

SOFT CLAY BRICK MACHINE

Until You Have Investigated Ours.

Send for Photo.

W. E. TALLCOT & CO., Croton-on-Hudson, N. Y.

Washington University Testing . . Laboratory

Tests of the Strength of Materials

Of all kinds made by experienced and competent experts. . . . . .

ST. LOUIS, MO.

All the United States Timber Tests made at this Laboratory.

Tests of Paving Brick a Specialty.

J. B. JOHNSON, Director.

MAKES THE FINEST BRICK in the WORLD.

THE Improved Lion Brick Press.

New Catalogue on application.

Complete Brickyard Machinery.

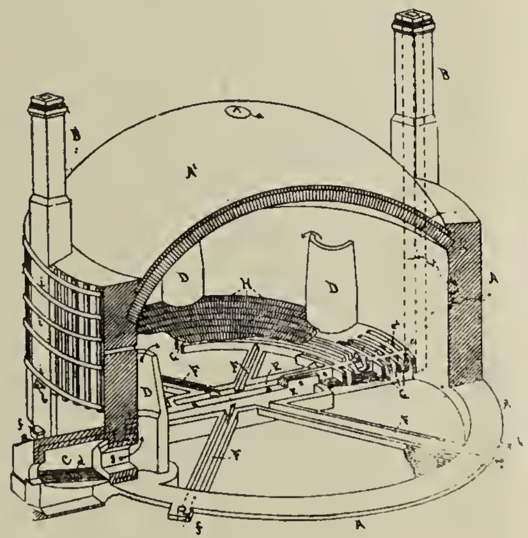
St. Louis Iron & Machine Works,

Main St., and Chauteau Ave., ST. LOUIS, MO.

BURNING MADE EASY

BY USING

Holman's Down Draft Kiln.



Cheaply and easily built, and Fully demonstrated to be one of the most perfect kilns on the market.

. . . . All Parts of the Kiln Fully Under Control.

SEND FOR ILLUSTRATED CIRCULAR.

C. J. HOLMAN, Sargeant's Bluff, Iowa.

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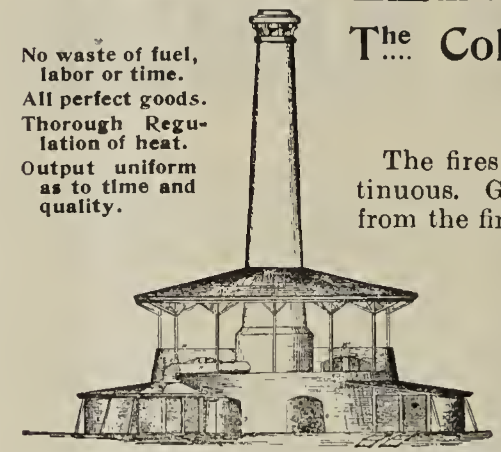

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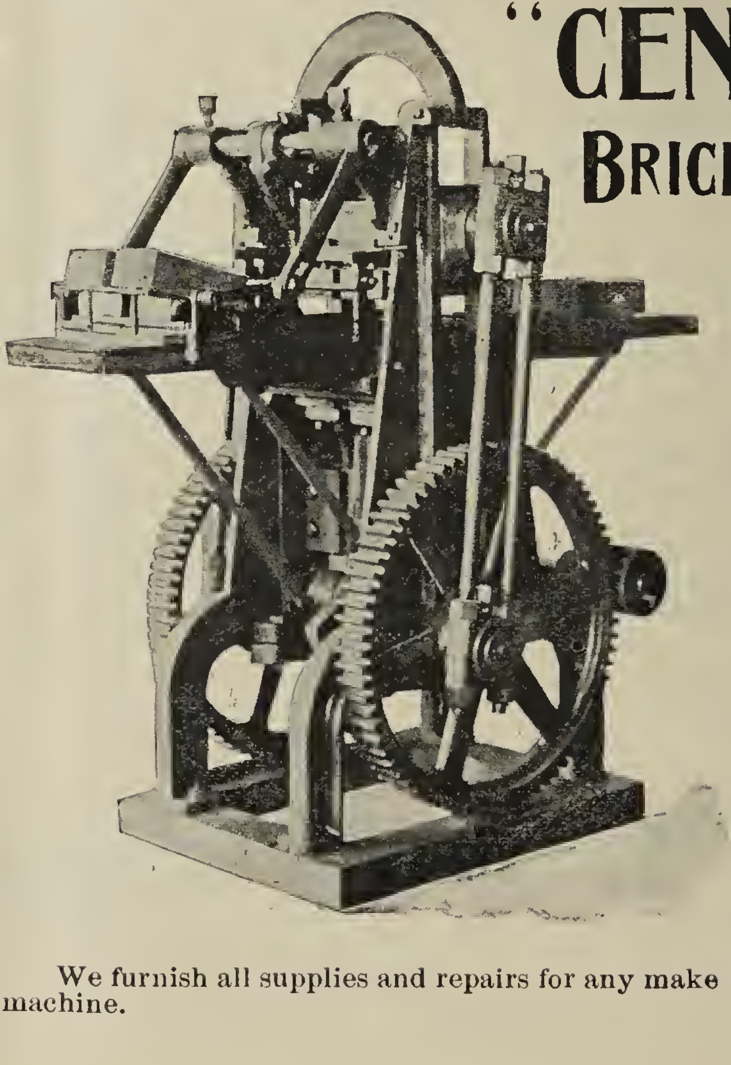

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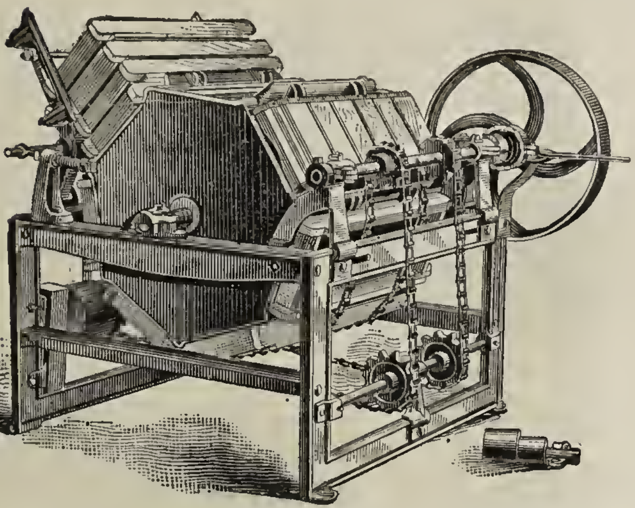
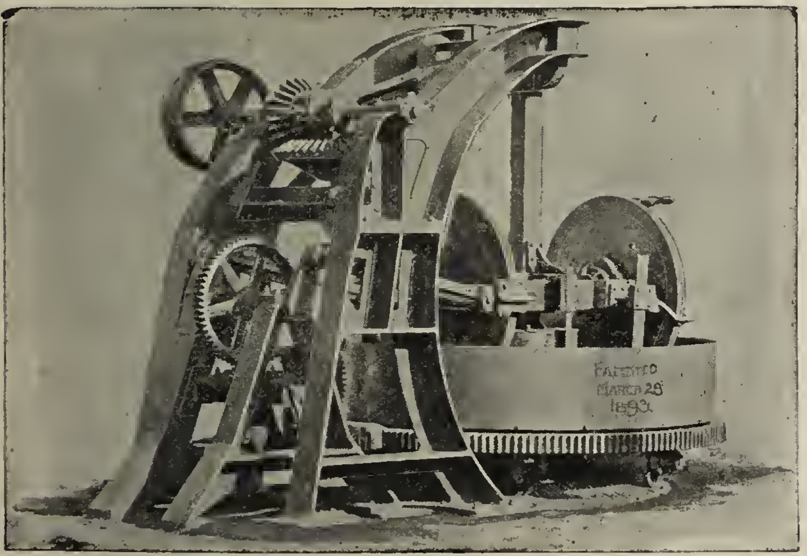


THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton. A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

Something New. Look it Up.



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BY HAND-POWER.

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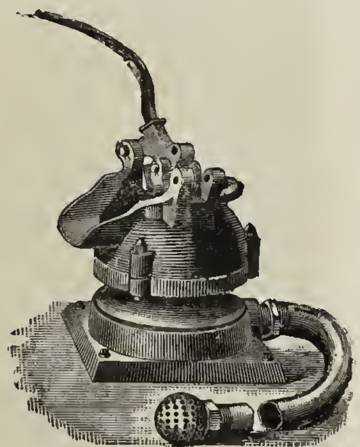

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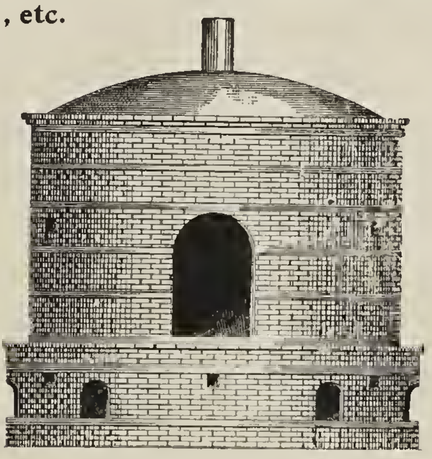

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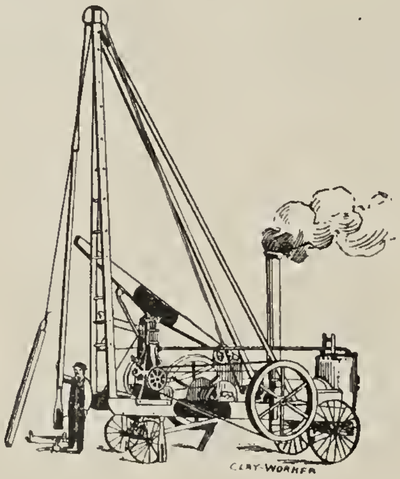

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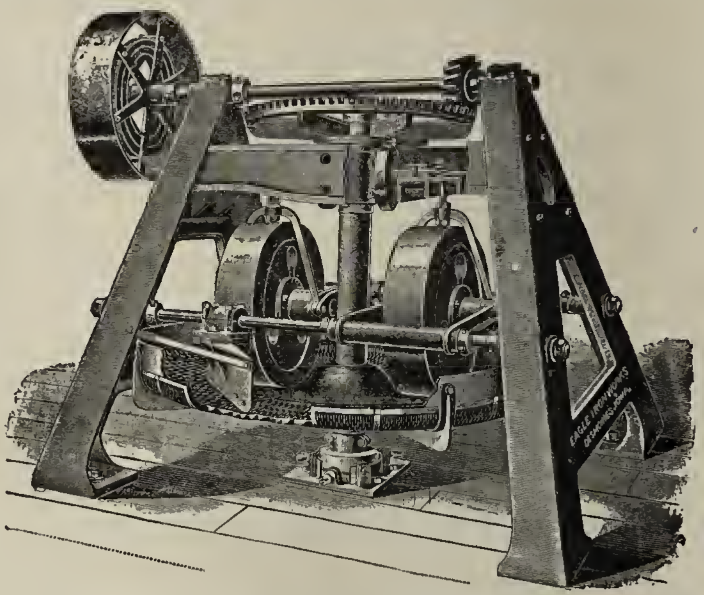

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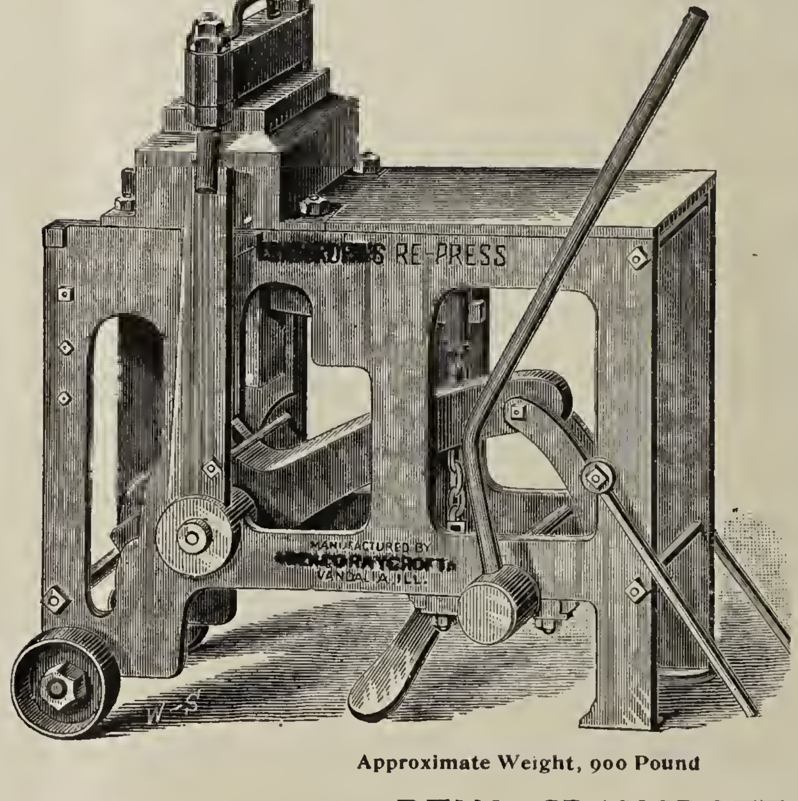
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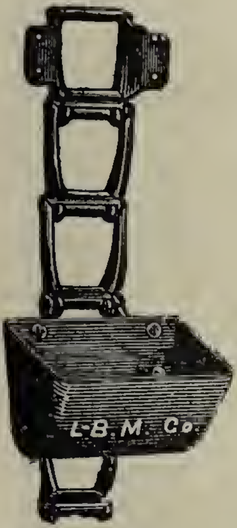

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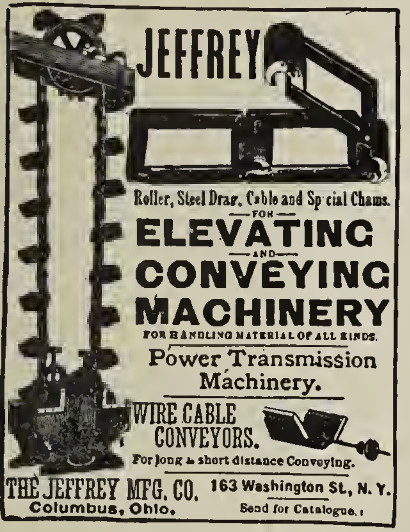

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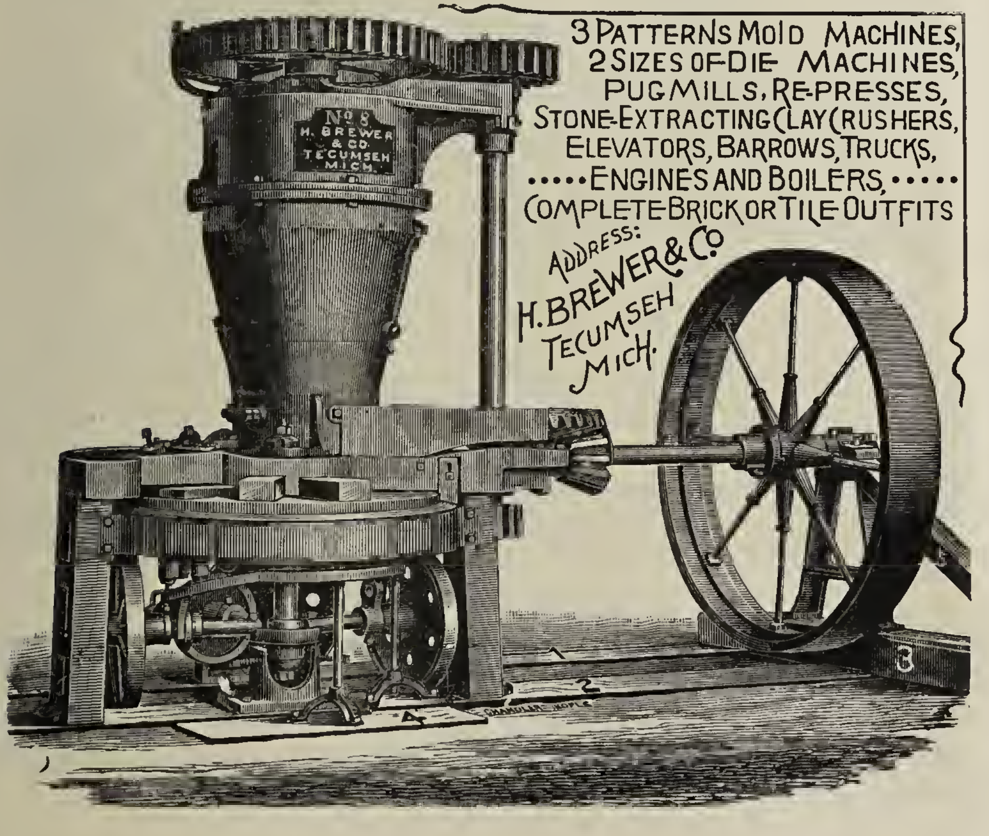

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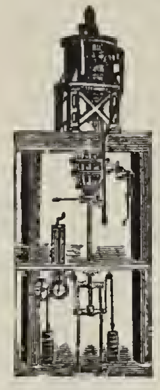

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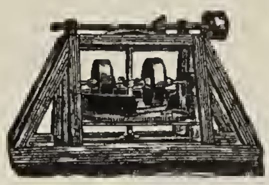

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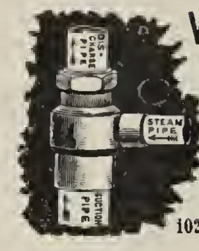

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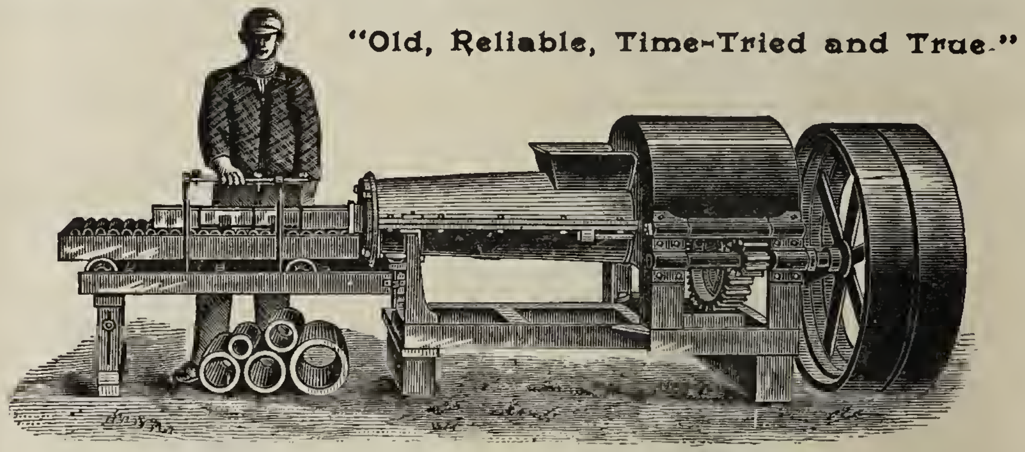

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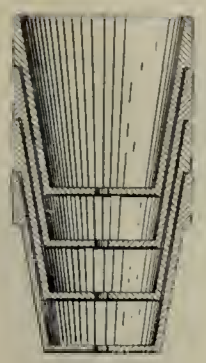

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The Rockwood Mfg. Co.,
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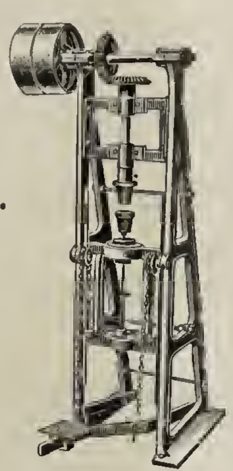


THE "AJAX" BRICK MACHINE

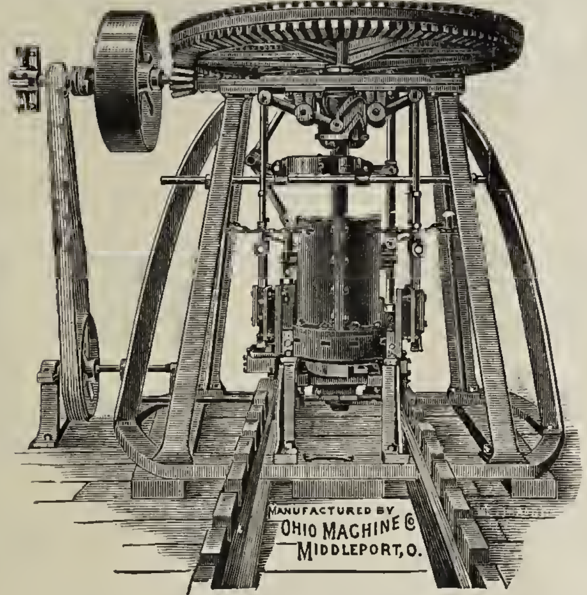
MANUFACTURED BY

Ohio Machine Co.,

Middleport, Ohio.

Under the very Latest Improved Grant-Murray Patent.

This machine is constructed with the object of giving to purchasers the very best results obtainable for the money invested. It is at once Simple, Durable, Convenient, and Easily operated. We claim these machines make the strongest brick in the market, a brick that is very superior for Street Paving and building purposes. Their superior quality as pavers may be ascertained by reference to some of the leading cities of Ohio and West Virginia. This machine works the clay very stiff, pressing all the clay into each brick that it will possibly contain, thus imparting the quality requisite to a No. 1 Paving Brick. We guarantee these machines to our customers, and solicit investigation as to their merits. For further particulars please correspond with

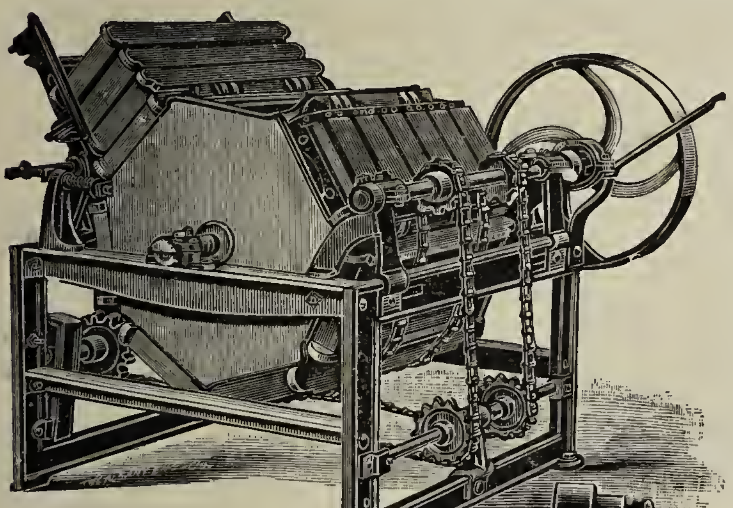


OHIO MACHINE CO.,
MANUFACTURERS,
Middleport, Ohio

We manufacture the Grant & Murray Patent Repress Brick Machine, pressing 4 brick each revolution and 40,000 per 10 hour day.

BUCK'S NEW CHAMPION

Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurrer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.
WHITEHEAD BROS. & CO., General Agents, 517 West 15th St., New York City.

The F. F. V. Vestibule Limited via the Chesapeake & Ohio R'y, is the only Solid train with through Dining Car between New York, Philadelphia, Baltimore, Washington, Cincinnati and the West. Lighted with Electricity. Heated with Steam.

H. W. FULLER,
Gen'l Pass. Agent,
WASHINGTON, D. C.

C. B. RYAN,
Ass't Gen'l Pass. Agent.
CINCINNATI, OHIO

LAKE ERIE & WESTERN
NATURAL GAS ROUTE
RAILROAD.

Solid Train Between
Sandusky and Peoria
—AND—
INDIANAPOLIS and MICHIGAN CITY,
FT. WAYNE and CONNERSVILLE.

Through tickets sold to all points in the United States and Canada.

NORTH BOUND—LEAVES.

No. 20 Passenger	7:00 a. m.
*No. 22 Passenger	1:20 p. m.
No. 24 Passenger	7:00 p. m.

SOUTH BOUND—ARRIVES.

*No. 21 Passenger	10:20 a. m.
No. 23 Passenger	2:50 p. m.
No. 25 Passenger	6:20 p. m.

*Daily.

Union Depot connections at BLOOMINGTON and PEORIA for points WEST, SOUTHWEST and NORTHWEST.

Direct connections made at LIMA, FOSTORIA, FREMONT or SANDUSKY for all points EAST.

Immediate connections at TIPTON with trains on Main Line and I. & M. C. Div., for all points NORTH, SOUTH, EAST and WEST.

For tickets, rates and general information, call on A. H. SELLARS, Agent, Lake Erie & Western R. R.

C. F. DAILY, Gen. Pass. Agt.,
INDIANAPOLIS, IND.

Indiana, Decatur & Western

RAILWAY.

Short line between INDIANAPOLIS and KANSAS CITY. The only line running Reclining Chair Cars between INDIANAPOLIS, and DECATUR, SPRINGFIELD and JACKSONVILLE, ILLINOIS.

TIME OF TRAINS AT INDIANAPOLIS:

LEAVE.

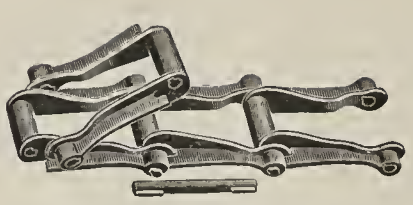
Mail and Express	8.30 a m
Accommodation	3.25 p m
Fast Express	11.20 p m

ARRIVE.

Fast Express	3.30 a m
Accommodation	10.40 a m
Mail and Express	4.50 p m

JNO. S. LAZARUS, Gen. Pass. Agent.

TAKE THE
BIG 4
TO
ST. LOUIS



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

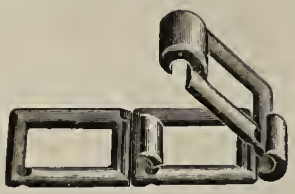
F. H. C. MEY,

Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.



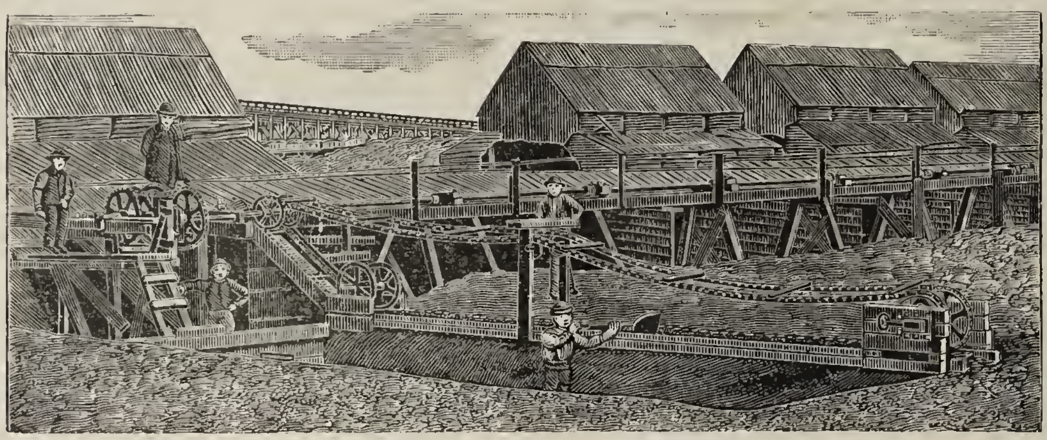
THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker.

It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.

Send for Catalogue.



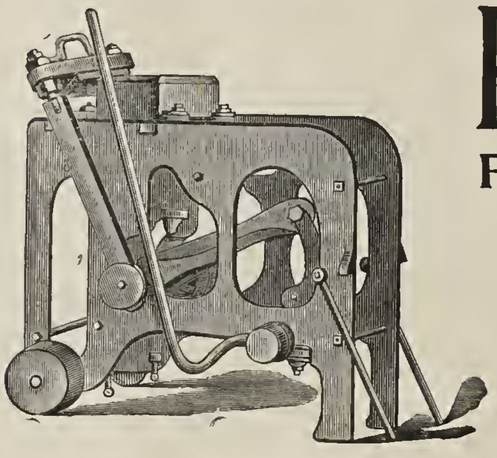
MEY PATENT CLAY ELEVATOR.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

····Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

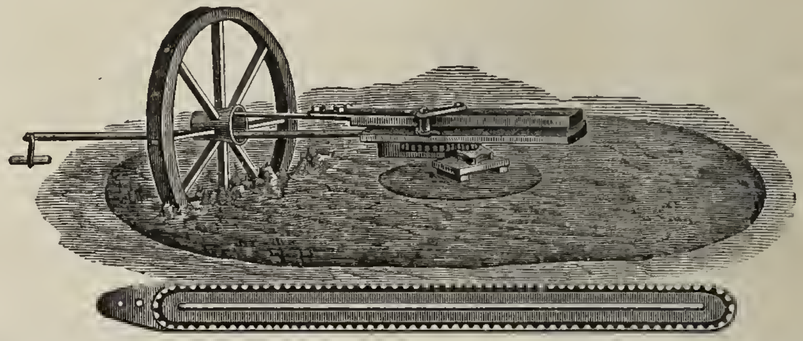


RED BRICK PRESS.

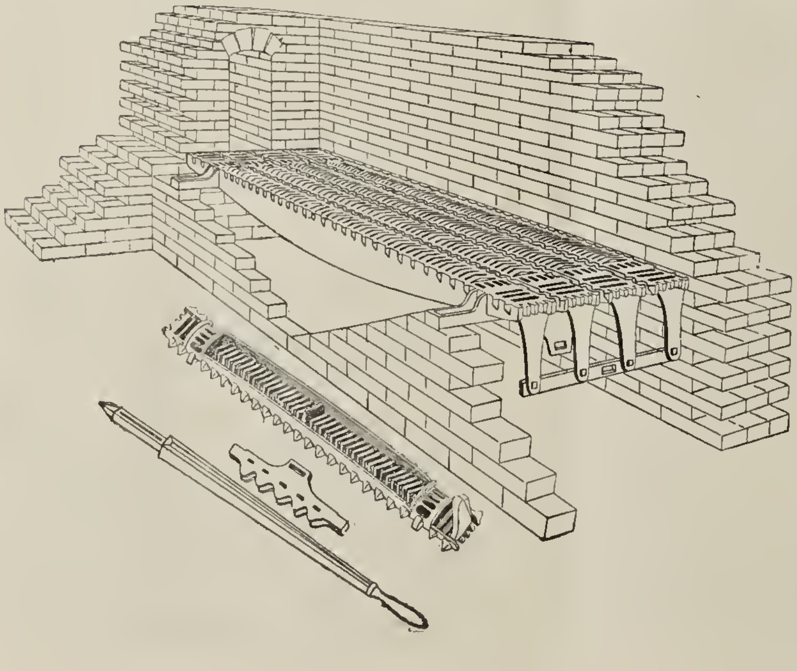
GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.



A Rocking Grate for the Clayworker.

Our Grates give greatest economy of fuel. Cold drafts through furnace are greatly reduced. Why not make cheaper brick?

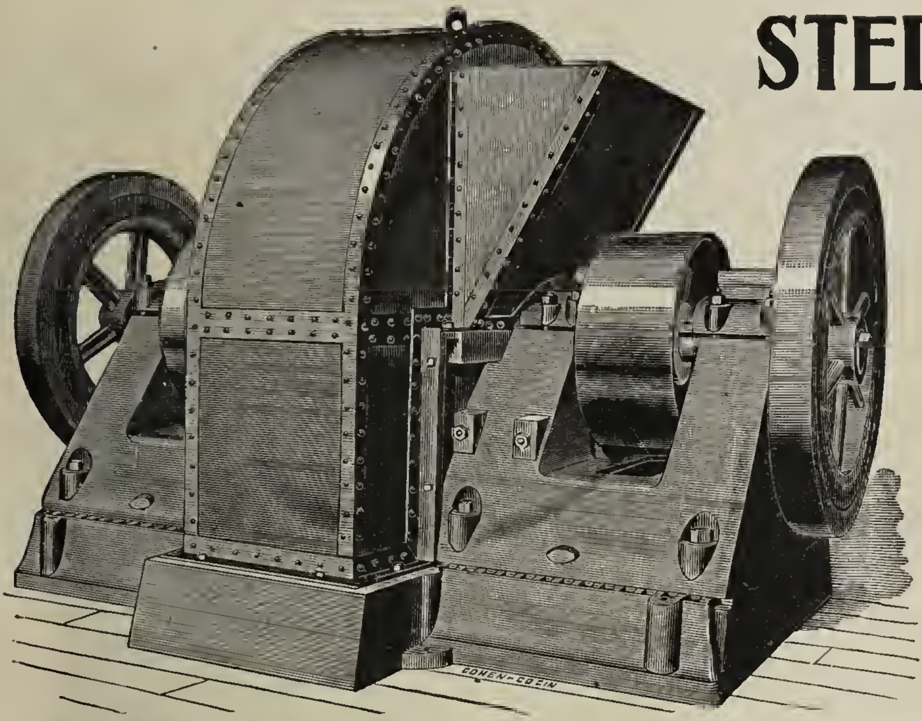
A good thing: Our Art Catalogue.
Write us.

The Fuller Engineering Co.,

New York,
Chicago,
St. Louis,
New Orleans,
Charolett, N. C.

Engineers, Founders and Mechanics,
Builders of Oil Mills, Gin and Brick Machinery,

CALVERT, TEXAS.



STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it will not clog in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

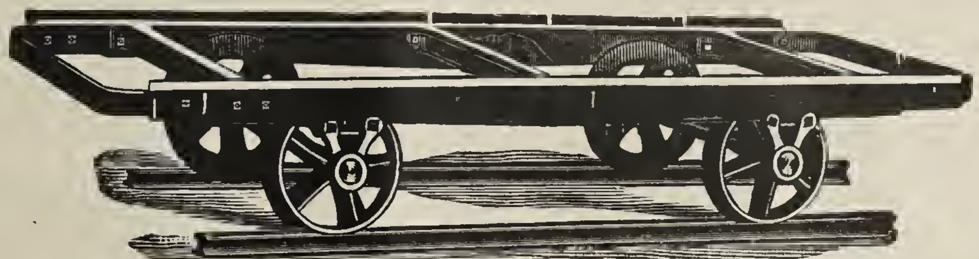
Aurora, Ind.

BRICK CARS.

THE BEST!

For carrying all kinds of brick. Over 15,000 in use. It will pay you to inform yourself fully.

Write Us.
Visit Us.



STYLE 128.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

The New South Brick Machinery

Southern Clay Eaters. Veni, Vidi, Vici.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion or constipation.** No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

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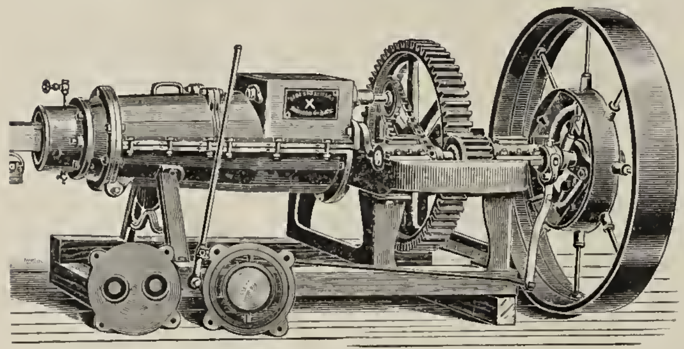

Our X Brick and Tile Machine.

SIDNEY, IOWA, November 4th, 1895.

J. C. STEELE & SON, Statesville, N. C.

GENTLEMEN:—I thought I would let you know that I am well pleased with the New South X Machine. It is the cheapest, runs the lightest and makes the nicest brick of any machine in southwest Iowa. We have a 12 H. P. engine and can make 20,000 bricks in ten hours, and there is not a hand-cutting table in this part of the country that can compete with yours for cutting square on the ends. I consider it the most complete outfit that a man can buy for the money. It surprises old brickmakers. They say your truck is a Yankee trick. We have a club-footed boy, 16 years old, who trucks 15,000 to 18,000 per day with one of them. We wish you success with your enterprise.

Yours, etc.,
S. O. CARTER.

• • • •

Strictly modern machinery at the lowest price.
We have just completed a new machine "X-tra."

Send for catalogue.

J. C. STEELE & SON, Statesville, N. C.

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15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

• • •

12 Second Hand Machines.

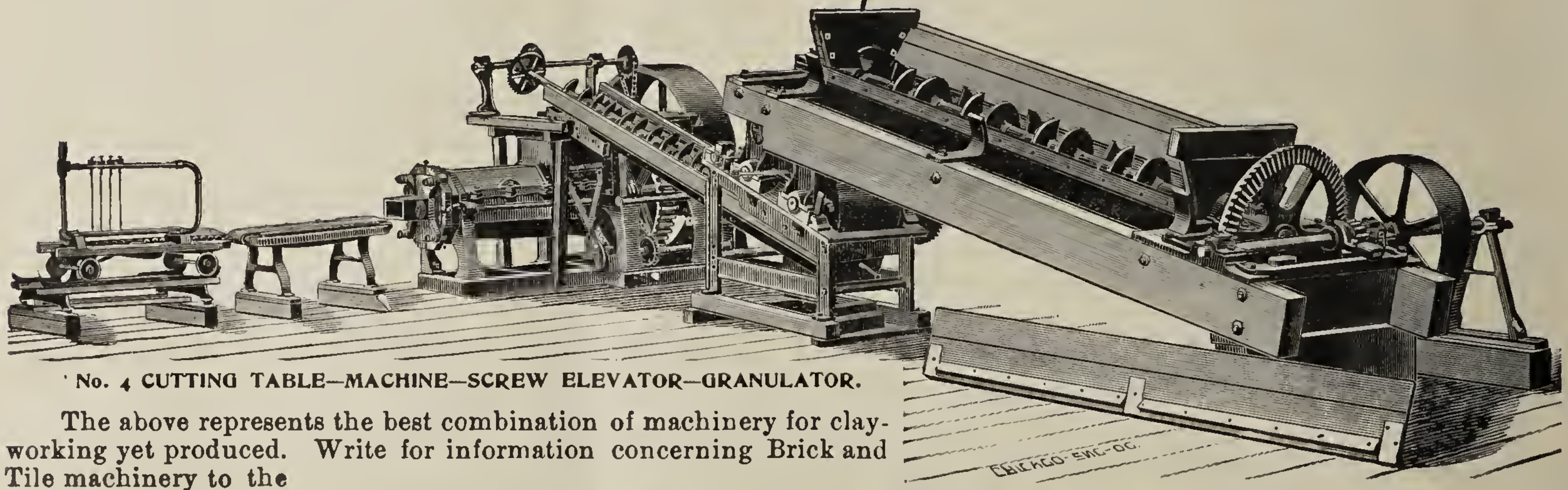
Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER MANUFACTURING CO

DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.

SEND FOR PRINTED MATTER.

ADRIAN BRICK AND TILE MACHINE CO.



No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clayworking yet produced. Write for information concerning Brick and Tile machinery to the

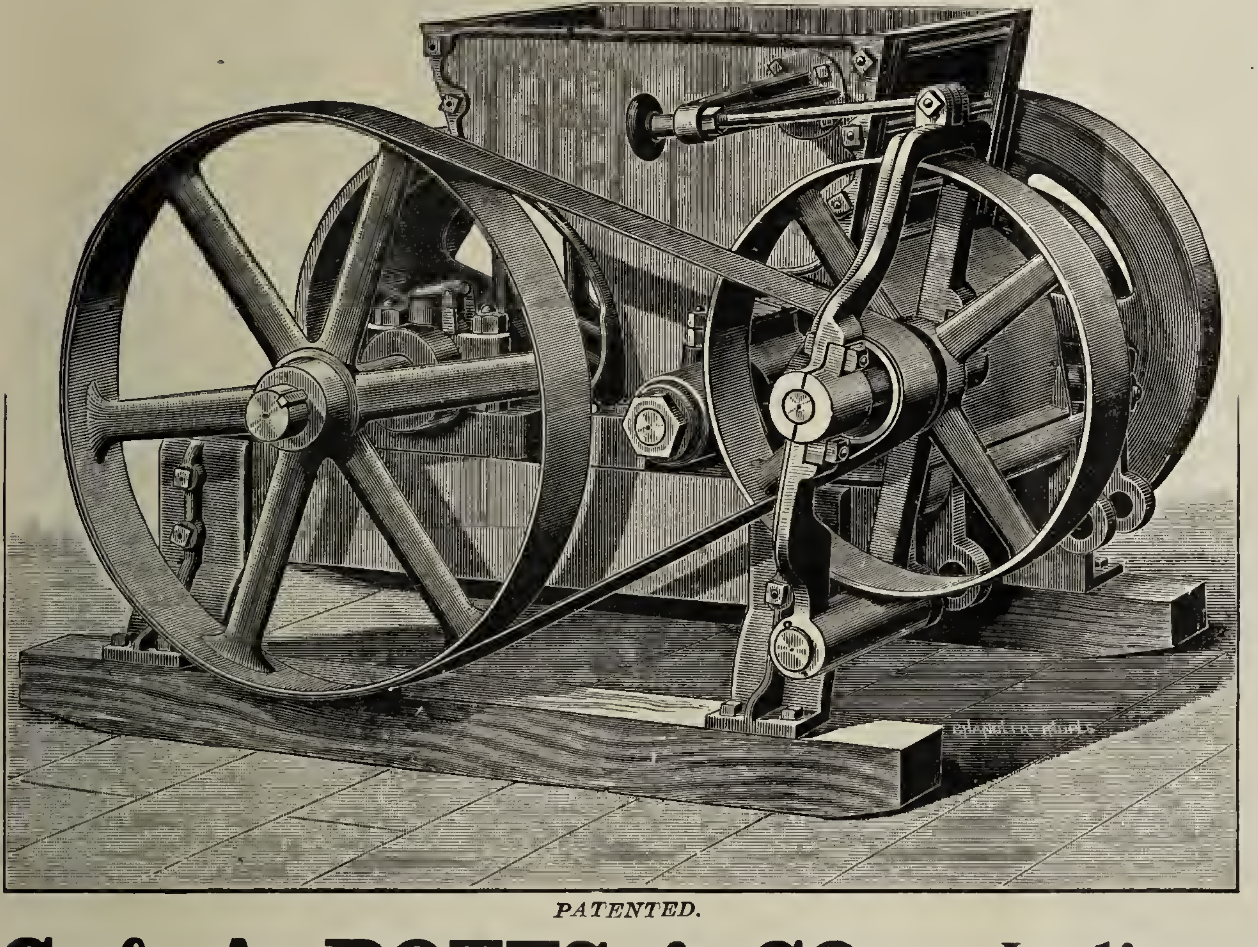
ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

NO CATALOGUE

is complete without Cuts
Poor illustrations are worse than none.
They offend the critical and reflect on the
character of the articles advertised.
For the finest kind of wood cuts, half-tones and
Zinc-Etchings. Send for an estimate to the

H. C. BAUER ENGRAVING CO.,
INDIANAPOLIS, IND.

The Potts Disintegrators



PATENTED.

WORK WET or DRY CLAYS.

• • •

Separate or grind the stones. Simple in

CONSTRUCTION,
STRONG and
DURABLE.
CHILLED ROLLS.

You take no chance of Patent Litigation by purchasing this machine.

Twelve sizes and styles. Capacity from 15 M to 150 M brick per day.

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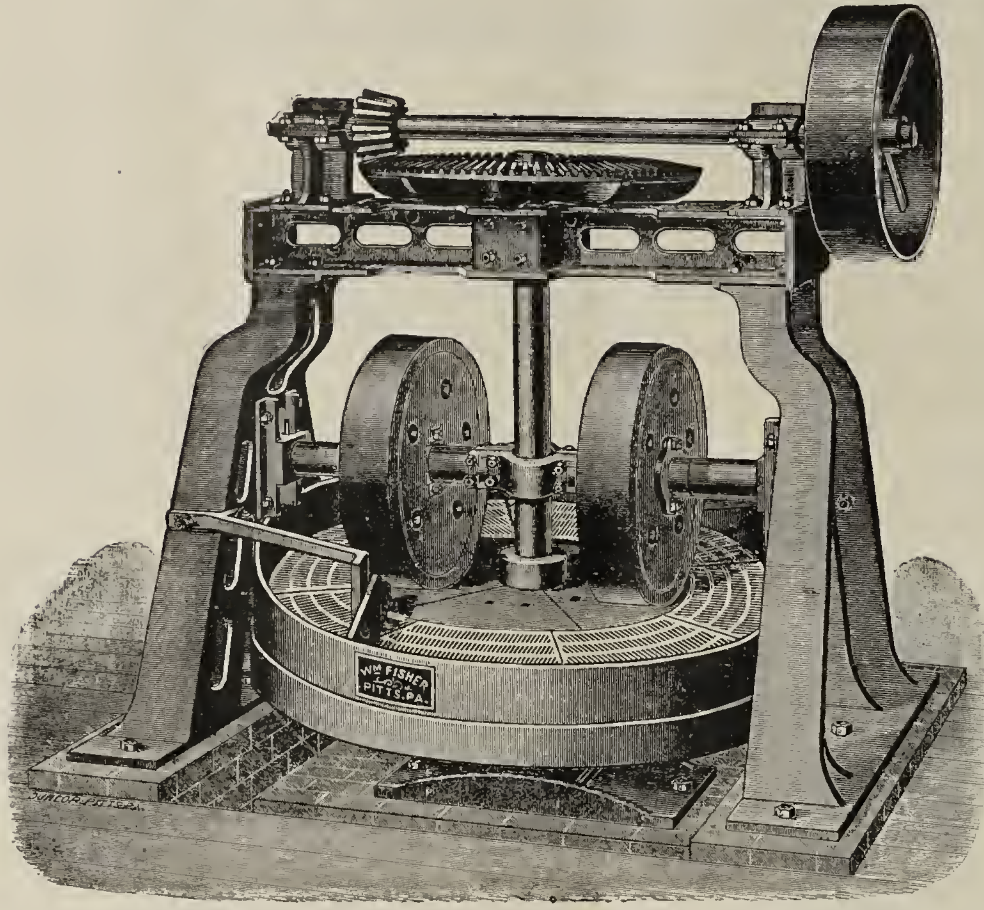
C. & A. POTTS & CO., - Indianapolis, Ind.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.


WM FISHER PITTS. PA.

Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

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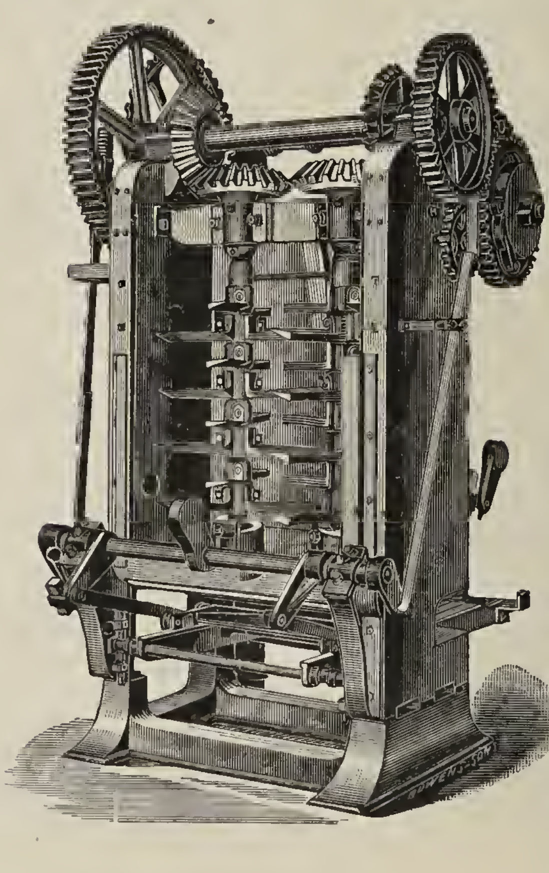
THE DUPLEX

Is the Standard of All Soft Clay Brick] Machines.



It is made entirely of iron and steel, thus being very Strong and Durable, Simple in Construction, and makes a much stiffer brick than can be made with any other soft clay machine.

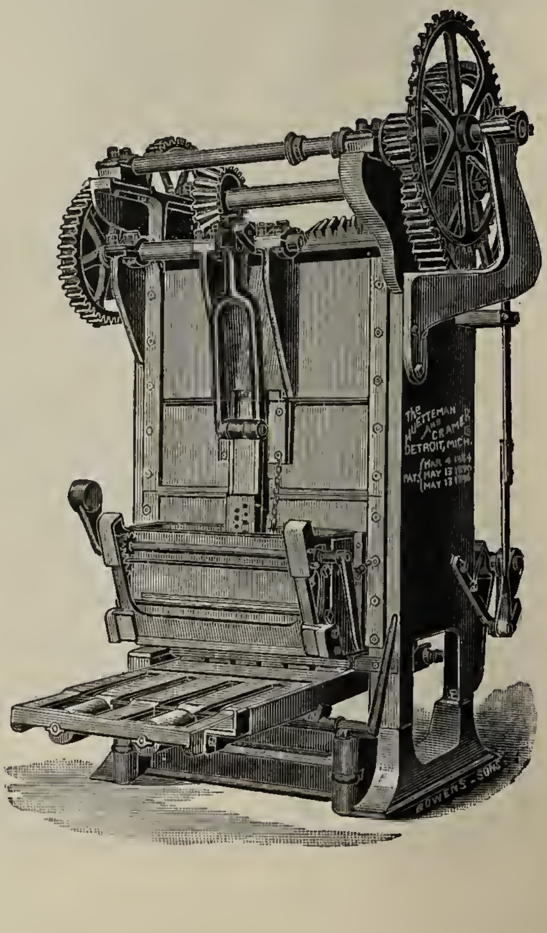
Write for Catalogue . .
. . . and Prices to

The Huetteman
& Cramer Co.,

Manufacturers of the Duplex Brick Machine and general outfit for brickyards,

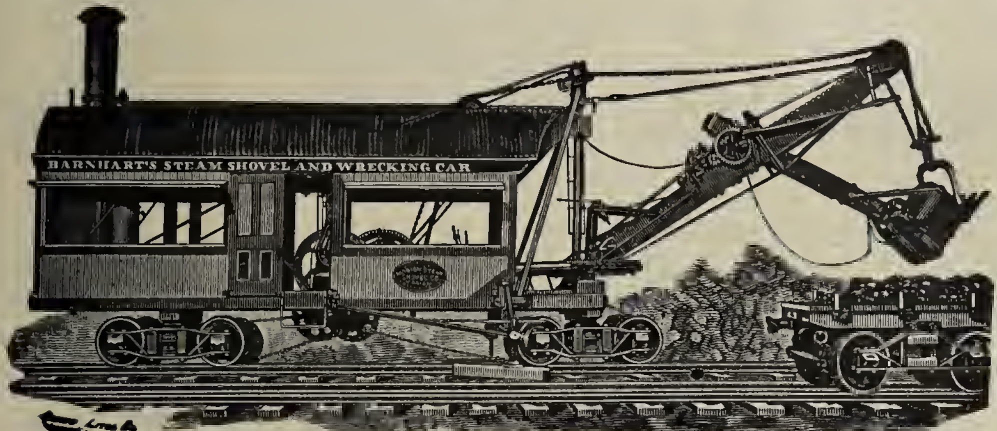
12, 14 & 16 Sherman St.,

DETROIT, -- MICH.



Steam Shovels for Brickyards.

OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

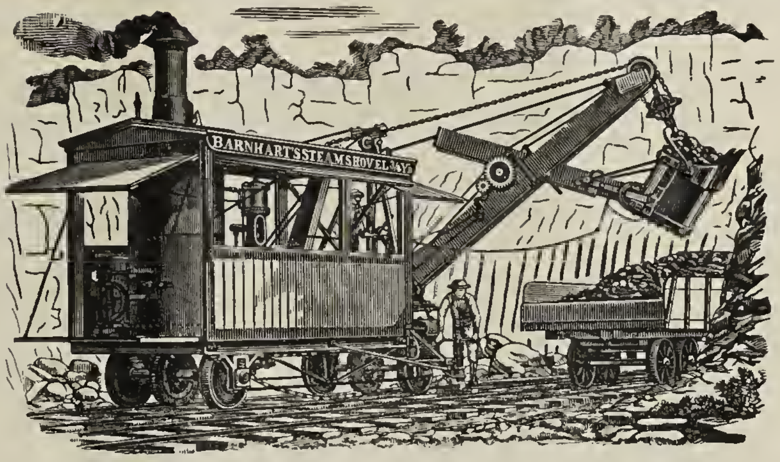
STYLE A—1½ YD.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

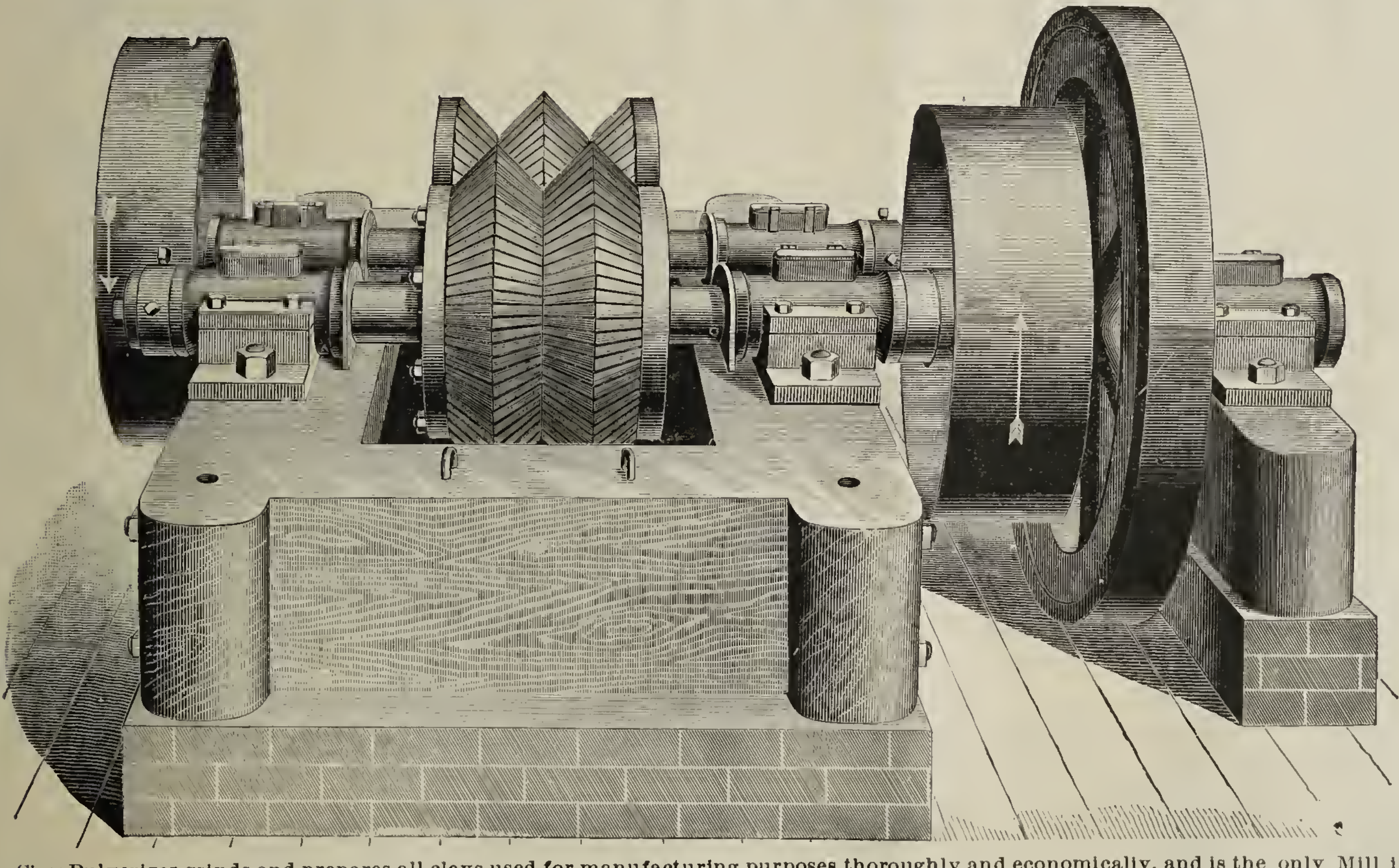
603 West Center Street, - **MARION, OHIO.**



STYLE C—¾ YD.

NEWELL IMPROVED CLAY PULVERIZER

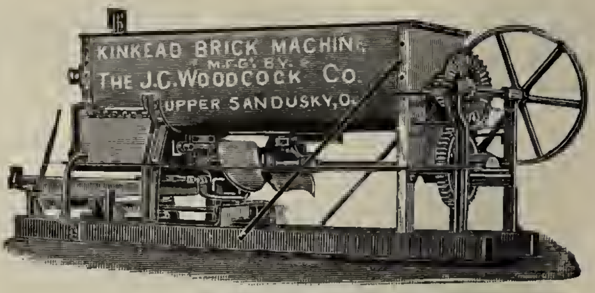
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
26 Cortland and 21 Dey Streets, **New York, U. S. A.**

A Good Brick Machine:

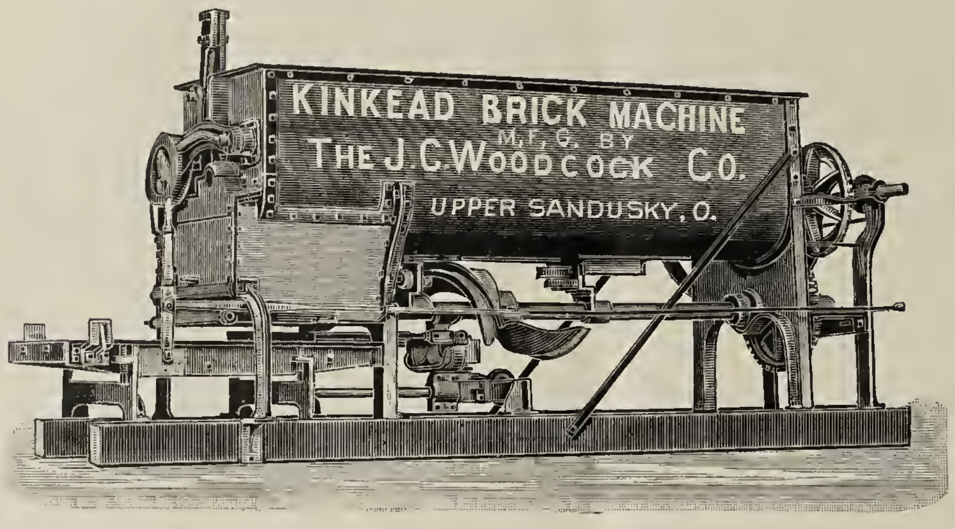

KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C.WOODCOCK CO.
UPPER SANDUSKY, O.

Rear View.

One that's Strong enough to withstand the severe strain of working stiff clay.

One that's Durable and will not only make good brick under favorable conditions but will make good brick under the varying conditions incident to brickyard work.

One that's Cheap because it is simple in construction and never breaks down or gets out of repairs but will turn out a desired quantity (30 to 50 M) every day, six days in the week is well nigh "worth its weight in gold." **We** offer it to you at a much lower price and also a line of excellent.


KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C.WOODCOCK CO.
UPPER SANDUSKY, O.

Front View.

Brickyard Supplies:==

Brick Moulds, Trucks and Barrows, Elevators, Pug Mills, Etc.

All warranted to be first-class and on reasonable terms.

Dont fail to get our prices.

The J. C. WOODCOCK CO.,
Upper Sandusky, Ohio.

LEVIATHAN BELT.

"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

Zanesville, Ohio, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

Gentlemen:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. Burton, Secretary and Treasurer.

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

248 Randolph St., CHICAGO, ILL.

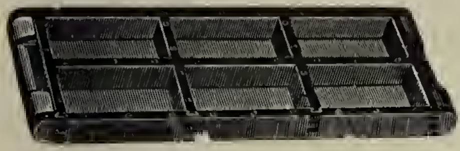
PHILADELPHIA:
1219 Carpenter Street.

BOSTON:
120 Pearl Street.

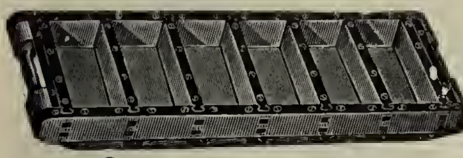
ARNOLD'S BRICKYARD SUPPLIES.

••They are the BEST that are Made.••

3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

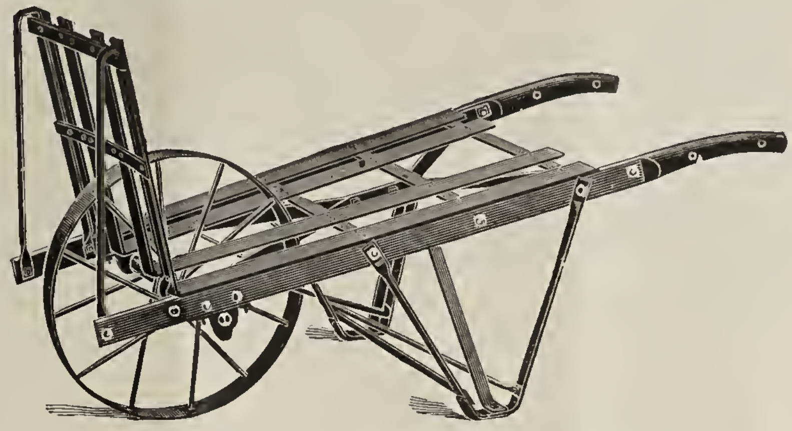
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

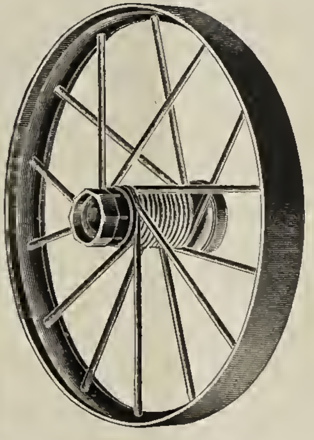
All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.





METAL WAGON WHEELS

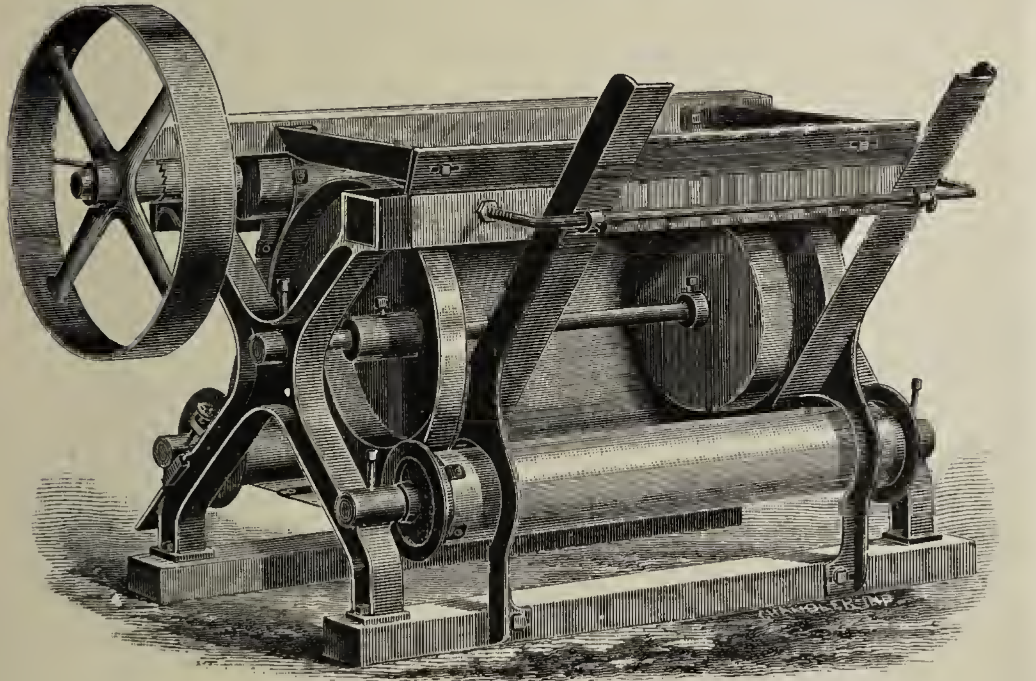
MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The **strongest** wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced.

Circular and prices sent on application. Address

The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

The Potts Mould Sander

No Chains nor Gear to Wear or Break.



No place for moulds to catch and cause delays.

Simple in construction, strong and durable.

Sands mould better than can be done by any other means, easily and quickly changed to suit any size mould.

Write for prices.

G. & A. POTTS & CO.,

420-428 West Washington Street, (See ad. on pages 395 and 409.) *INDIANAPOLIS, IND.*

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

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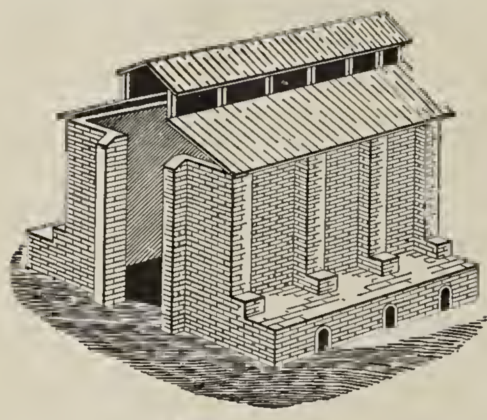
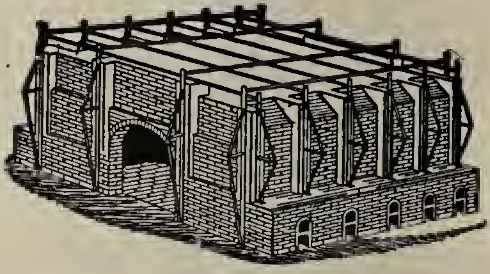
For Burning all Kinds of Wares.



Up-Draft Kiln.



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Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

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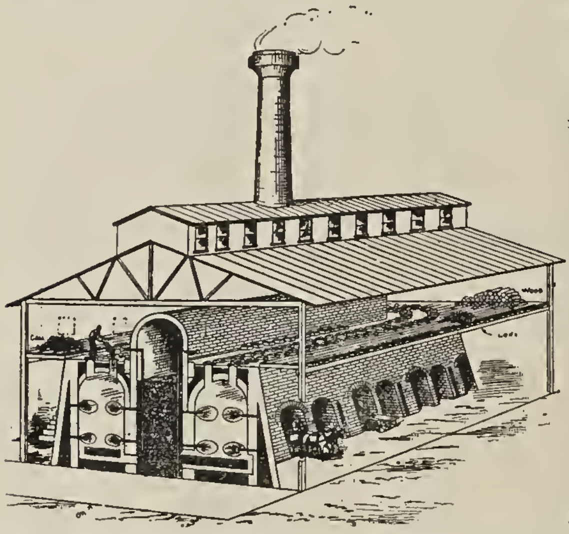

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.
No soft or Salmon brick.
No yards or sheds needed.

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Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Wheeler. Mailed free on receipt of price, $1.00.

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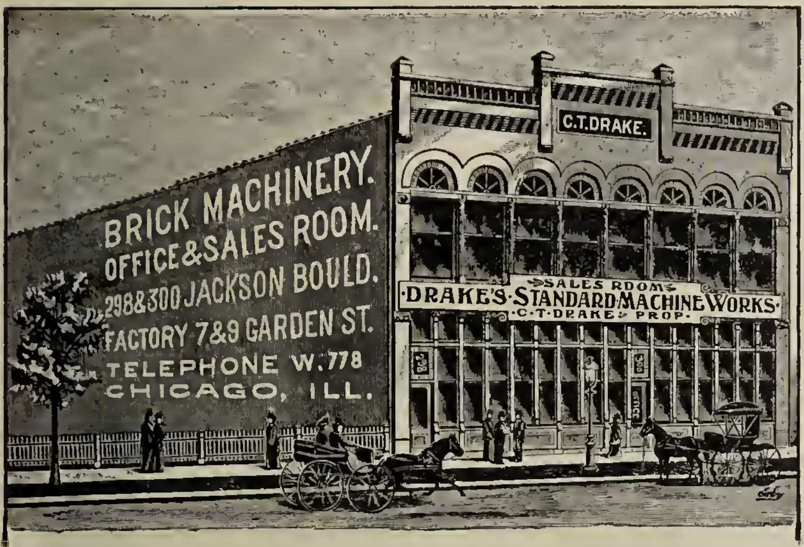
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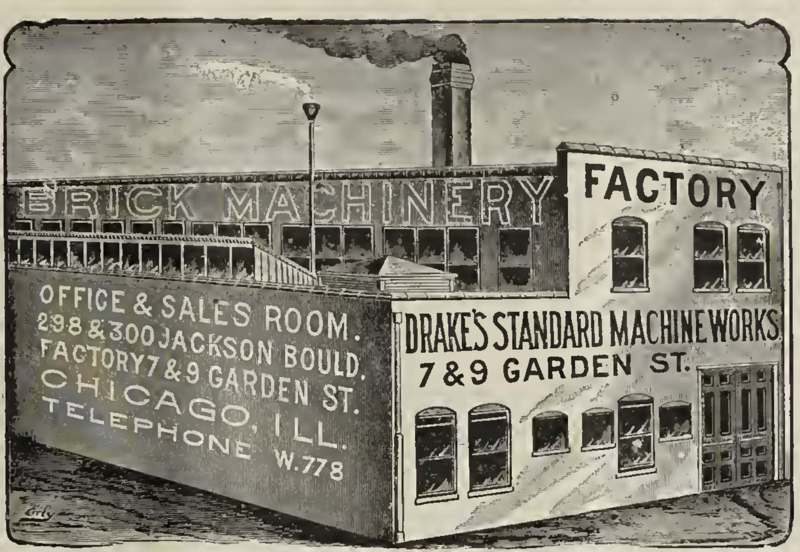
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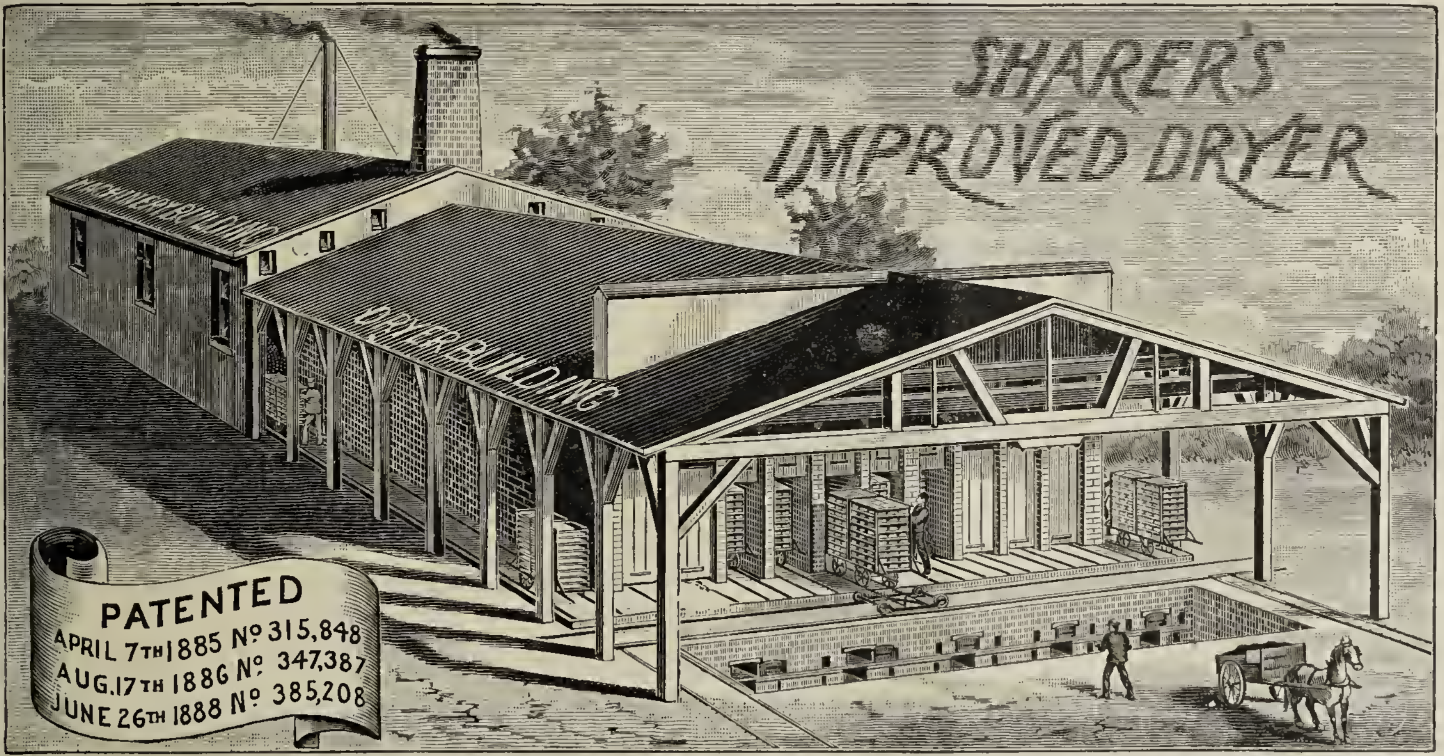
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COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address **GEO. W. SHARER,** 2224 Tioga St., **Philadelphia, Pa.**

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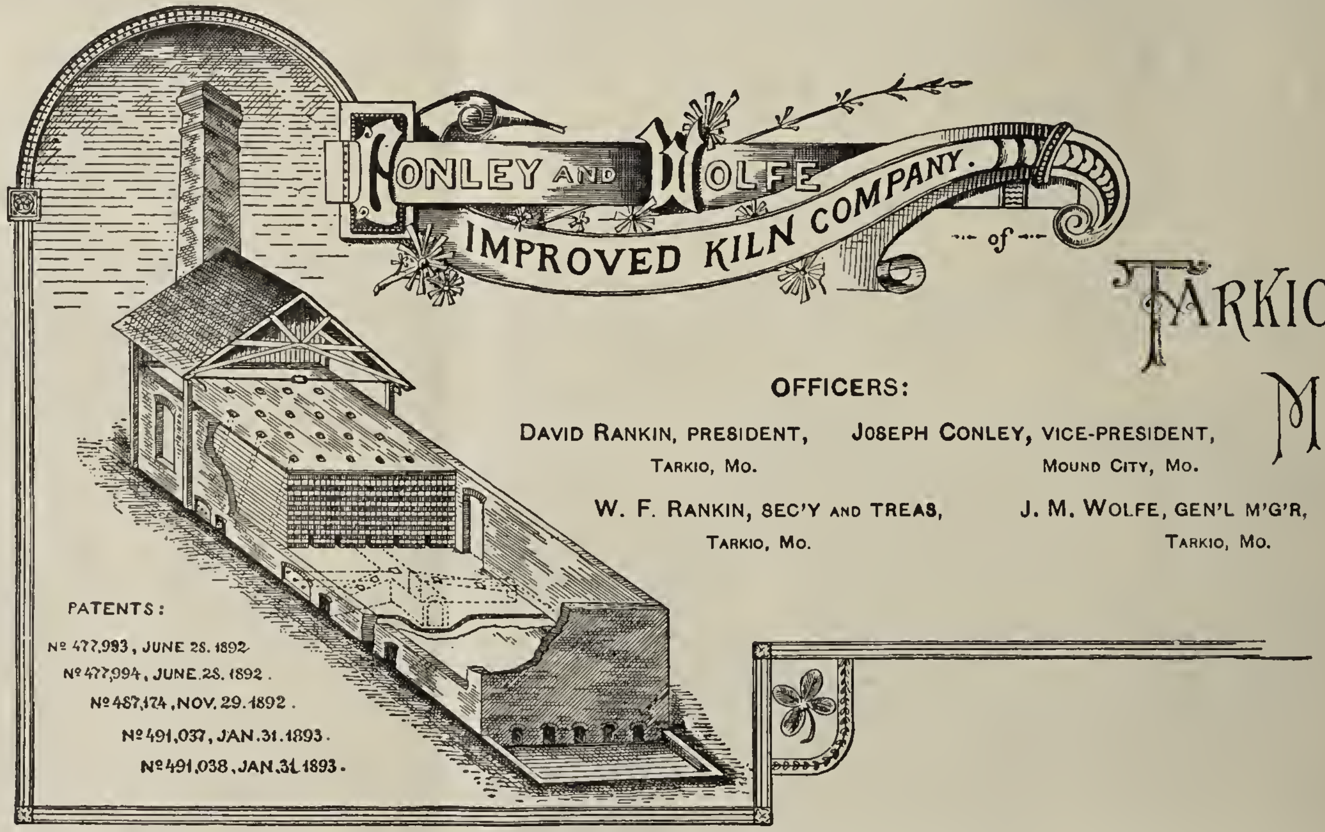

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PATENTS:

No 477,993, JUNE 28. 1892.

No 477,994, JUNE 28. 1892.

No 487,174, NOV. 29. 1892.

No 491,037, JAN. 31. 1893.

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THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

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WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost.

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Morrison's Latest Improved Kilns.

Price, $85.

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NONE BETTER AT ANY PRICE.

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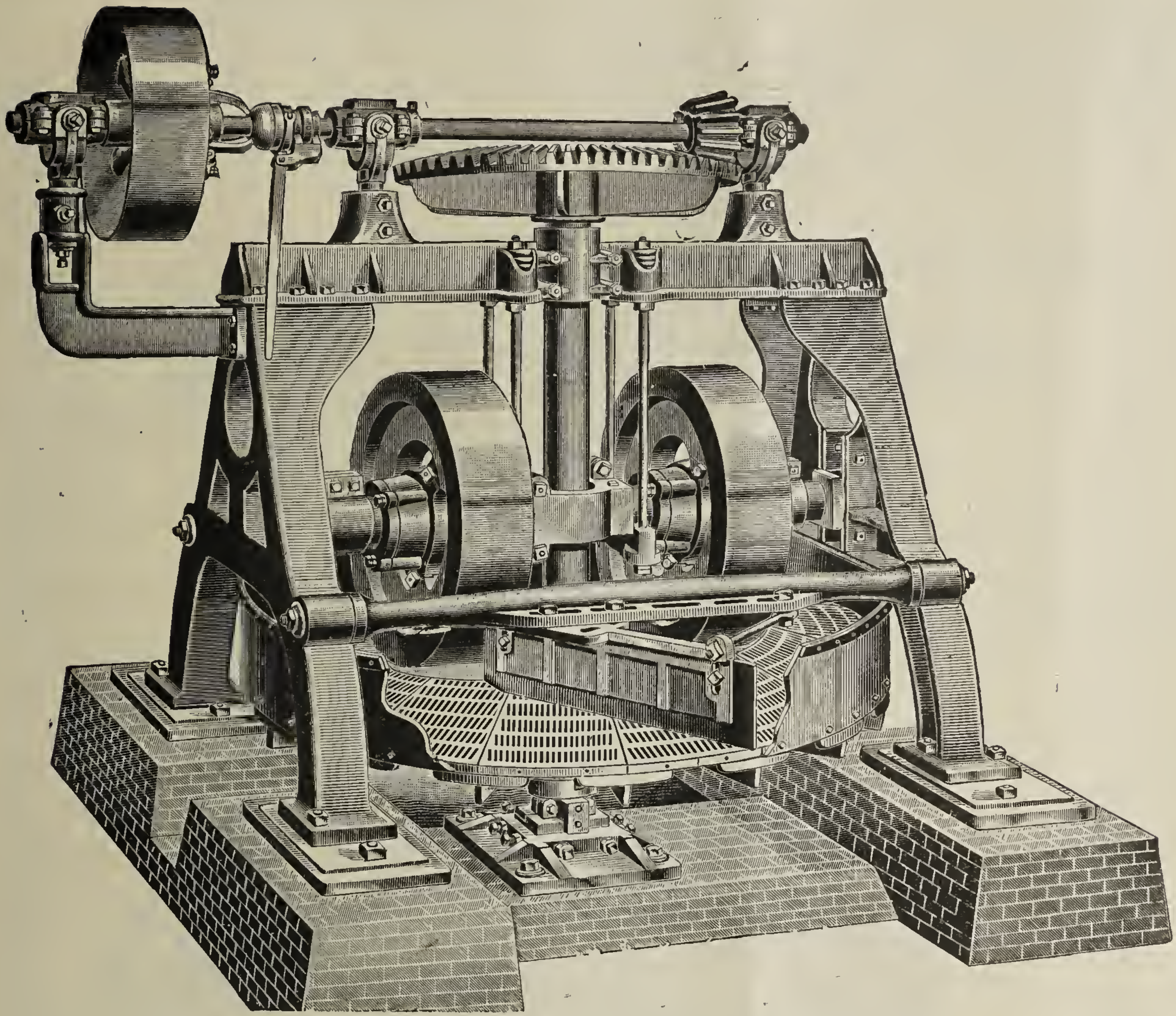

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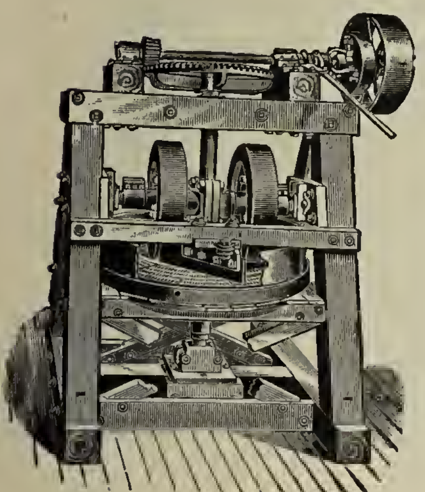

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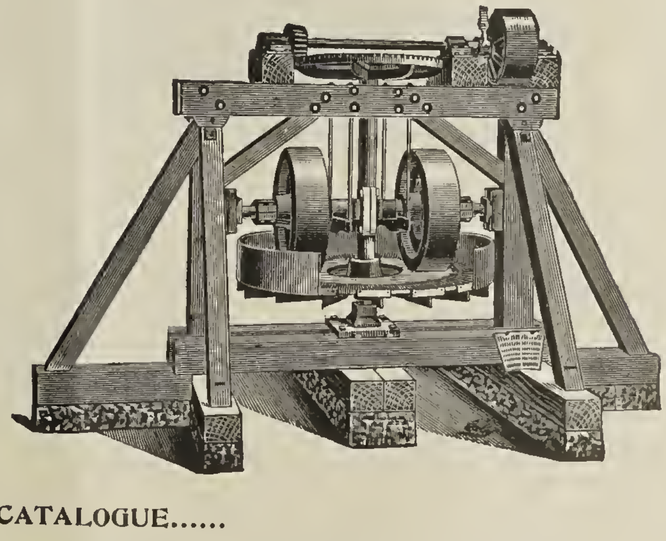

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A BRICK-MACHINE that has never made a failure.

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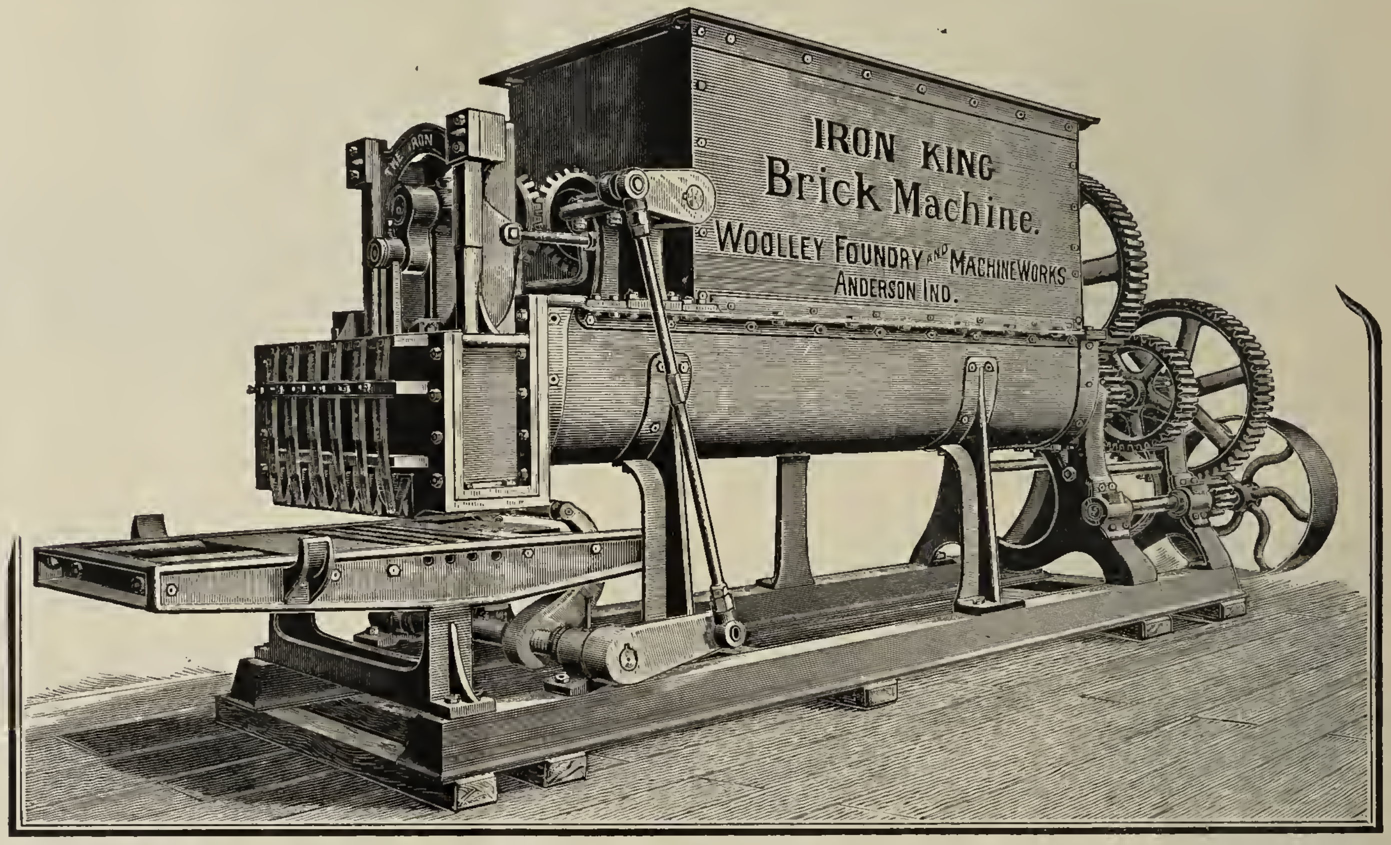
All of these Machines have proven themselves equal to any and Superior to most on the Market.



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For Potteries and Encaustic Tile Works.

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Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

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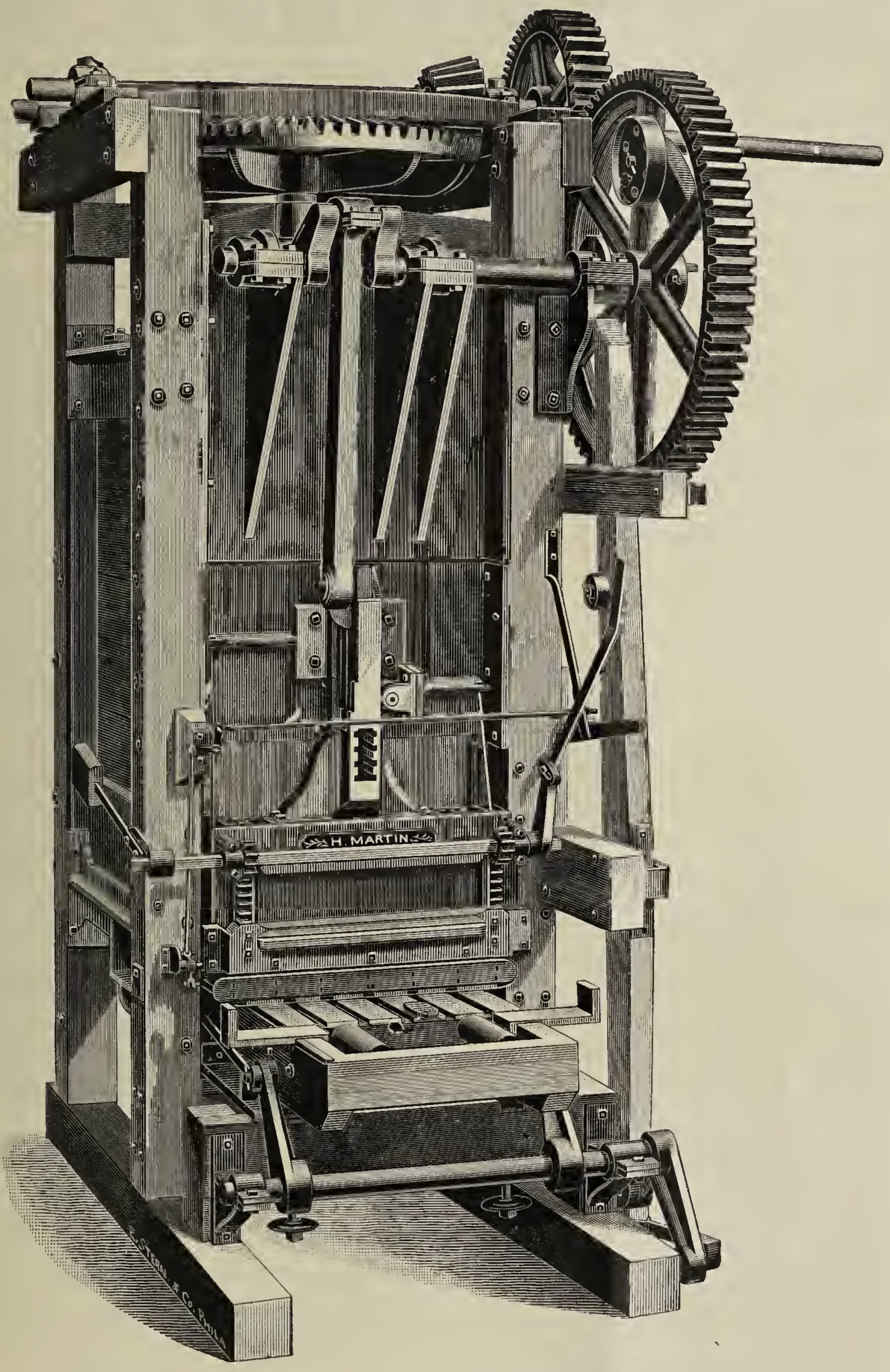

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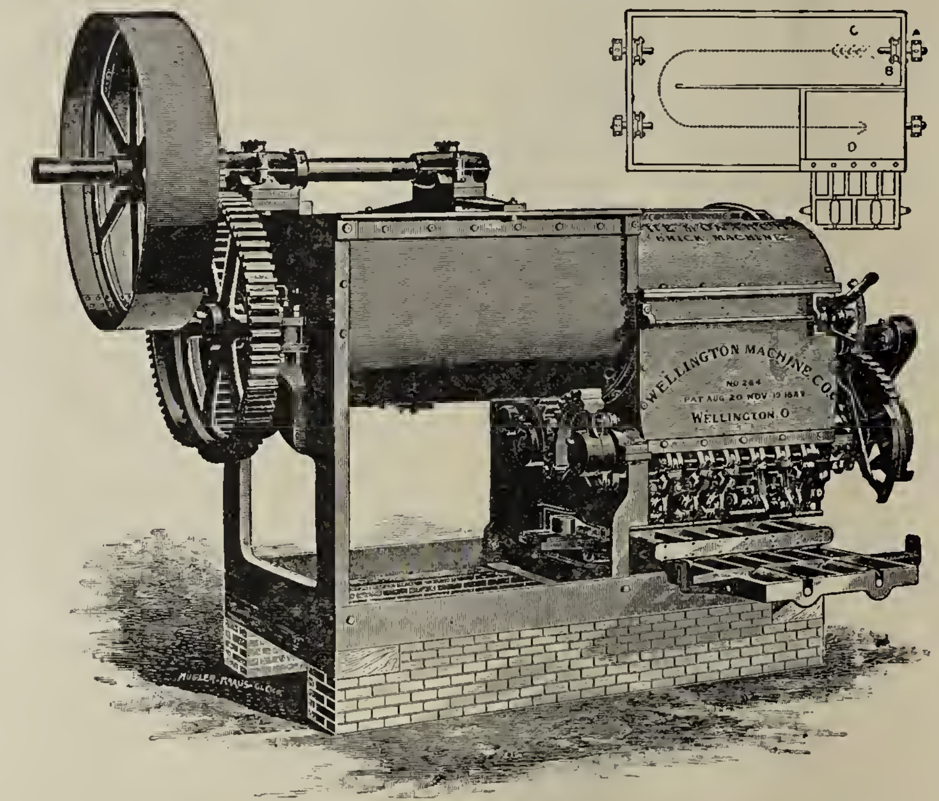
—From any other Brick Machine, and there are reasons for it. Sixty users (see last three months of the CLAY-WORKER) say they **are good Reasons.**

You don't want to buy a machine until you know all there is to be learned on the subject. So if you do not **Realize the Great Difference** between this machine and others, our circular gives full particulars.



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THE DIFFERENCE IS NOT ONLY IN CONSTRUCTION, BUT IN RESULTS ALSO.

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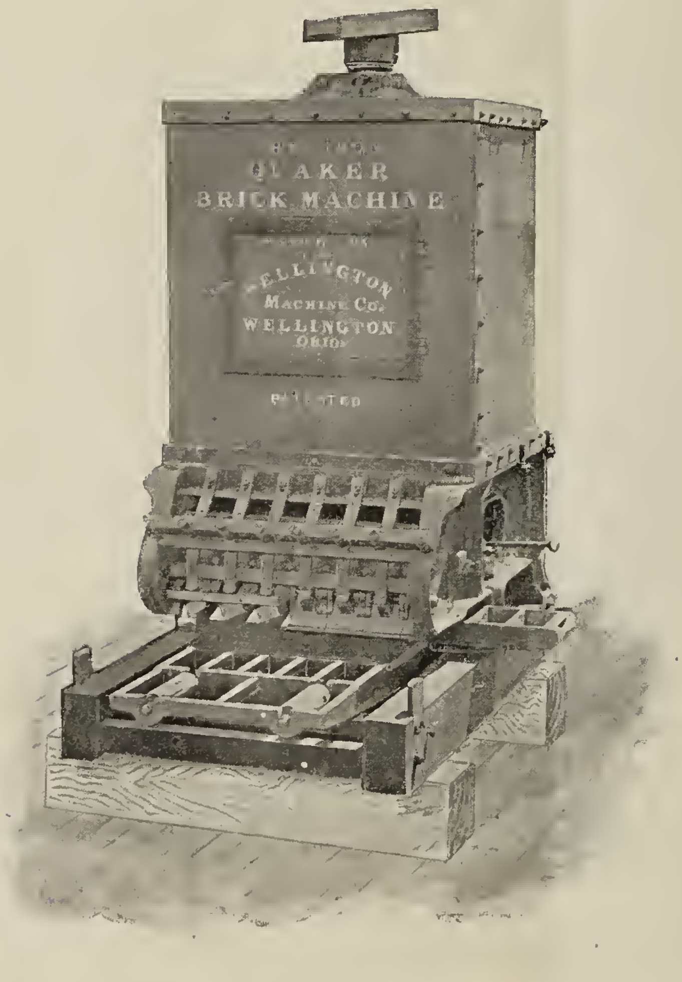

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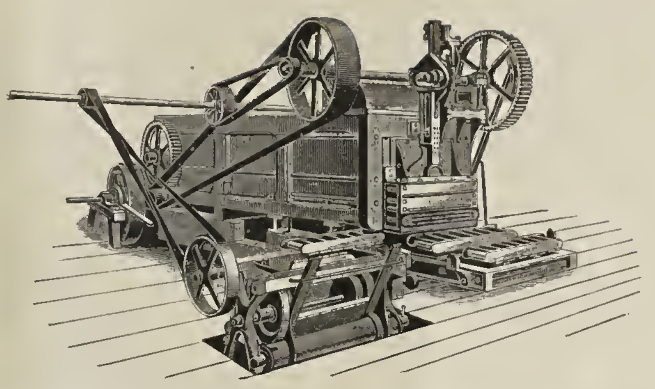

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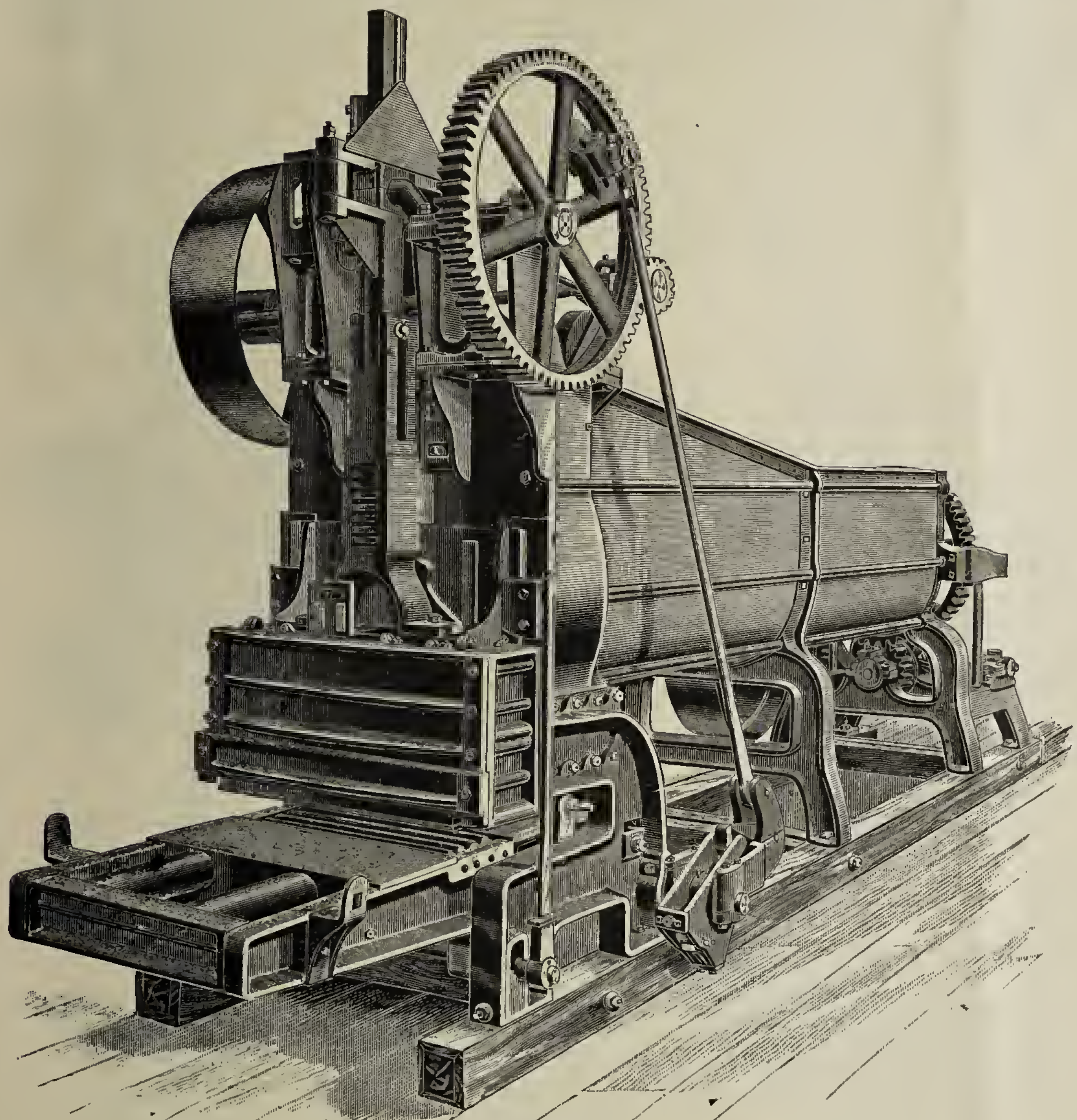
ARE RECORD BREAKERS.



Simple in

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STRONG and

DURABLE.

For quantity and quality of Brick made they have no equal.

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Made in two styles, either all Iron, or Wood Pug Mills.

They are the cheapest, all things taken in consideration.

We manufacture everything used on the brickyard. **Moulds, Trucks, Barrows, Kiln Castings, Elevators, Pulleys and Shafting.** Write for prices. You will find them low.

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Write for Interior View
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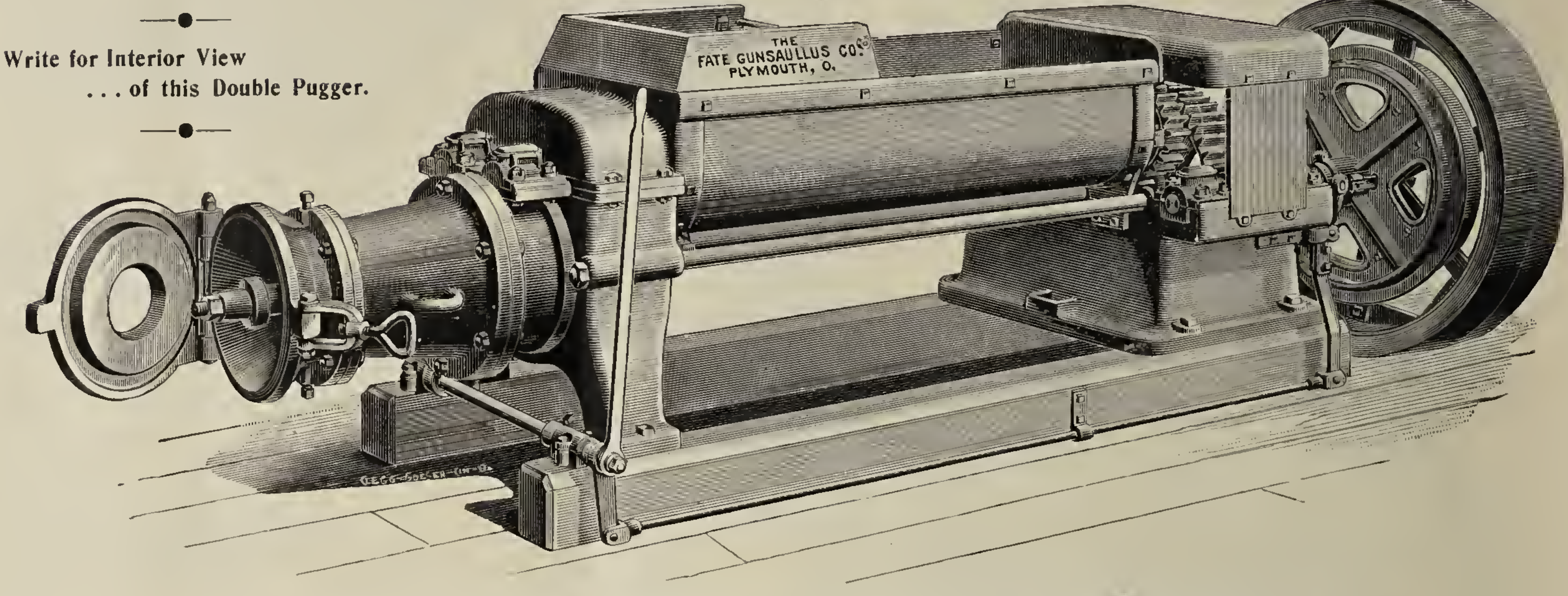
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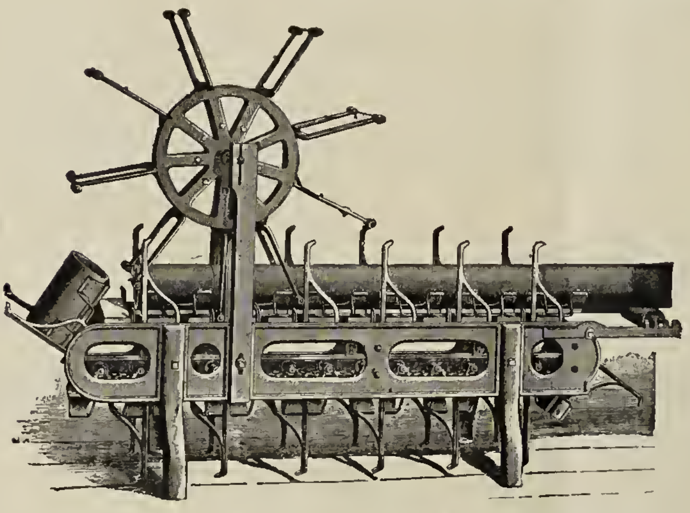
The "HUMMER" Combined Pug Mill, Brick and Tile Machine.



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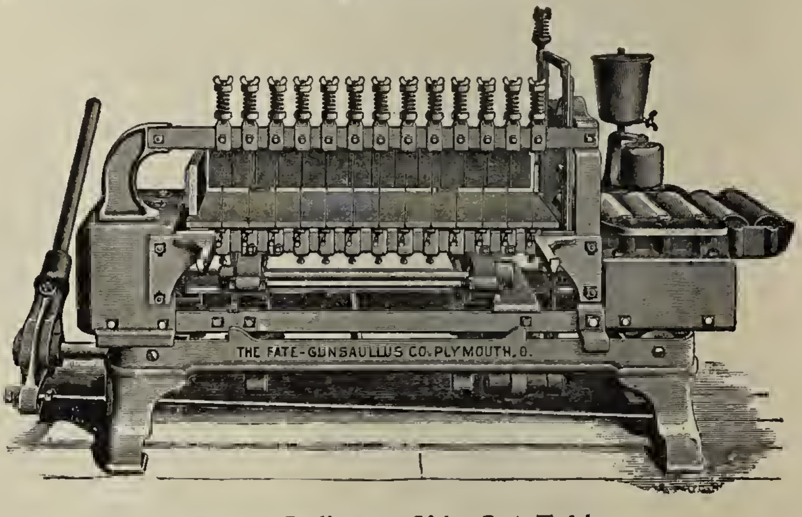
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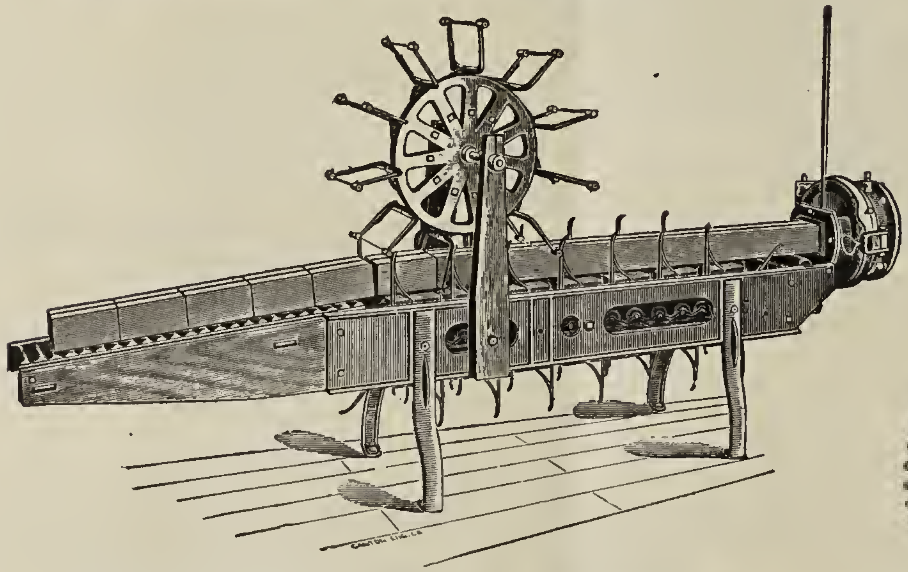

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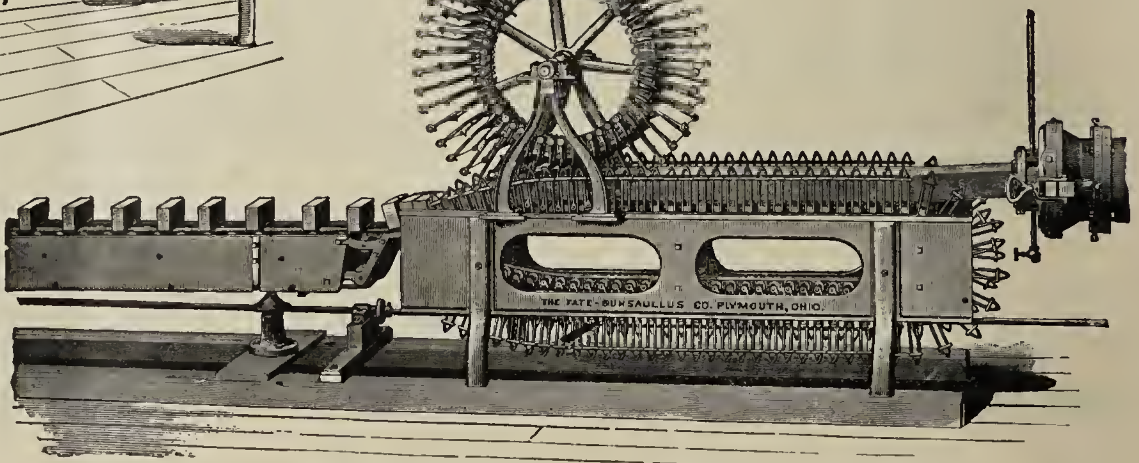
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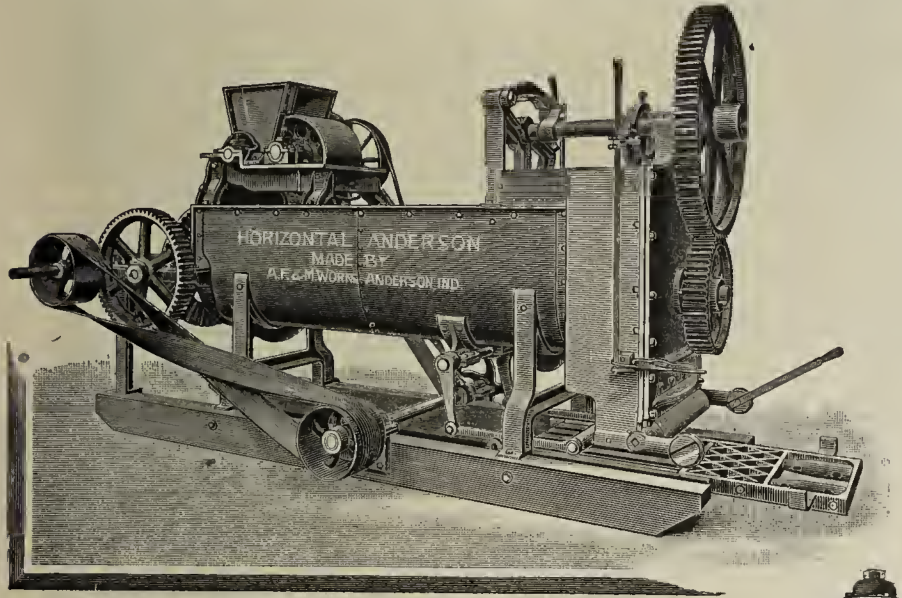
OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.



This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.

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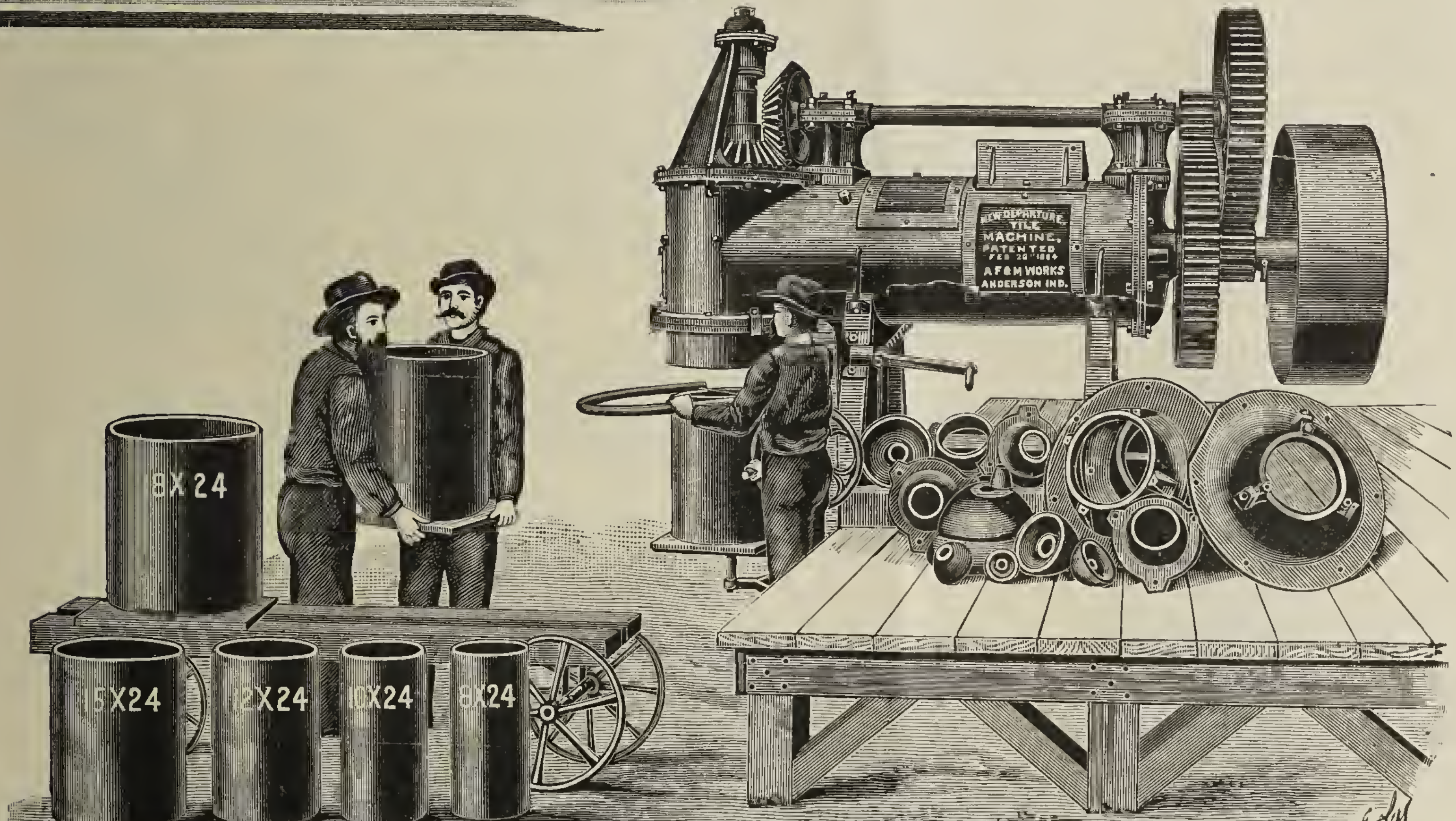

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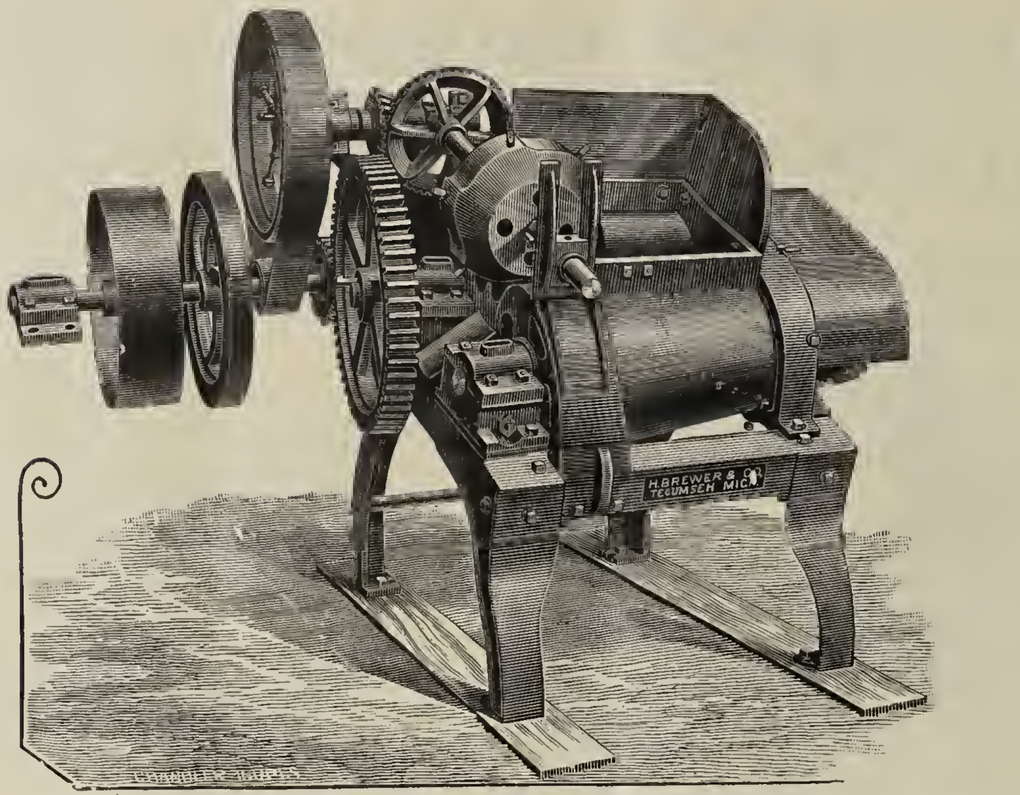
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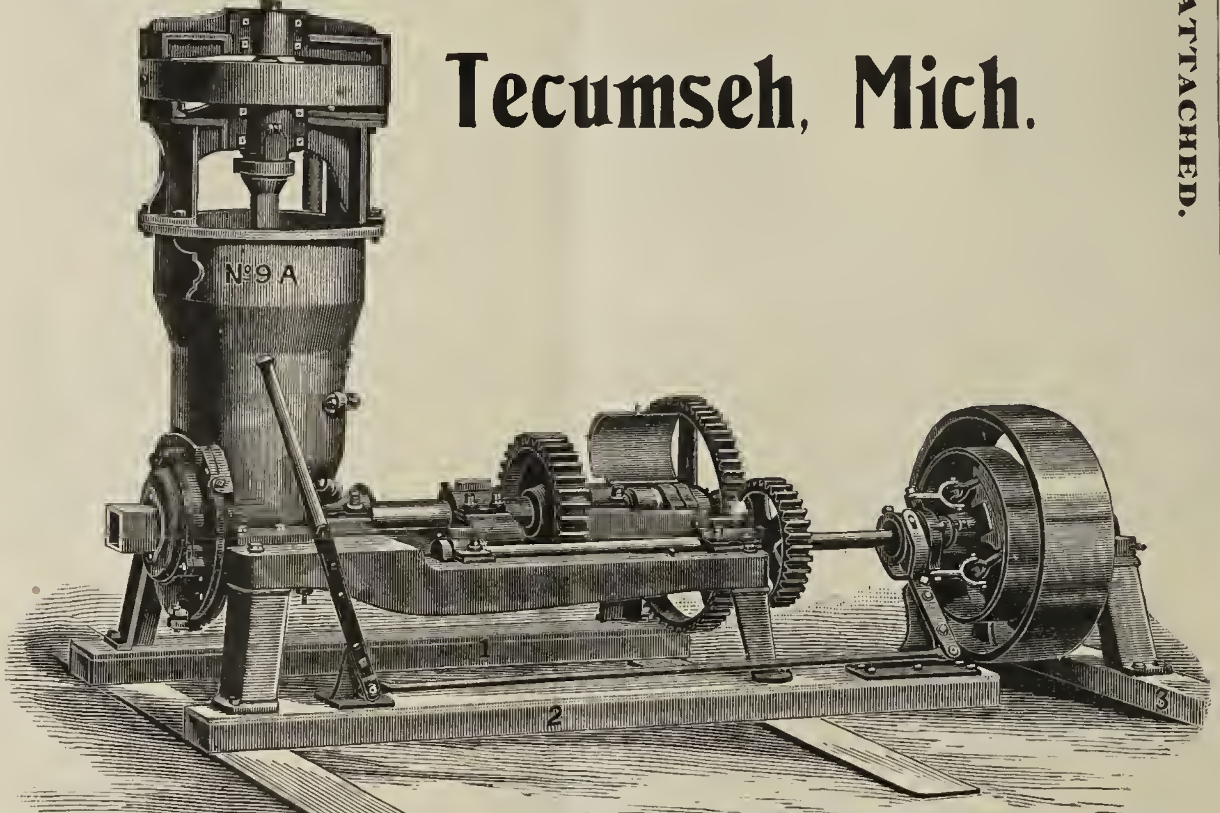
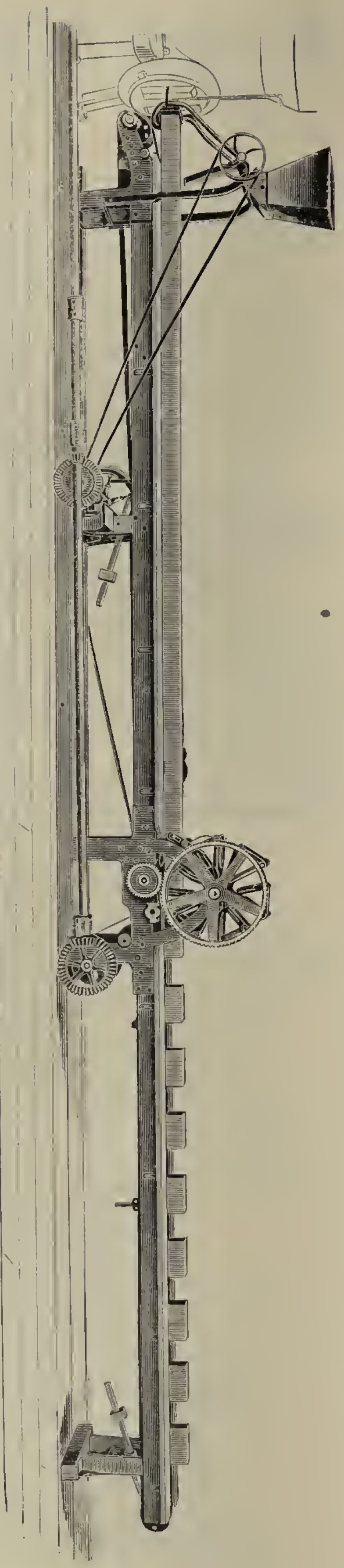


No. 9 "A" BRICK MACHINE.



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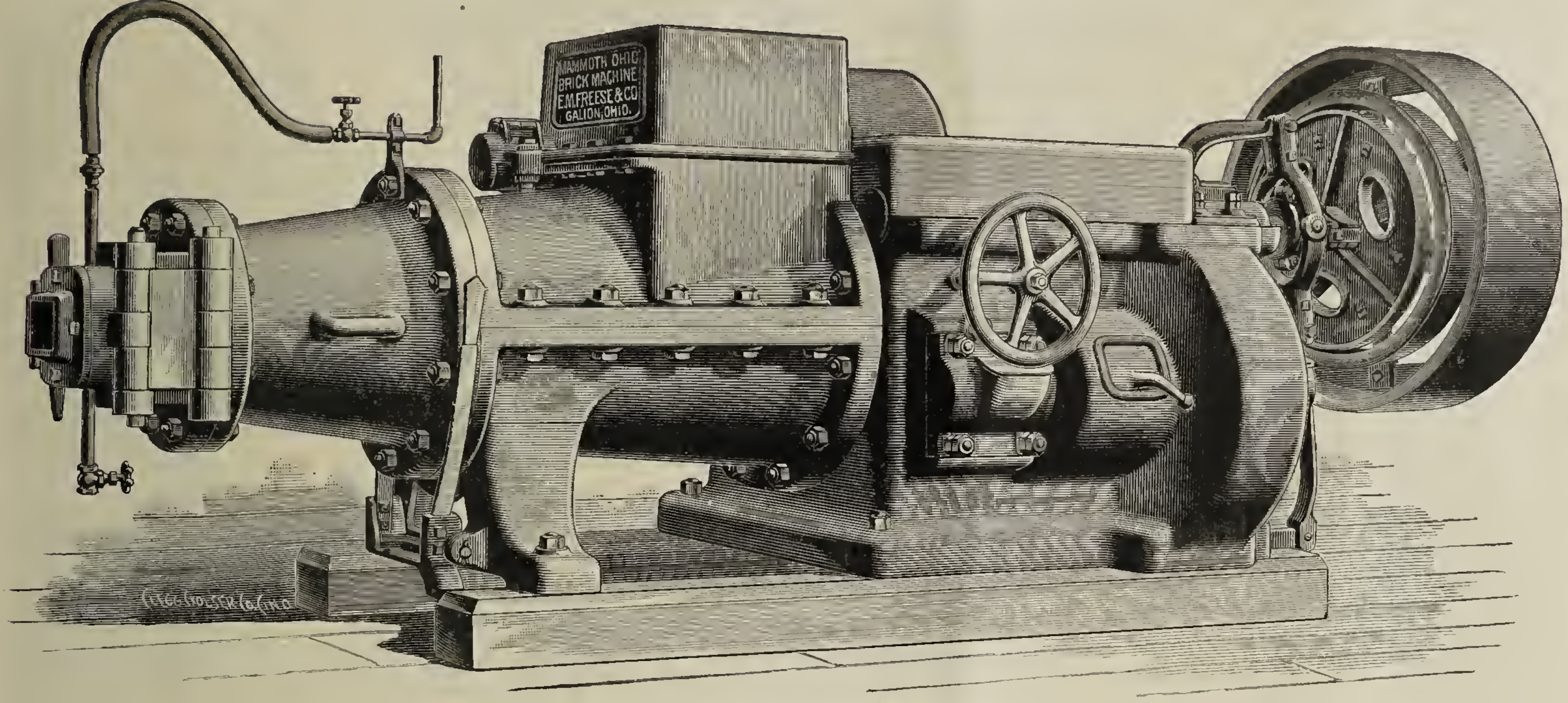
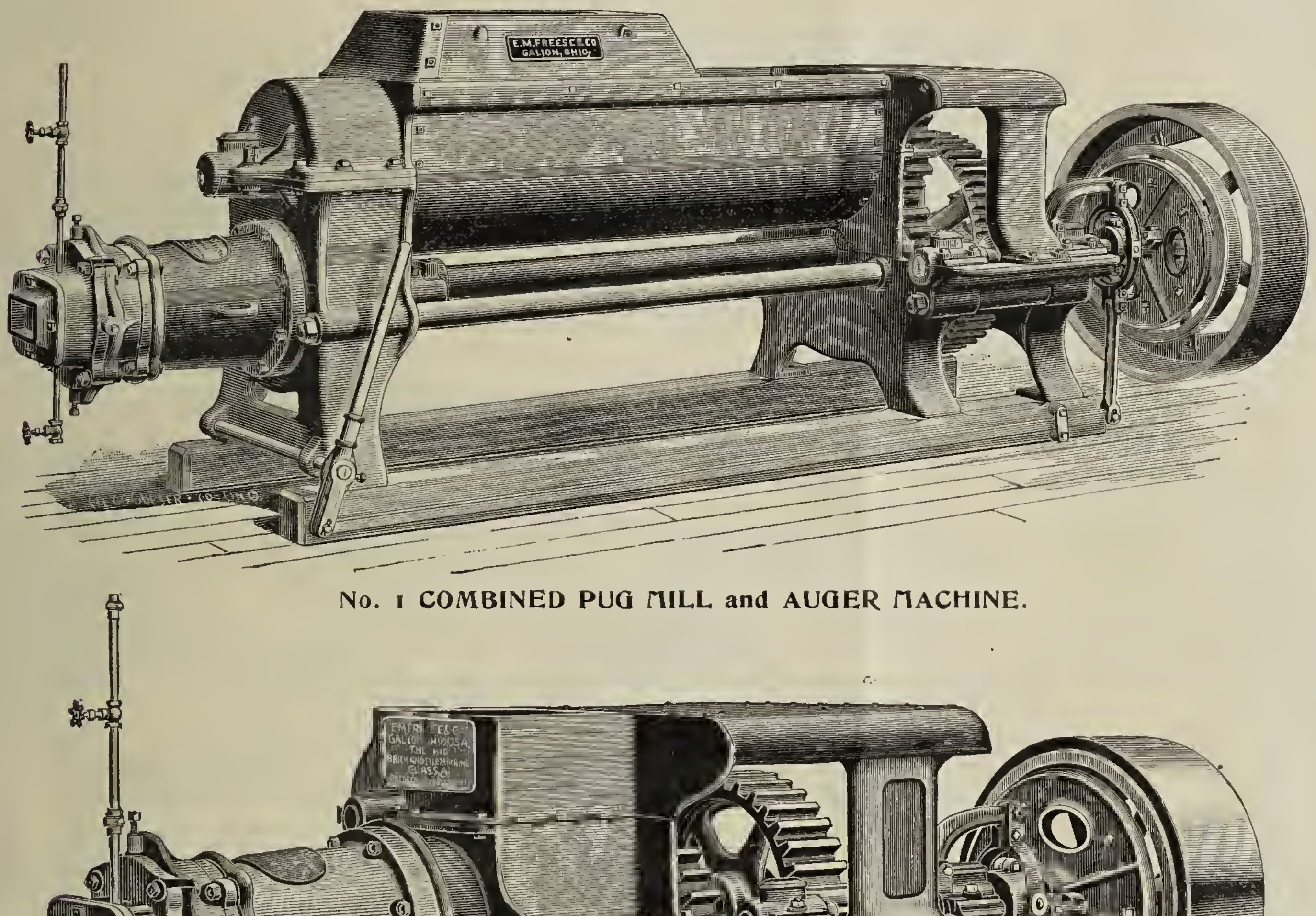


MAMMOTH BRICK MACHINE.



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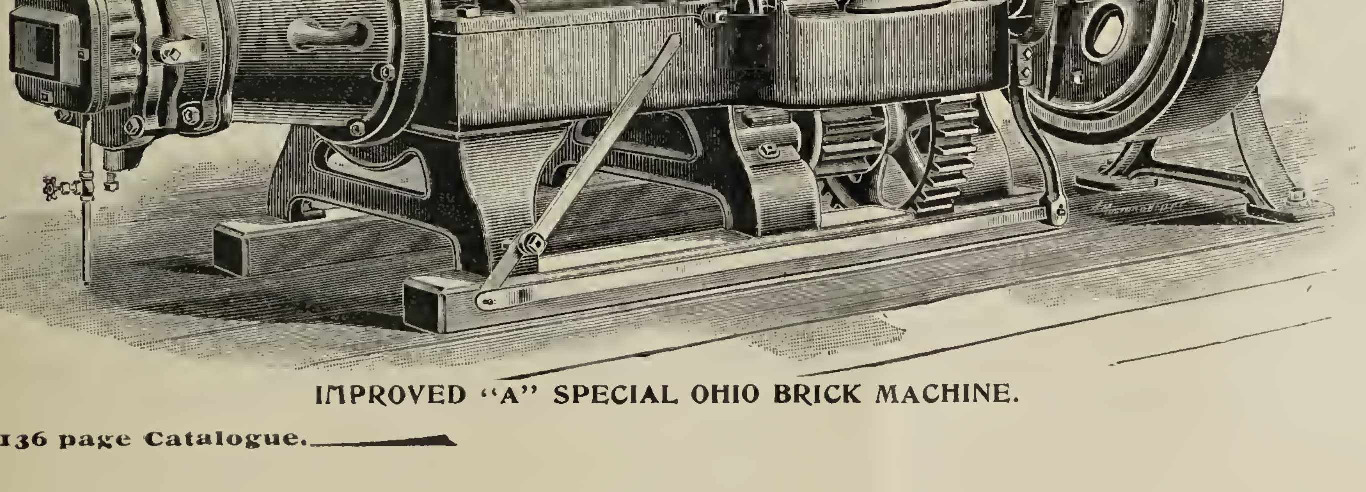

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Send for 136 page Catalogue.

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The Universal Continuous Kiln.

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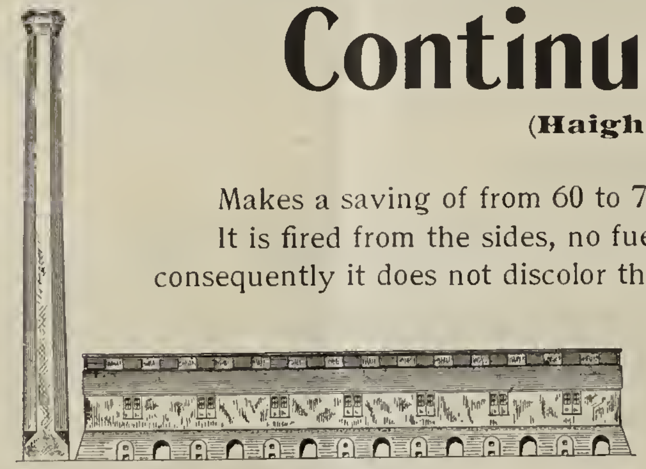

Makes a saving of from 60 to 75 per cent. in the cost of fuel. It is fired from the sides, no fuel being fed among the brick, consequently it does not discolor the ware.

It burns successfully not only common brick but also paving brick, fire brick, pressed brick and hollow ware.

It combines the economy of continuous systems, with the convenience and efficiency of ordinary down-draft or up-draft kilns, and with equal adaptability for handling successfully a wide range of products.

It will pay you to investigate it.

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Designers and Equippers of Complete Brickmaking Plants,
Including Drying and Burning Systems.

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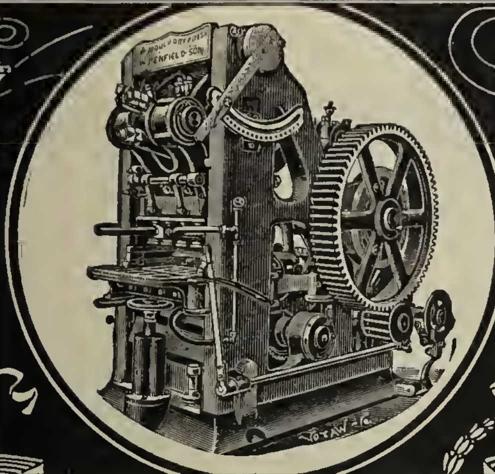

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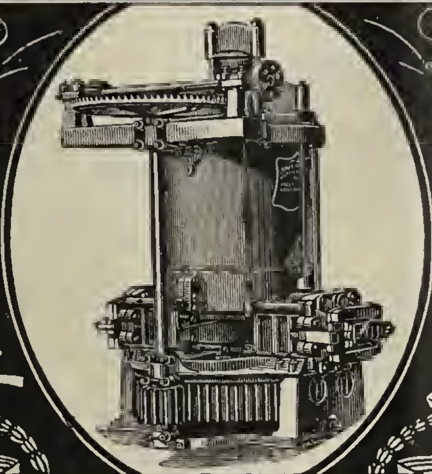
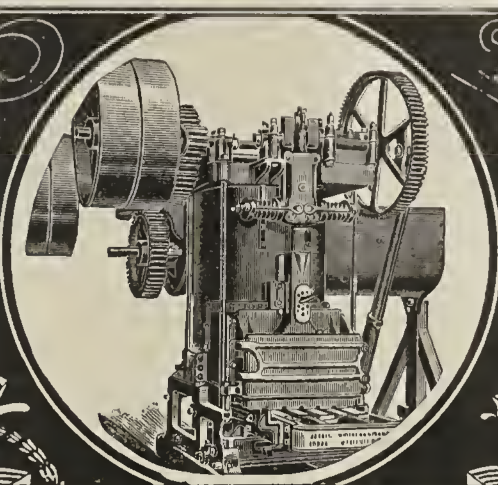


PLUNGER BRICK MACHINES



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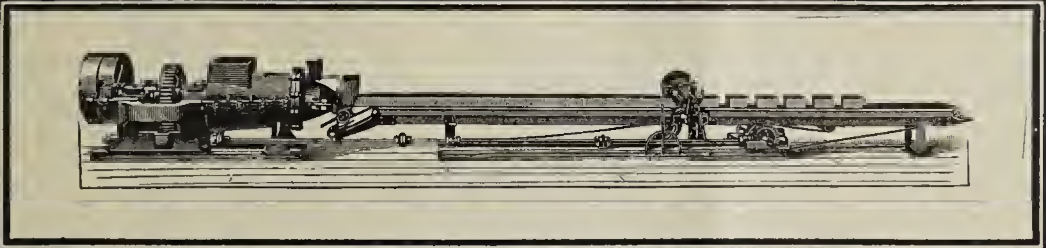
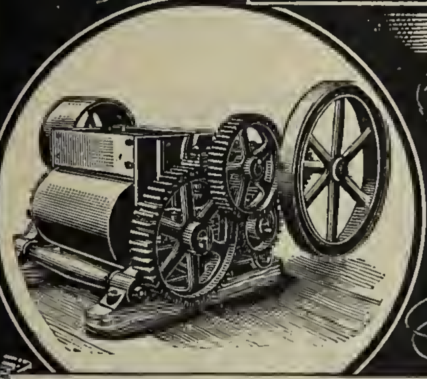


AUGER BRICK MACHINES



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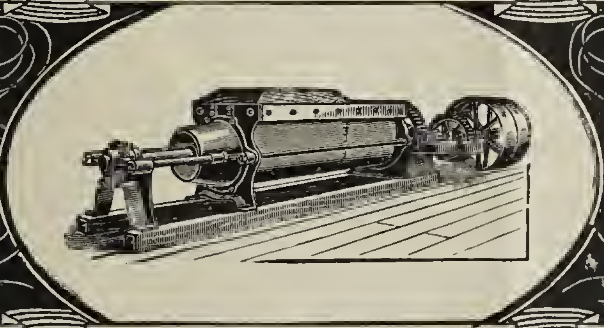

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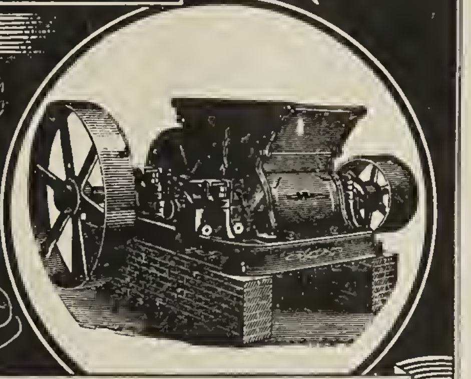

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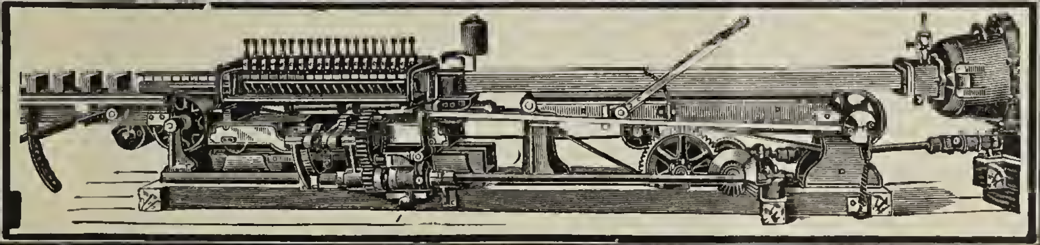

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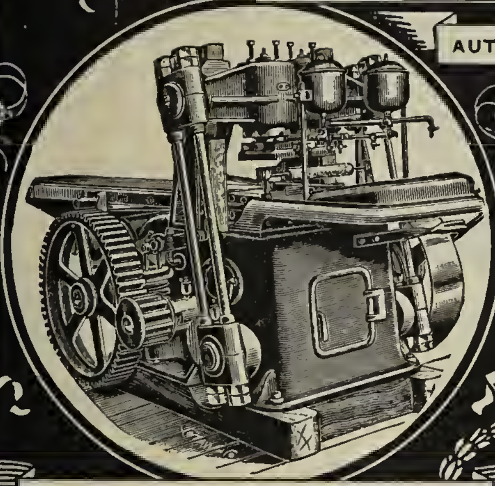

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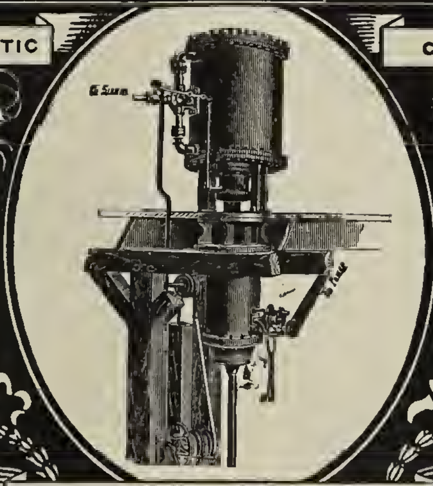

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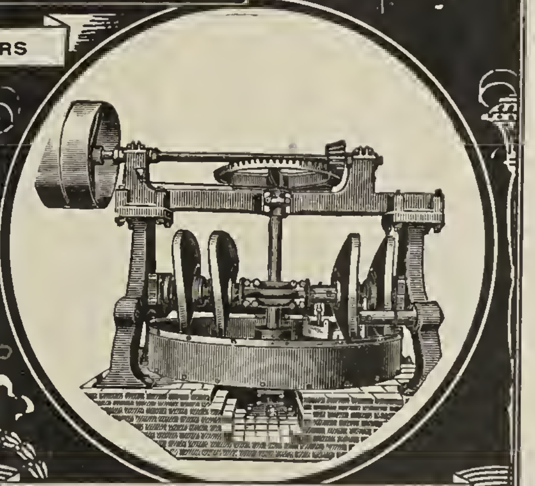

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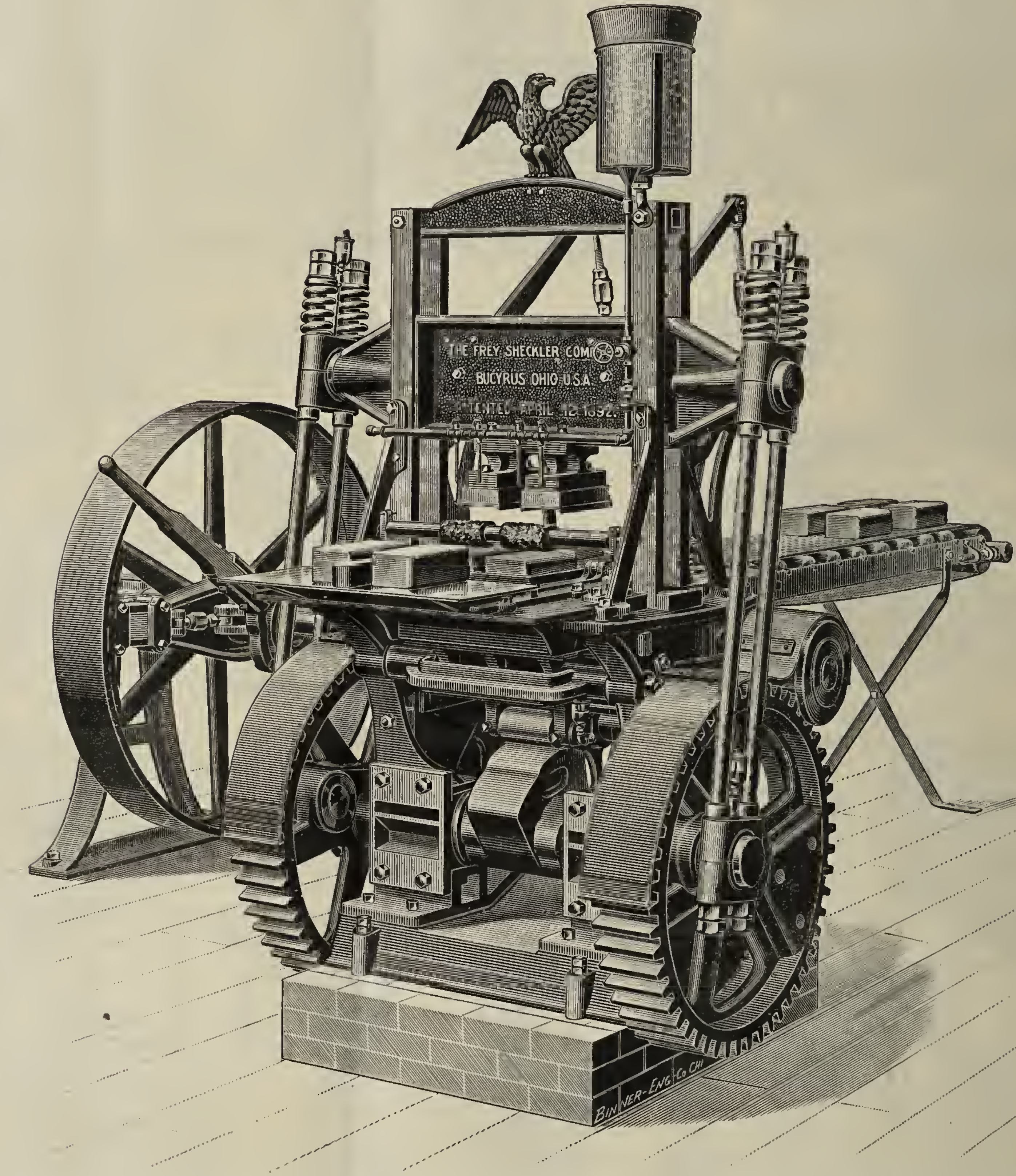
J. W. PENFIELD & SON, WILLOUGHBY, O. U·S·A·

Purington HAS TRIED AND APPROVED The Eagle Repress.



At Galesburg, Ill., The Purington Paving Brick Company worked the **EAGLE REPRESS** side by side with a Repress built by one of our neighbors. After constant trial for more than three months, please listen to what Mr. Purington says concerning it:

> "We are very much pleased with the Press, and have never as yet spent one cent on it since it was put in. Please ship the three Represses ordered from you."

Such encouraging words of approbation from one of the largest, most reputable and capable brick manufacturers in the world is a prize worth working for, and proves the standard quality of our Repress.

It will last four times as long as any other Repress, and will not cost one-tenth as much for repairs.

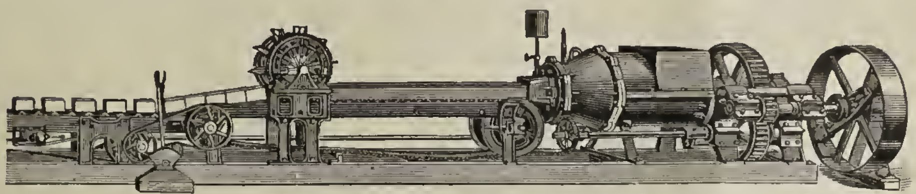
THE FREY-SHECKLER CO., - Bucyrus, Ohio, U. S. A.

Manufacturers of Clayworking Machinery, and Builders of the Bucyrus Steam Tunnel Dryer.

BRICK MACHINERY FOR 1896.

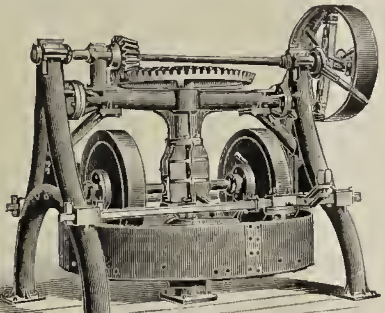
Write for
Catalogue.

Before Buying
Write for our Prices.

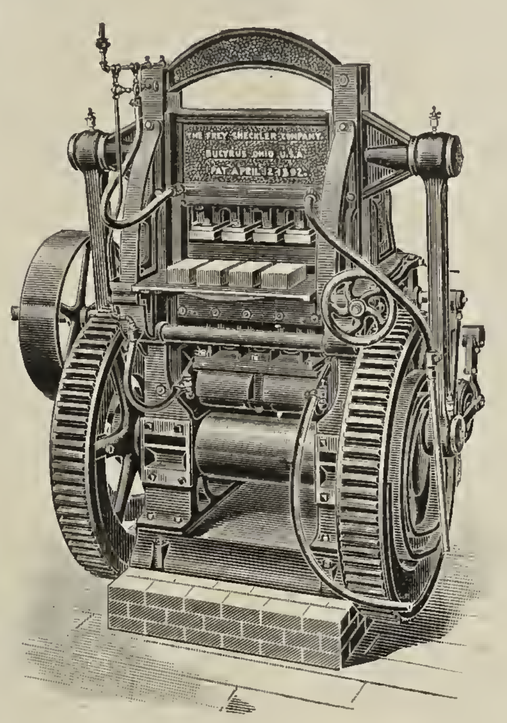


No. 1 Giant Machine and Automatic End Cut Table.

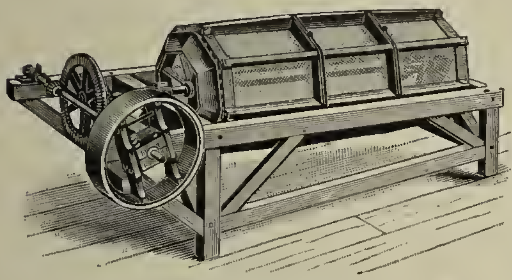
Pug Mills and Granulators.



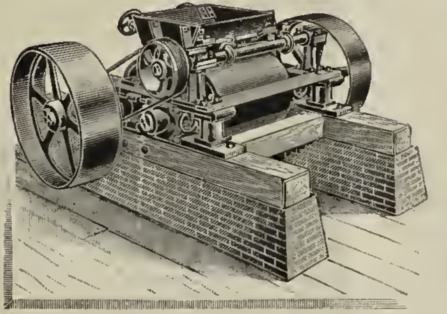
Dry and Wet Pans.



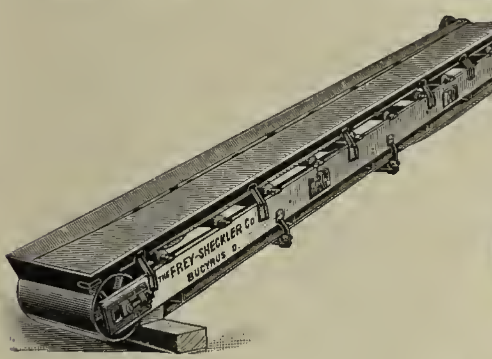
4-Mould Semi-Plastic Brick Press.



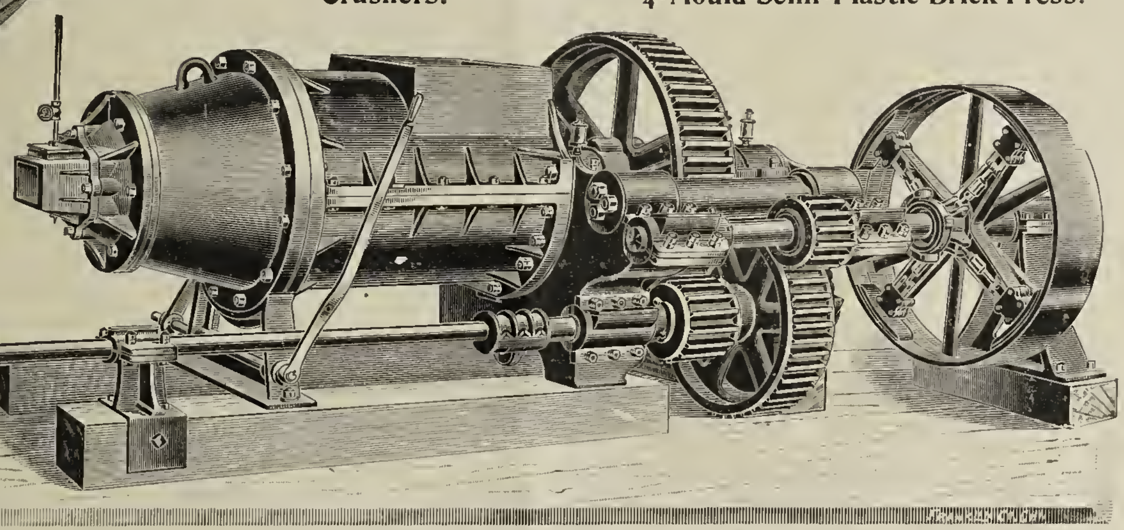
Clay Screens.



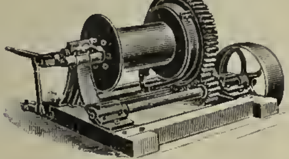
Crushers.



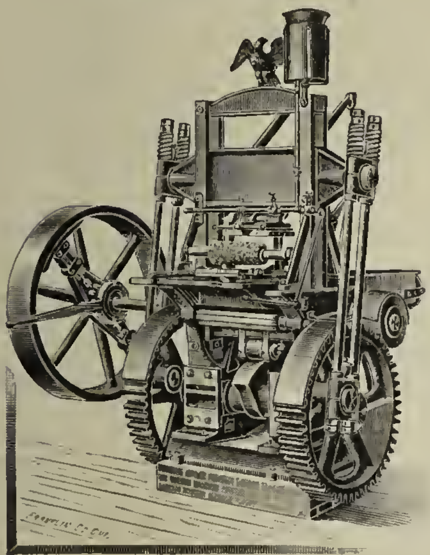
Clay Conveyors.



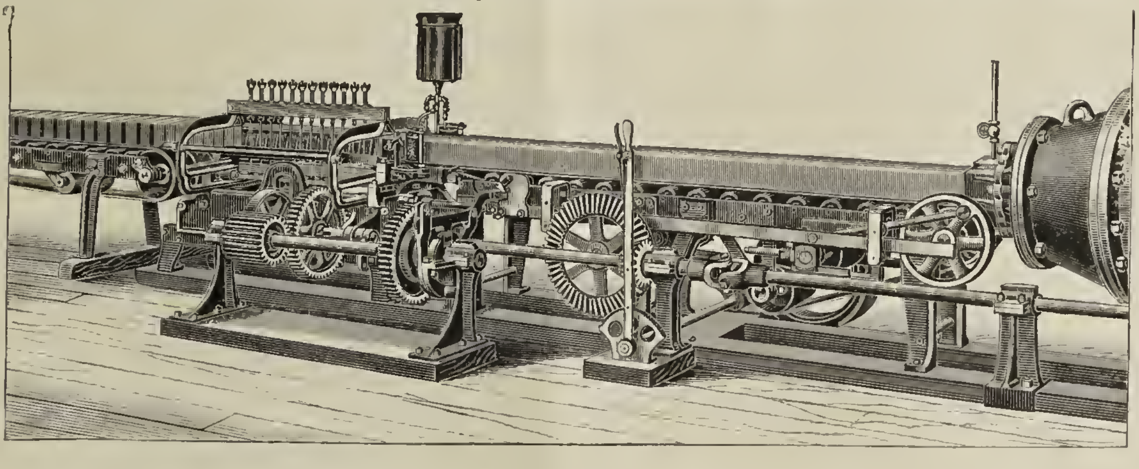
Special Bucyrus Giant Brick Machine.



Winding Drums.



Brick Re-Press.

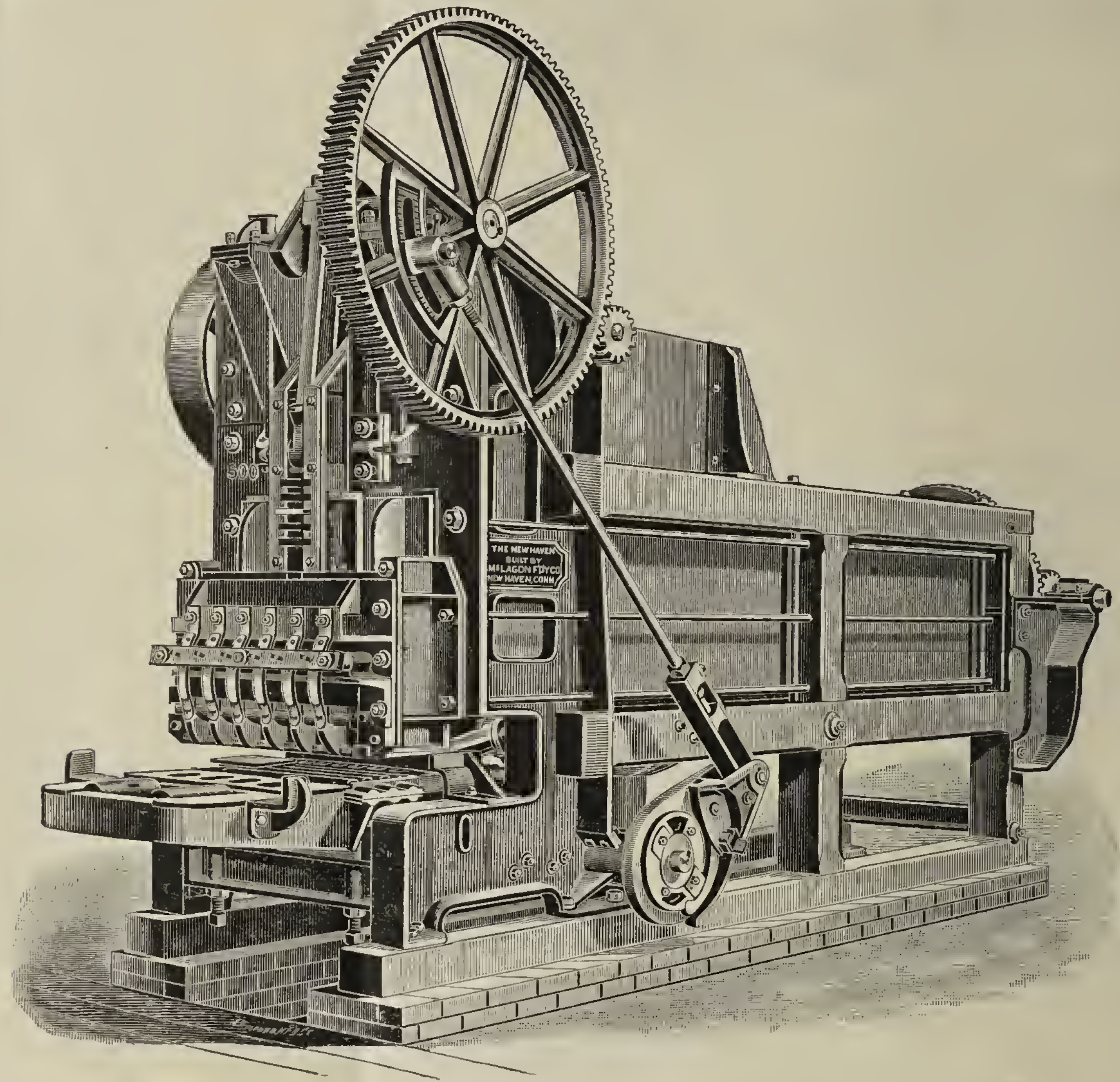


Bucyrus Automatic Table for Side Cut Brick.

The Frey-Sheckler Co., BUCYRUS,
OHIO, U. S. A.

More "New Haven" Brick Machines

Have been sold this season than in any previous year This has been the case every year during the past eight years, with one exception.



More than that: Every machine sold is now in successful operation with one exception. That exception was destroyed by fire.

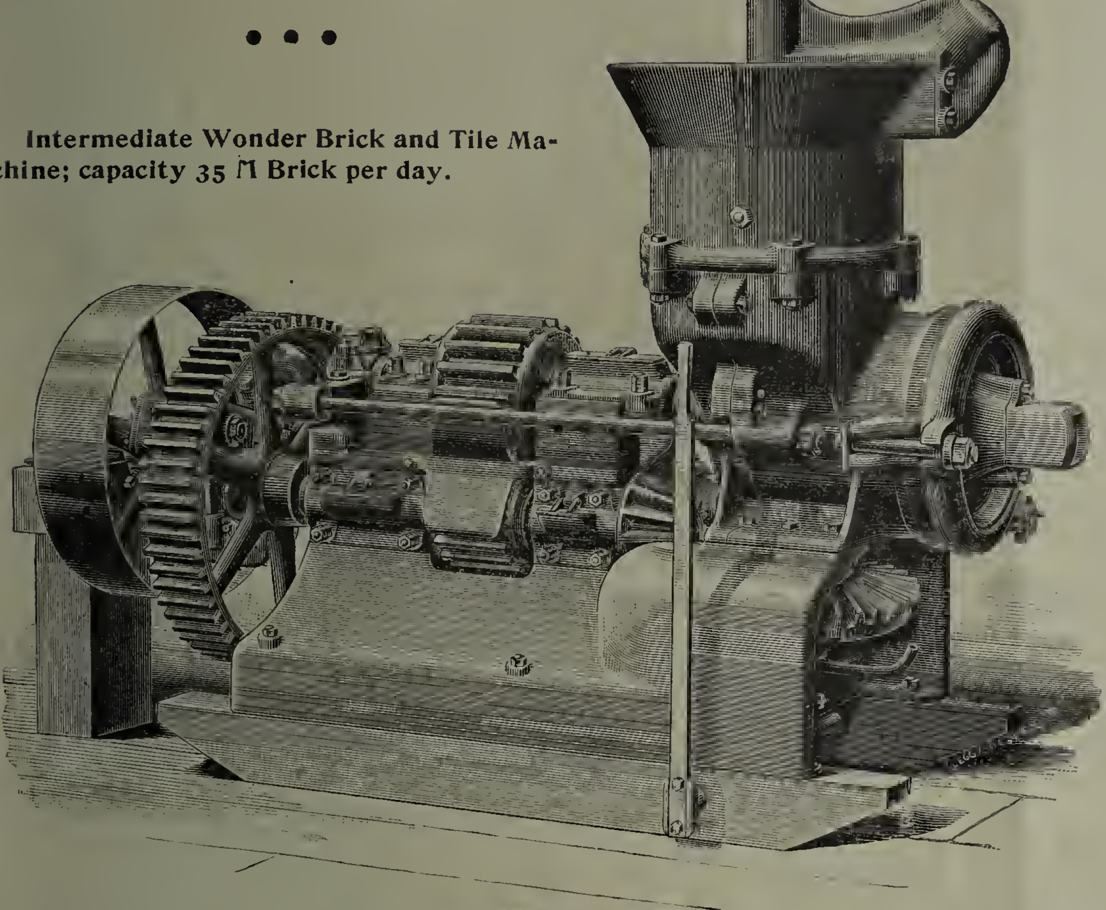
Brick Machinery of Such Endurance is Worth Considering.

The Eastern Machinery Co.,
NEW HAVEN, CONN.

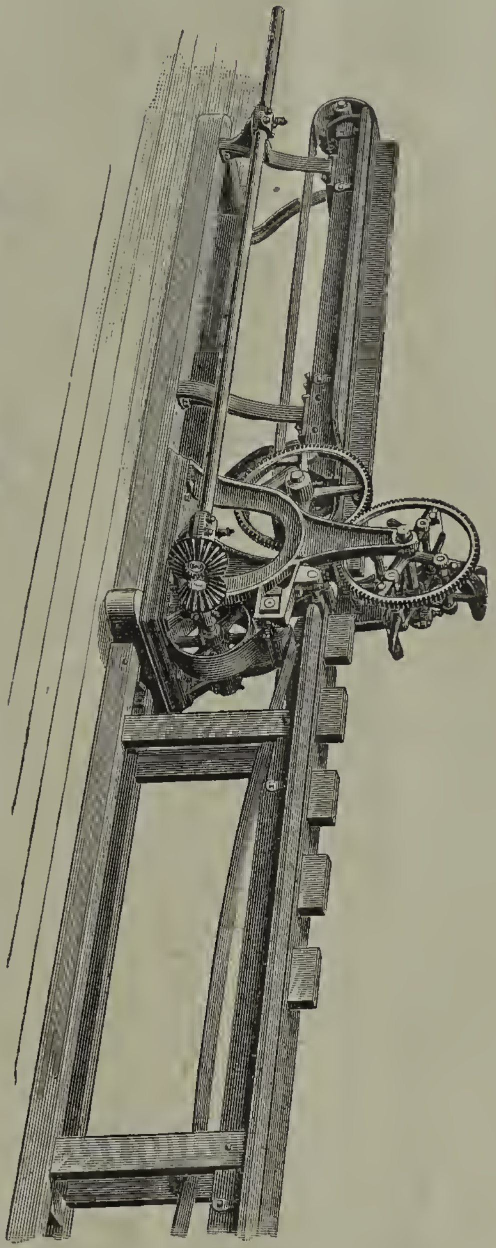
WONDER MACHINERY,

For Brick and Tile.

• • •

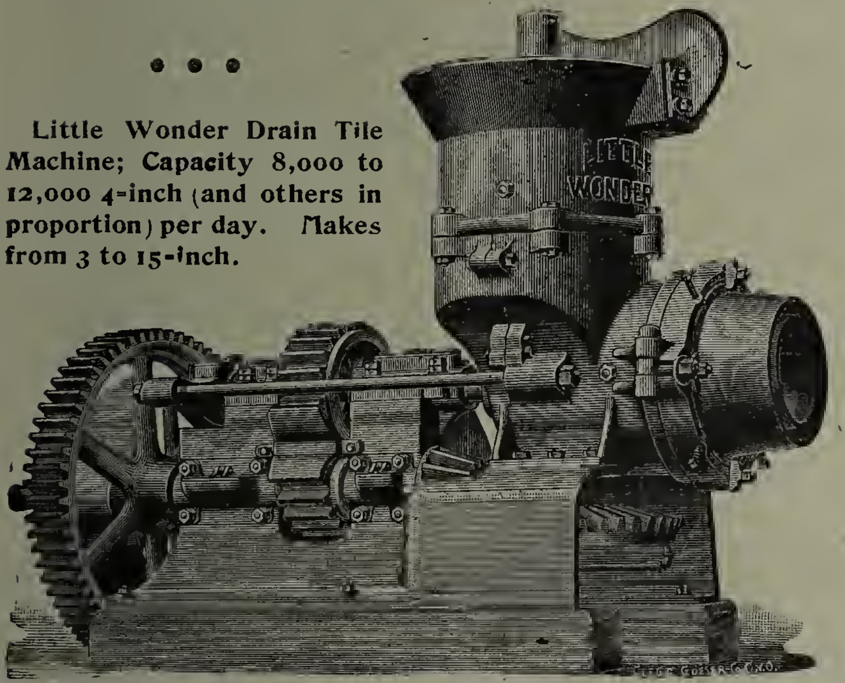


Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



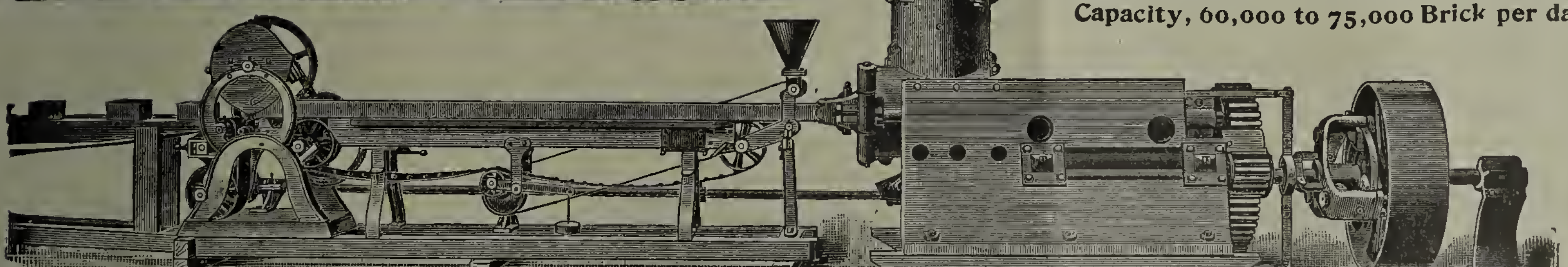
Cunningham's Single Stream Automatic End Cut Brick Cutter.

• • •



Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.

• • •



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.

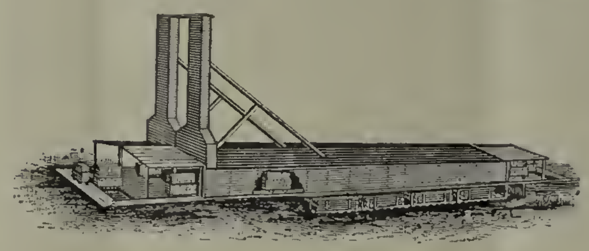
AS MANUFACTURED BY

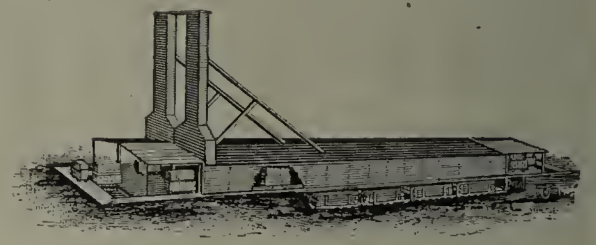
The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

Iron Clad Dryer....IN THE LEAD





DRYING BUILDING BRICK.

CHICAGO, July 18, 1894.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—We have had one of your 12 track dryers in use for nearly three years, and two six track dryers for more than two years. Since you have improved these dryers by means of the receiving tank and pump system, we are drying 175 to 180 M brick per day, with a saving of 20 to 25 per cent. of steam used under the old system. It is possible to dry up to 200 M bricks every 24 hours without injury to the ware, and we have done this on several occasions, when we were compelled to run over time.

Our experience with other dryers formerly used on our plant and the results obtained by other manufacturers in this neighborhood with hot air and fire dryers, compels us to say, that in our estimation, your dryers are more economical and show better results than any we have seen. We use 2 boilers 5x18 feet for these dryers, and at times have to reduce the quantity of steam used, to prevent getting the bricks too dry. Pressure carried 85 pounds.

Yours respectfully,
WECKLER-PRUSSING BRICK CO.,
Alexander Prussing, Sec'y.

DRYING PRESSED BRICK.

MONTREAL, P. Q., September 13, 1895.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—Replying to your favor as to how the dryer erected by your Mr. Lederer is working, I have much pleasure in telling you that we have no fault to find. We dry our bricks easily in twenty-four hours, and so far, without a hitch of any kind.

Your system of returning condensation is undoubtedly the best the writer has ever seen, it needs very little attention and is a decided success in every way. We are drying dry-press, square, ornamental and plastic builders and pavers with equal success.

Wishing you a deserved success, we remain.

Very truly yours,
LA PRAIRIE PRESS BRICK & TERRA COTTA CO.

DRYING SOFT MUD BRICK.

MILWAUKEE, WIS., November 5, 1895.

WOLLF DRYER Co., Chicago, Ill.

Gentlemen:—One season has passed with us in the manufacture of brick, where we used the dryer you built for us, and I must state that we have had more success than we expected, as our clay is very hard to dry, and we could do nothing drying our brick out doors, they all would check. Our repairs have not amounted to 5 cents, and think it recommends itself. If we had to build another dryer, it would be the Iron-Clad Dryer only.

Yours truly,
MILWAUKEE BRICK CO.,
R. Reinke, Vice-Pres.

DRYING PAVING BRICK.

LOUISVILLE, KY., April 12, 1895.

WOLFF DRYER Co., Chicago, Ill.

Gentlemen:—Replying to yours of the 11th inst., will say that the dryer you recently put in has worked splendidly, exceeding our expectations. It dries our brick perfectly in twenty-four hours and would dry a good many more than we make, which has been 30 M per day, repressed brick.

Our green brick measure 9¼ x 4⅝ x 2 9-16. Your dryer has far exceeded the old Penfield, in which it took four days and then did not dry. Will be pleased to hear further from you.

Yours truly,
KENTUCKY VITRIFIED PAVING BRICK CO.,
P. Bannon, Pres.

Write for prices and illustrated catalogue to

WOLFF DRYER CO.,

358 Dearborn St., Room 303, CHICAGO, ILL.

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THE CLAY WORKER
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA COTTA SEWER PIPE POTTERY ETC.
T. A. RANDALL & CO., PUBLISHERS.
CHANDLER SC. INDPLS.

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXV, No. 5. INDIANAPOLIS, IND., MAY, 1896. $2.00 a Year in Advance.

Brick Making Machinery.

• • • FOR SALE. • • •

One second-hand self-contained Dry Pan, seven feet in diameter, and a total weight of about eight tons. The crushing rolls are 40 inches in diameter by 10-inch face. The pan has been repaired by us and has a new main center casting, complete set of new grinding plates, new perforated screens, and is provided with friction clutch pulley 30 inches in diameter by 10-inch face.

The price is $450 net f. o. b. Philadelphia.

Chambers Brothers Company,

FIFTY-SECOND STREET, BELOW LANCASTER AVE.,

J. E. EASTES, Chicago Agent,
174 South Clinton Street.

PHILADELPHIA, PA.

THE CUMMER DRYERS

The Cummer Dryer is a

Direct Heat Dryer.

. . . NO . . .

- Boilers,
- Pumps,
- Steam Pipes,
- Big Fuel Bills,
- Experimenting.

. . . YES . . .

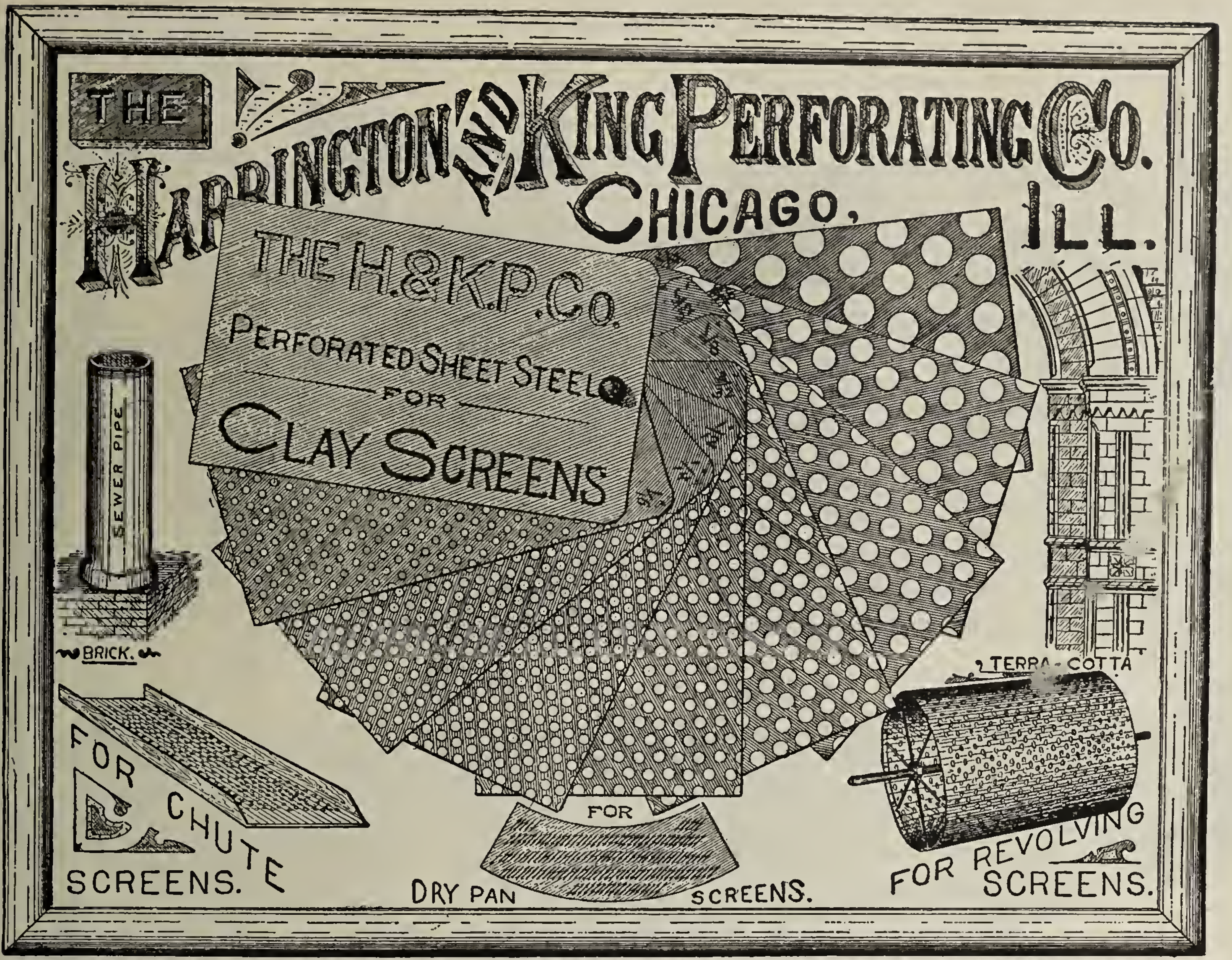
We Guarantee Results and will guarantee to dry your brick with a given amount of fuel. For instance, if your brick each carry one pound of moisture and you want to dry 20,000, we will guarantee to dry them with less than 3,000 pounds of **Slack Bituminous** coal.

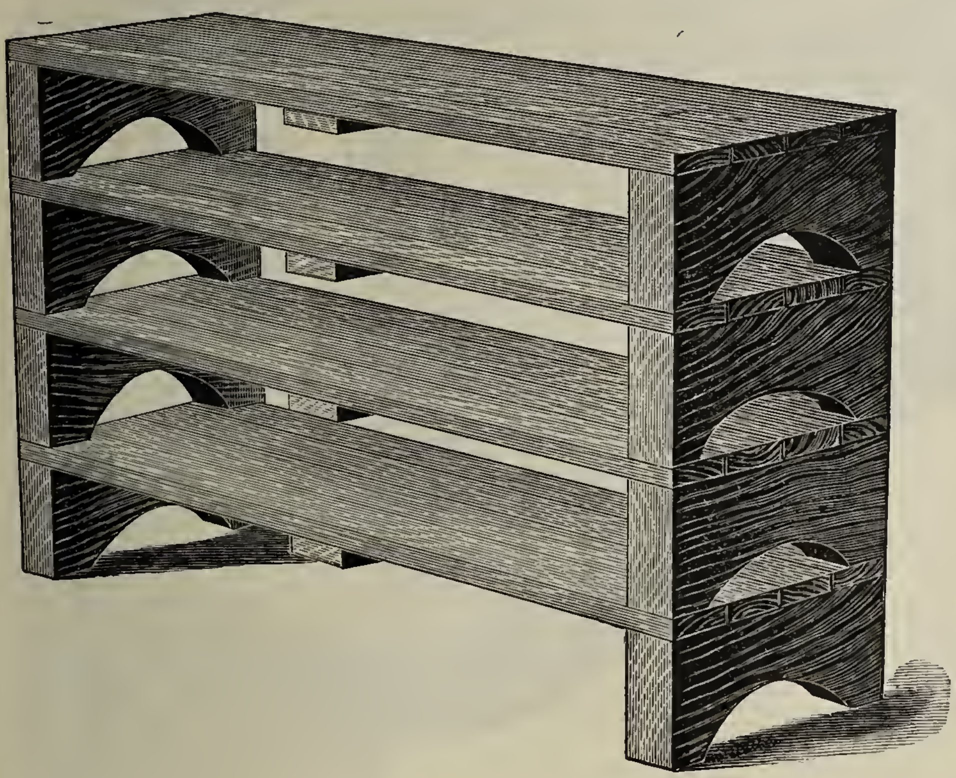
CONVERTED

If you have a Dryer that is not satisfactory, it can be **Converted** into a "**CUMMER**" at slight expense.

The CUMMER REVOLVING CLAY DRYER has many users and is well known.
Clay can be dried cheaper in it than by any other method.

The F. D. Cummer & Son Co.,
CLEVELAND, OHIO.





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Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

Rack Pallets,
Hacking Pallets,
Pallets for Dryers,
Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

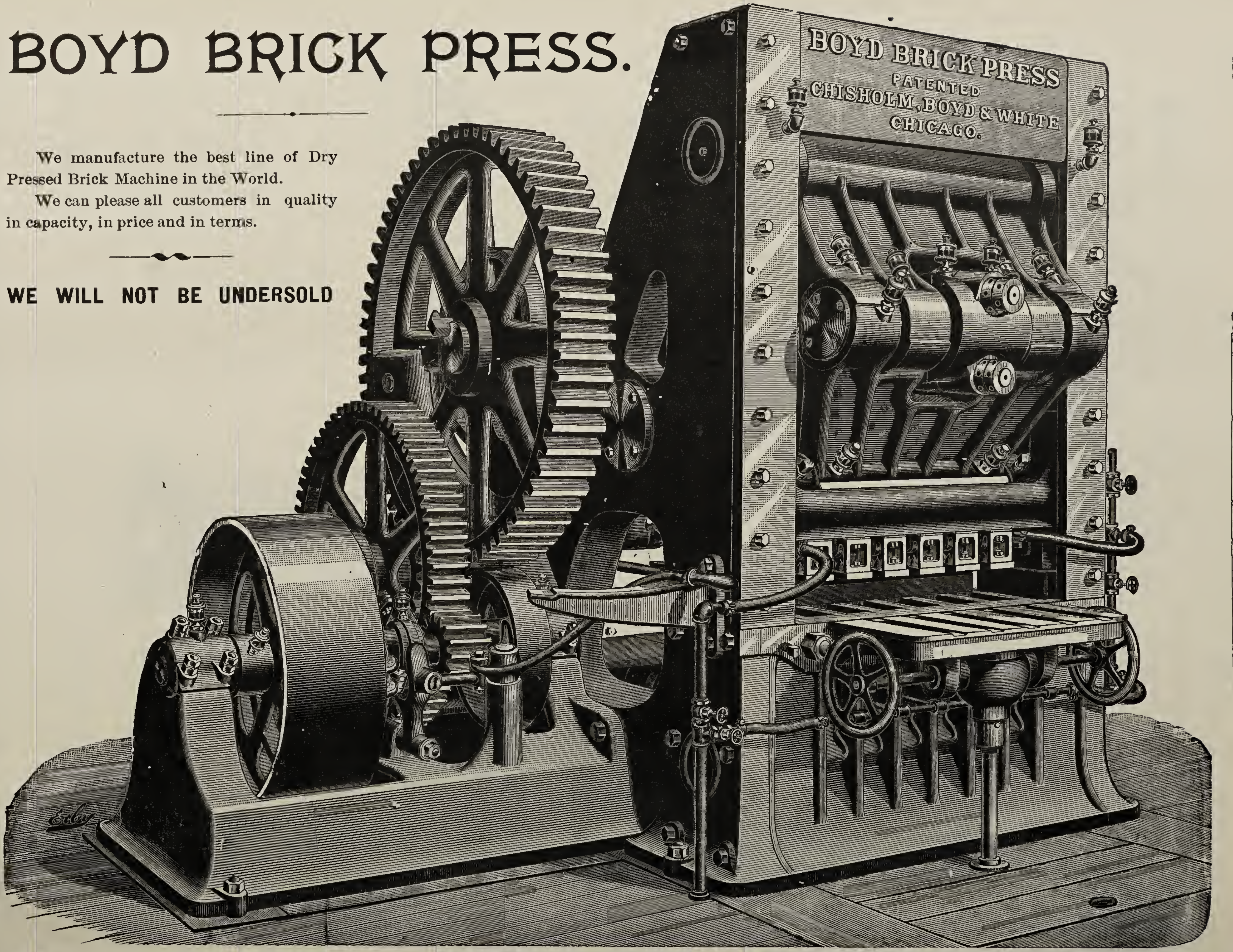
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

BOYD BRICK PRESS.

We manufacture the best line of Dry Pressed Brick Machine in the World.

We can please all customers in quality in capacity, in price and in terms.

WE WILL NOT BE UNDERSOLD



The CHISHOLM, BOYD & WHITE CO., 57th and Wallace Sts., **Chicago.**

A SURE THING.

We will construct and equip a Brick Plant of any capacity desired for any responsible party, furnishing Brick Presses, Power, Kilns, Clay-preparing Machinery, Shafting, Belts, etc., and erect the necessary Buildings. We will make and burn one or more kilns of brick, and turn the Plant over to him in proper working order under guarantee of satisfactory results as to quality of product and cost per 1,000; the loss to be ours in case of failure.

Why experiment when you have a sure thing?

THE CHISHOLM, BOYD & WHITE CO.,

57th and Wallace Streets. CHICAGO.

"NEMO ME IMPUNE LACESSIT."

Clay-Working Machinery.

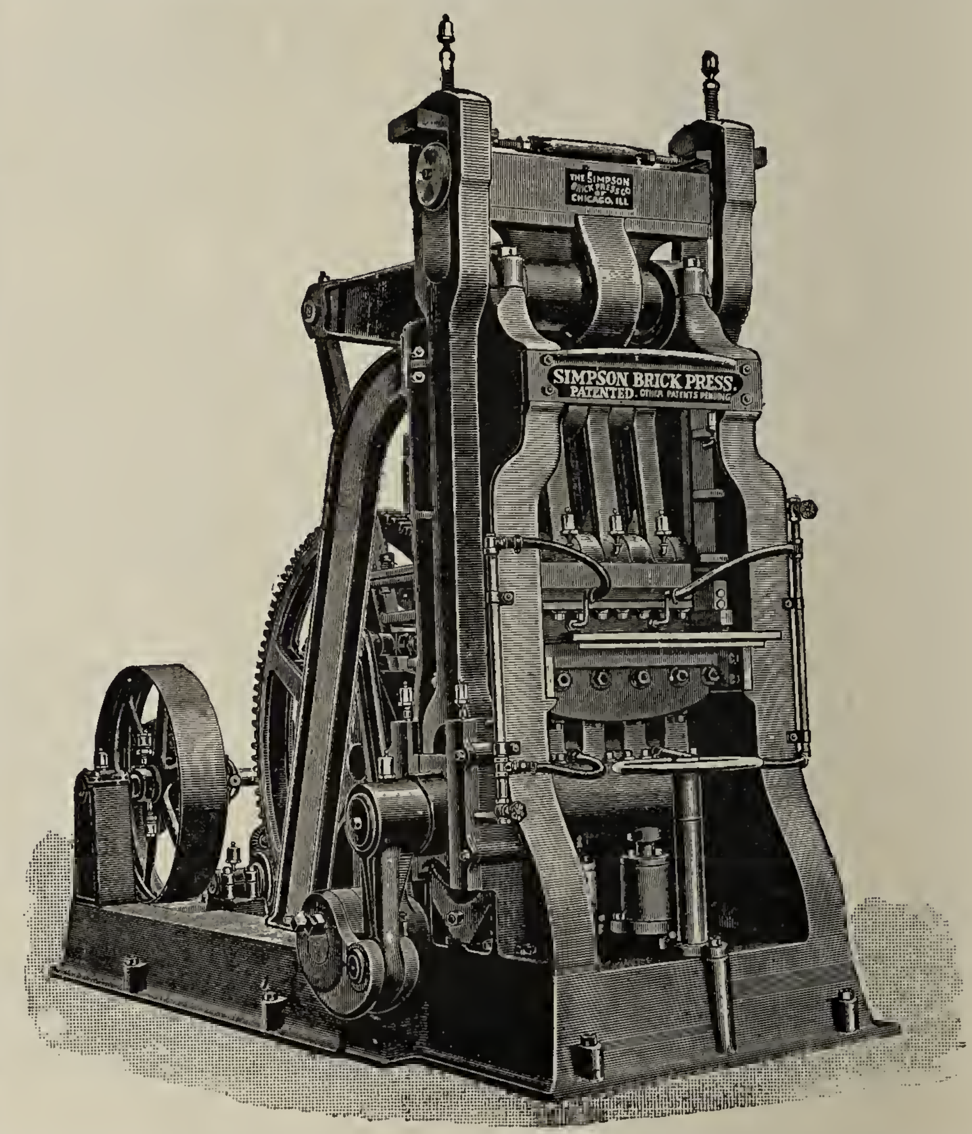
The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line of Brickyard Equipments. . .

Complete Plants Constructed and Guaranteed. . . .


THE SIMPSON BRICK PRESS CO CHICAGO, ILL
SIMPSON BRICK PRESS. PATENTED. OTHER PATENTS PENDING

OUR MACHINERY has long since **passed the experimental stage,** and is considered the standard by competent brickmakers. Write for catalogues.

THE SIMPSON BRICK PRESS CO.,

Chamber of Commerce
Chicago...

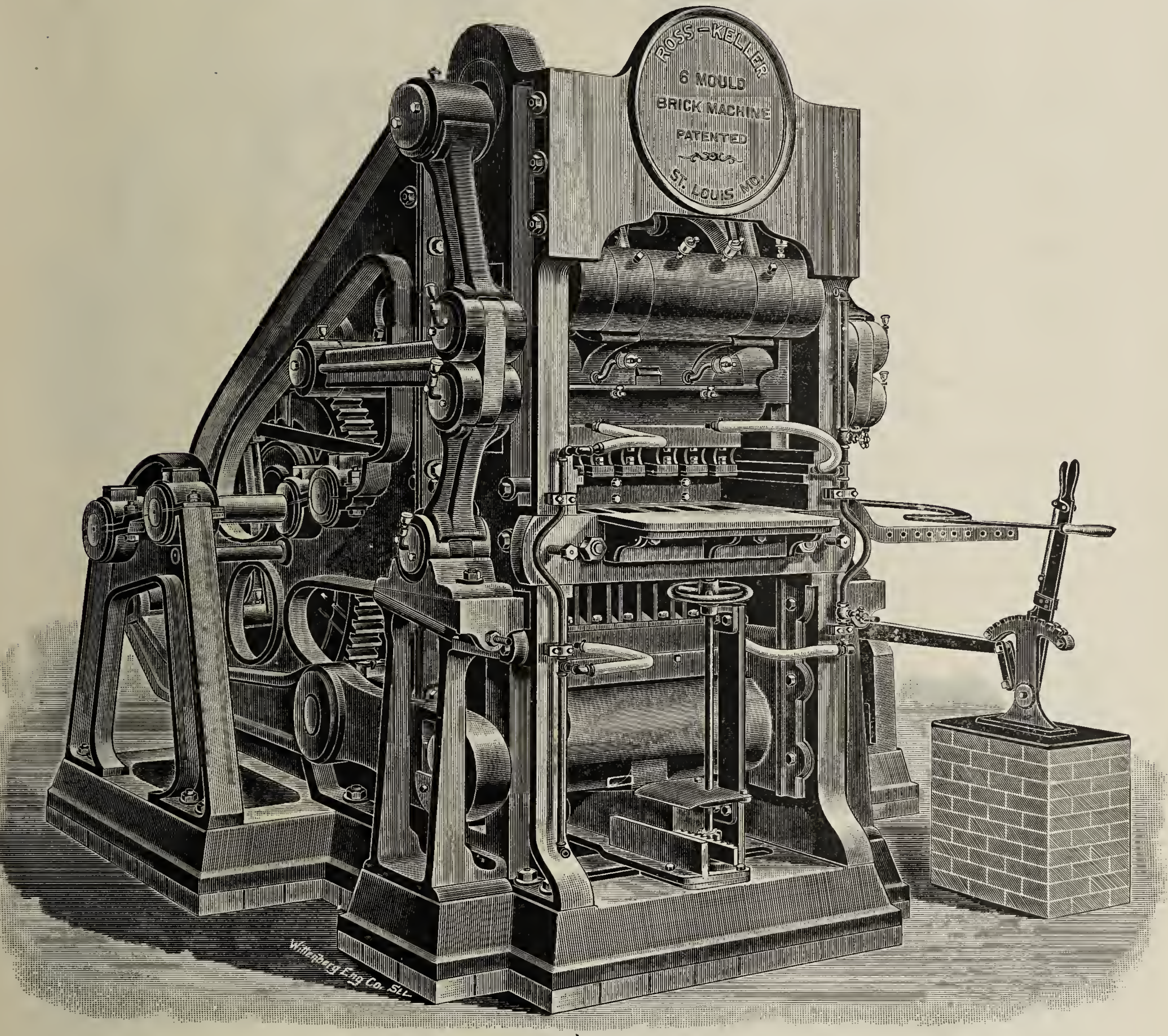
Agents for Canada:
WATEROUS ENGINE WORKS CO.,
BRANTFORD, ONTARIO.

The Latest Improved

Ross-Keller TRIPLE PRESSURE Brick Machine.

Manufactured in four and six-mould sizes. Weight of four-mould machine 58,000 pounds; capacity 24,000 brick per day. Weight of six-mould machine 75,000 pounds, capacity 36,000 brick per day.

BRICK SET IN KILN DIRECT FROM MACHINE.



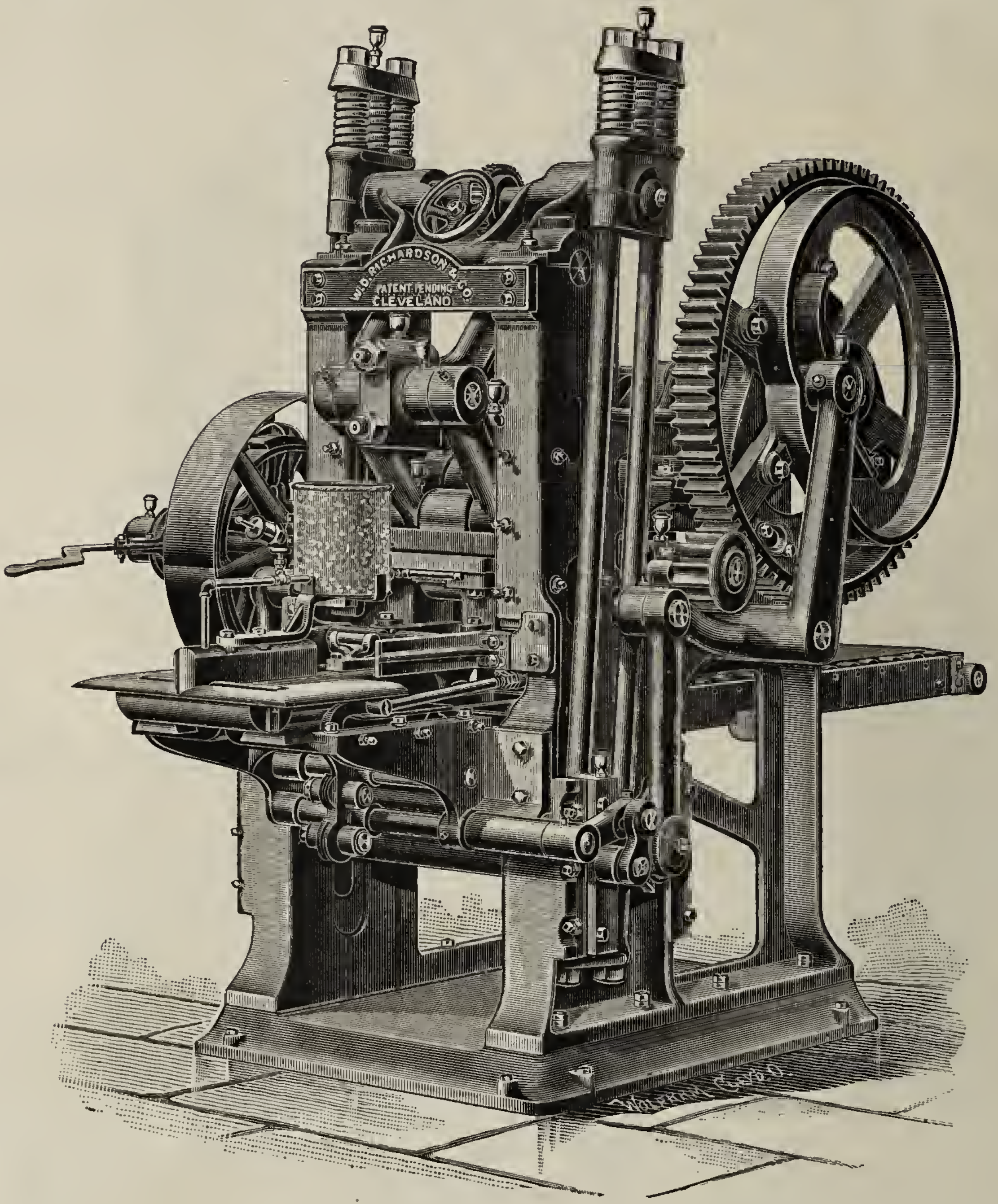
The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

If you want the best come and see us, or write for price and full particulars, address

Ross-Keller Brick Machine Company,

Office 108 Rialto Building, **ST. LOUIS, MO., U. S. A.**

The Richardson ✵ ✵ Double Pressure Repress.



The Only Repress with two distinct pressures upon both sides of the brick.

The Only Repress with an Automatic Feeding Table.

The Heaviest, the Strongest, the Most Durable Repress ever put into successful operation.

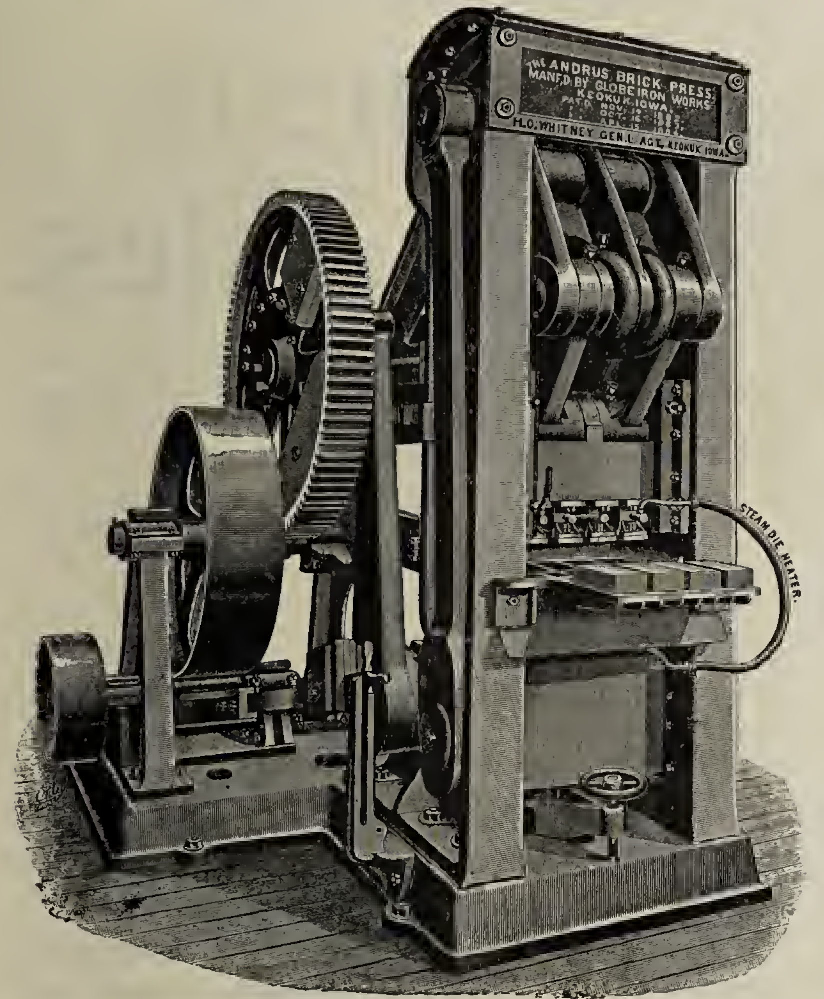
If you are going to buy a repress why not get the best, the one that embodies the latest improvements in the process of repressing?

We will place it in your factory on trial and take it out at our expense if not satisfactory. Send for details.

W. D. Richardson & Co.,

809 Cuyahoga Building, ——CLEVELAND, OHIO.

THE ANDRUS DOUBLE PRESSURE BRICK PRESS.


THE ANDRUS BRICK PRESS.
MANF'D BY GLOBE IRON WORKS
KEOKUK, IOWA.
H.O. WHITNEY GEN.L AGT. KEOKUK IOWA.
STEAM DIE HEATER

We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . .

Send for descriptive Catalogue, address

H. O. Whitney,

General Agent,

KEOKUK, IOWA.

The FERNHOLTZ MOLD BOX.

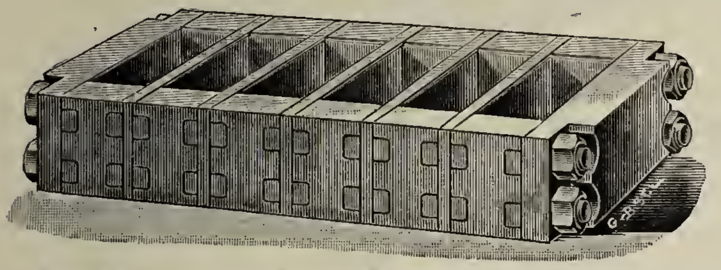
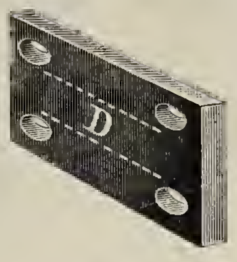


Figure 1. Patented April 10th, 1894.
No. 518,185.

The most practical, durable and economical Mold Box that has ever been invented It insures square corners and edges on the Brick and positively does not spring.

Every Brick is perfect, if the clay is in proper condition. It is made entirely of specially prepared chilled iron.



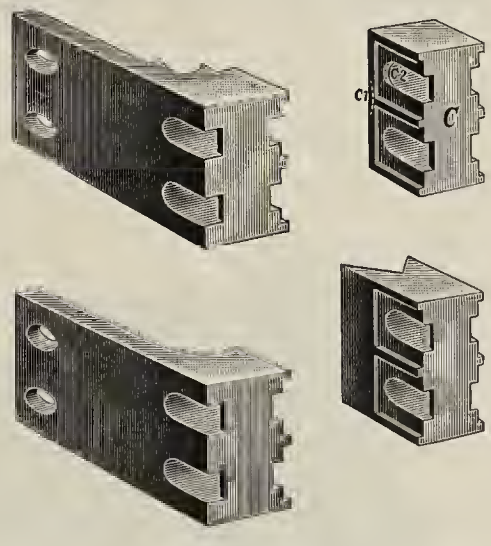


Figure 2. Showing Combination of Any Desired Kind.

It will outlast the hardest Mushert steel and when worn can be knocked down by building a small fire under it and melting the brimstone, at which time it can be reground, if necessary, and set up again, and is as good as new.

One of these boxes is good for 40,000,000 of brick. It can also be made a combination mold, as represented in Figure 2.

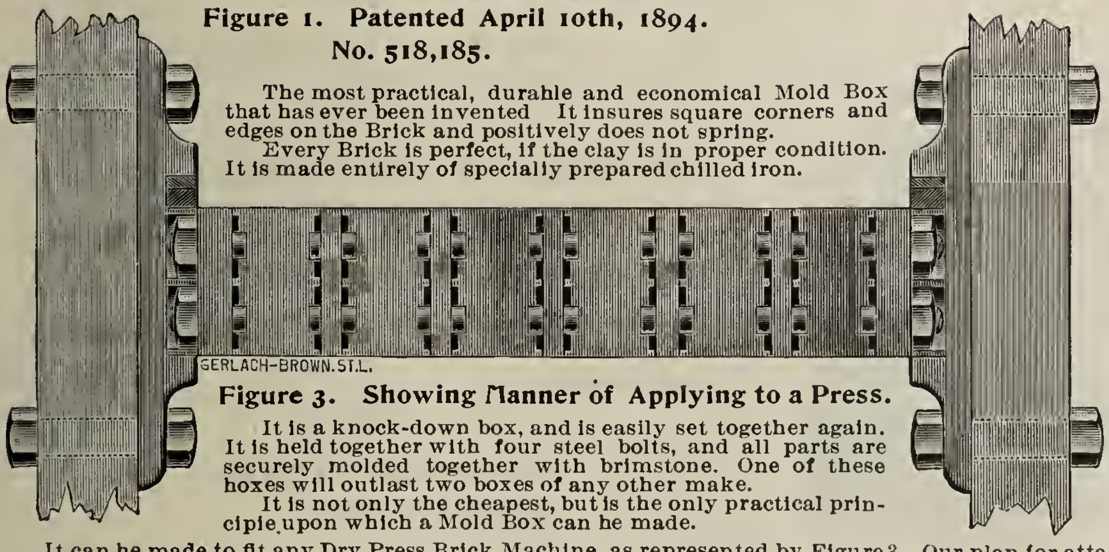

GERLACH-BROWN.ST.L.

Figure 3. Showing Manner of Applying to a Press.

It is a knock-down box, and is easily set together again. It is held together with four steel bolts, and all parts are securely molded together with brimstone. One of these boxes will outlast two boxes of any other make.

It is not only the cheapest, but is the only practical principle upon which a Mold Box can be made.

It can be made to fit any Dry Press Brick Machine, as represented by Figure 3. Our plan for attaching to a machine is also the simplest method known to the trade, which consists in bolting two iron brackets to the side-housings of the Press. Slip the mold box on to the lugs, adjust it, and drive in two reversible keys, and the work is done. A new mold box can be placed in any machine, after the brackets are set, in 30 minutes. One of the essential features of this Mold is that it never varies in size by re-grinding. Figure 3 shows the manner of attaching to a Press, as described above. We make them in two, three, four, five and six molds, and they are for sale to the public. For further information, write to

MILTON F. WILLIAMS & CO., 2705 and 2707 North Broadway, St. Louis, Mo.

Columbia Brick Press.

All working parts are made of Steel.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

The pressure is absolutely equal on top and bottom of brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

Any part of the gearing can be removed without taking machine apart.

The mould box can be taken out in a few minutes, without disturbing the other parts of machine.

The "COLUMBIA" presses clay or shale as dry as a hydraulic press, or so damp as to approximate a stiff mud brick, so that the range of products is from building brick to pavers. No other press does such a variety of work.

The "COUMBIA" is the only brick press on the market that meets ALL the needs of a brick plant.

For circulars and prices, address

H. B. HILGEMAN,

General Agent "COLUMBIA Brick Press,
. . . . and "COLUMBIA" Mould,
306 Oriel Building, ST. LOUIS, MO.

Terrazo Cement Tiles.

Complete Plants furnished for making the celebrated **"TERRAZO" Tiles.** Used to the exclusion of all other tiles in all floors, halls, etc., of the following among hundreds of structures in Germany:

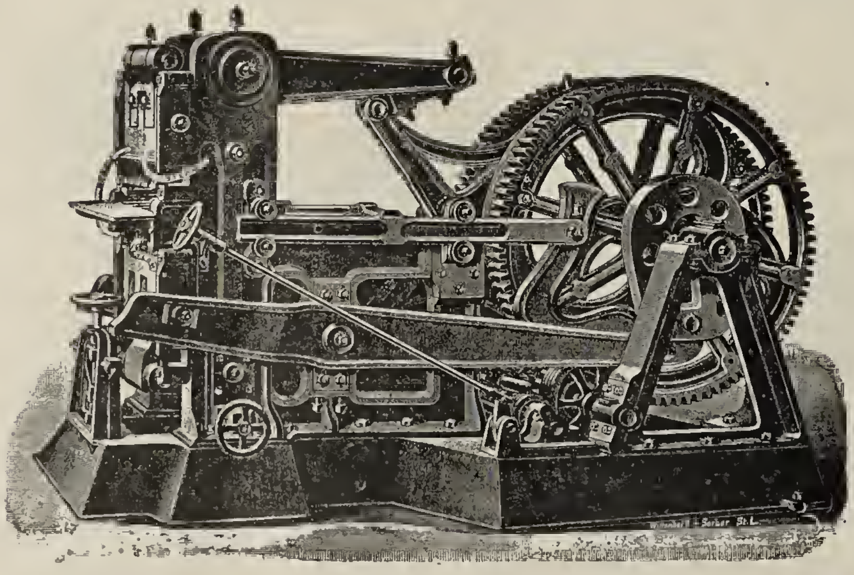
JOHANNIS CHURCH, ROYAL AGRICULTURAL COURT, ROYAL DEPARTMENT OF THE INTERIOR, DRESDEN; GERMANIA PALACE, BERLIN AND ANHALT RAILROAD DEPOT, IMPERIAL ART AND MECHANICAL MUSEUM, ROYAL MILITARY ACADEMY, BERLIN; IMPERIAL POST OFFICES, DRESDEN, BERLIN AND . . . . . . LEIPSIG. . . . . . .

Terrazo Tiles, any color, design or size. For circulars, estimates, etc. Address

H. B. HILGEMAN,

General Agent of THEO. WELGE, for the sale of Dr. BERNHARDI SOHN, G. E. DRAENERT, GERMANY, Machinery and Processes for making TERRAZO CEMENT TILES.
306 Oriel Building, ST. LOUIS, MO.

The Progress Brick Press



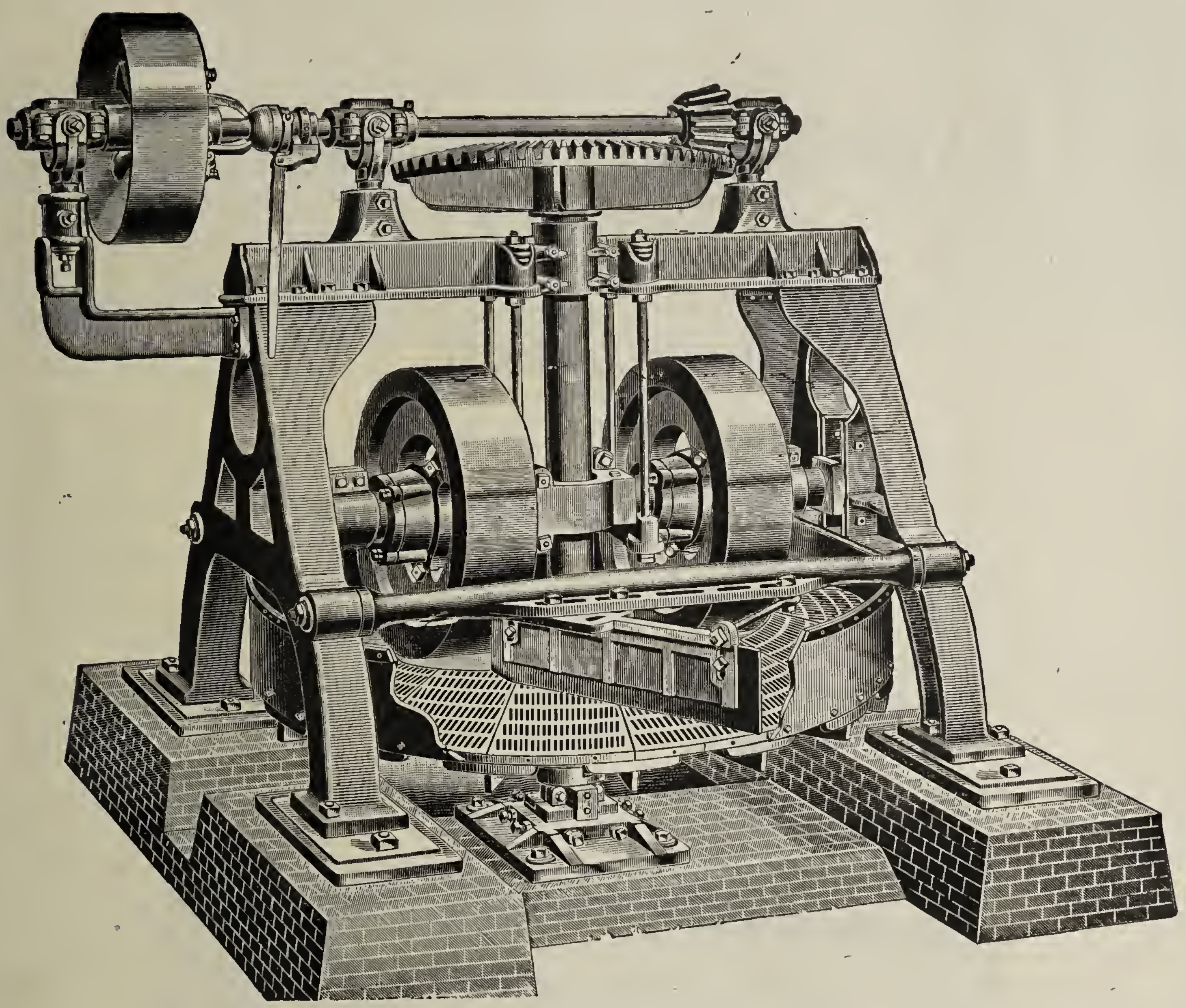
FOR PLAIN AND ORNAMENTAL BRICK. . . .

The Progress Brick Mould, Brick Grinding and Mitering Machines, Dry Clay Gatherers, and a full line of Dry Press Brick Manufacturers equipments.

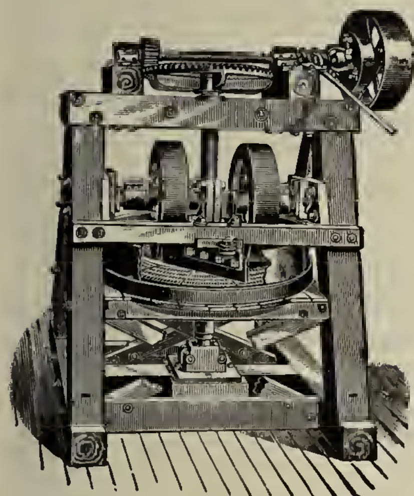
DESCRIPTIVE CATALOGUE ON APPLICATION. . . . .

Progress Press Brick and Machine Co.,

King's Highway and Oak Hill R. R. *ST. LOUIS, MO.*

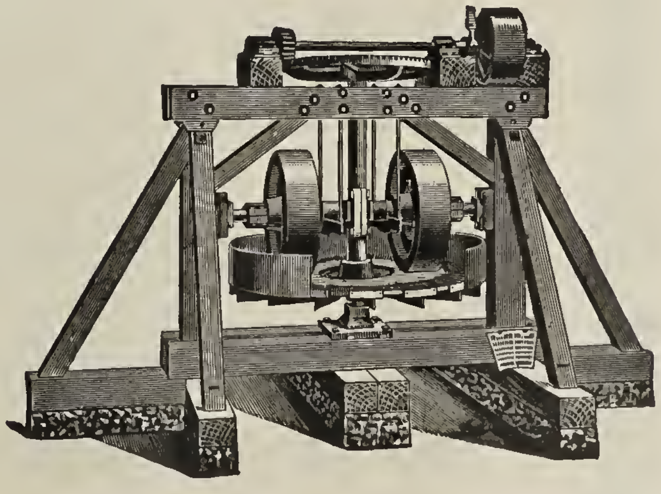


OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



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FROST ENGINE CO., Galesburg, Ill.,
U. S. A.

A Good Investment!

That's how Mr. Florey regards his purchase, as a perusal of his letter below will show, and he but voices the sentiment of **all users** of

The Standard Improved Brick and Tile Drier.

Downingtown, Pa., October 25, 1895.

THE STANDARD DRY KILN CO., Indianapolis, Ind.

Gentlemen:—I have been operating one of your improved Natural Draft Driers about two months now and have given it a very thorough test. After getting the temperature and drafts regulated to suit my clay, it hasn't given me a particle of trouble; in fact, has been running along nicely ever since. My clay checks and cracks very easily, but I have no difficulty in drying my brick perfectly in your Drier.

I use the Chambers Stiff Mud Machine and make 35,000 brick every day. The Drier takes care of them nicely, and I have never had to set a wet brick.

I look upon the purchase of your Drier as one of the best investments I ever made, and cheerfully recommend it as the least complicated, and in every way the most practical device of the kind I know of. It is costing me 25 cents per thousand for coal to run the machinery and dry my brick.

Yours truly,

JAMES FLOREY.

Its adaptability to the drying of all kinds of clay and all varieties of clay products and the further fact that it is **no experiment,** but a **proven success,** makes it the **popular Drier** of to-day. If you have this subject under consideration, our 110 page catalog will surely interest you.

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Patentees and Sole Manufacturers,

186 South Meridian St., INDIANAPOLIS, IND.

THE CLAY-WORKER

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

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Written for the CLAY-WORKER.

IN DEUTSCHLAND. No. 3.

From Berlin to Siegersdorf—The Largest Face-Brick Works of Germany—An Interview with Mr. Frederick Hoffmann, the Inventor of the Continuous Kiln.

THE TIME HAD arrived when we were obliged to say farewell to Berlin and to resume our journey southward. The kindness of Messrs. Cramer and Duemmler had provided us with letters of introduction to a number of clayworkers, and, so armed, we left for our immediate destination—Siegersdorf, in the province of Silesia, where Germany's largest face-brick works, the Siegersdorf Clay Works, are situated, and also where Mr. Frederick Hoffman, the venerable inventor of the continuous kiln, has his home. Nothing of interest was observed en route from Berlin. The country is level, and hence the scenery soon became monotonous. Though we arrived at Siegersdorf amid a heavy rain, we had not long to look for the brick factory, for, on leaving the station, a forest of tall smoke stacks, characteristic of the German brickyard, met our eyes. Soon we were inside the grounds and entered a commodious office building. After we had made known our errand a hearty welcome was extended us by the officers of the company. The permission of going through the works was readily granted, and Mr. A. Sachse, one of the superintendents, acted as our guide, and an excellent one he was, for the hours spent in taking in the plant were rendered the more agreeable by his interesting conversation.

FREDERICK HOFFMANN.

—The Raw Materials—

Embrace a number of kinds of clays, burning a large range of colors, from a pure white to a fine red. Intermediate colors and shades not natural are obtained by artificial means. The clays are taken to the factory in the typical clay cars and stored in cellar-like clay rooms. For dry-pressed ware, such as flooring tiles, the clay is stored in a shed to dry. Much care is devoted to the preparation of the materials, and several methods are employed, none, however, offering any special departure from methods with which the American brickmakers are acquainted. The preliminary grinding is done in ball mills and disintegrators, from which the ground material is conveyed to screens and the screened clay to pug mills and auger machines. This not being considered a sufficient preparation, the clay runs through the auger machine, is cut into lengths of eighteen inches, and the slabs are conveyed to the auger machines proper, where they are made into face brick.

—How Face Brick Are Made.—

Our brickmakers associate the term face or front brick with the idea of repressing or dry pressing, but in Germany these brick are always made with auger machines alone. They are not solid brick like ours, but, as a rule, hollow, and are made in four sizes—4-4, ¾, ½ and ¼ brick. The fronts of buildings consist of alternate courses of ¼ and ½ brick, using ¾ brick courses for corners and 4-4 for arches and windows. The size of the whole brick is 9.92 x 4.82 x 2.71 inches; of the three-quarters 7.36 x 4.82 x 2.71 inches, the halves and quarters having the same heads.

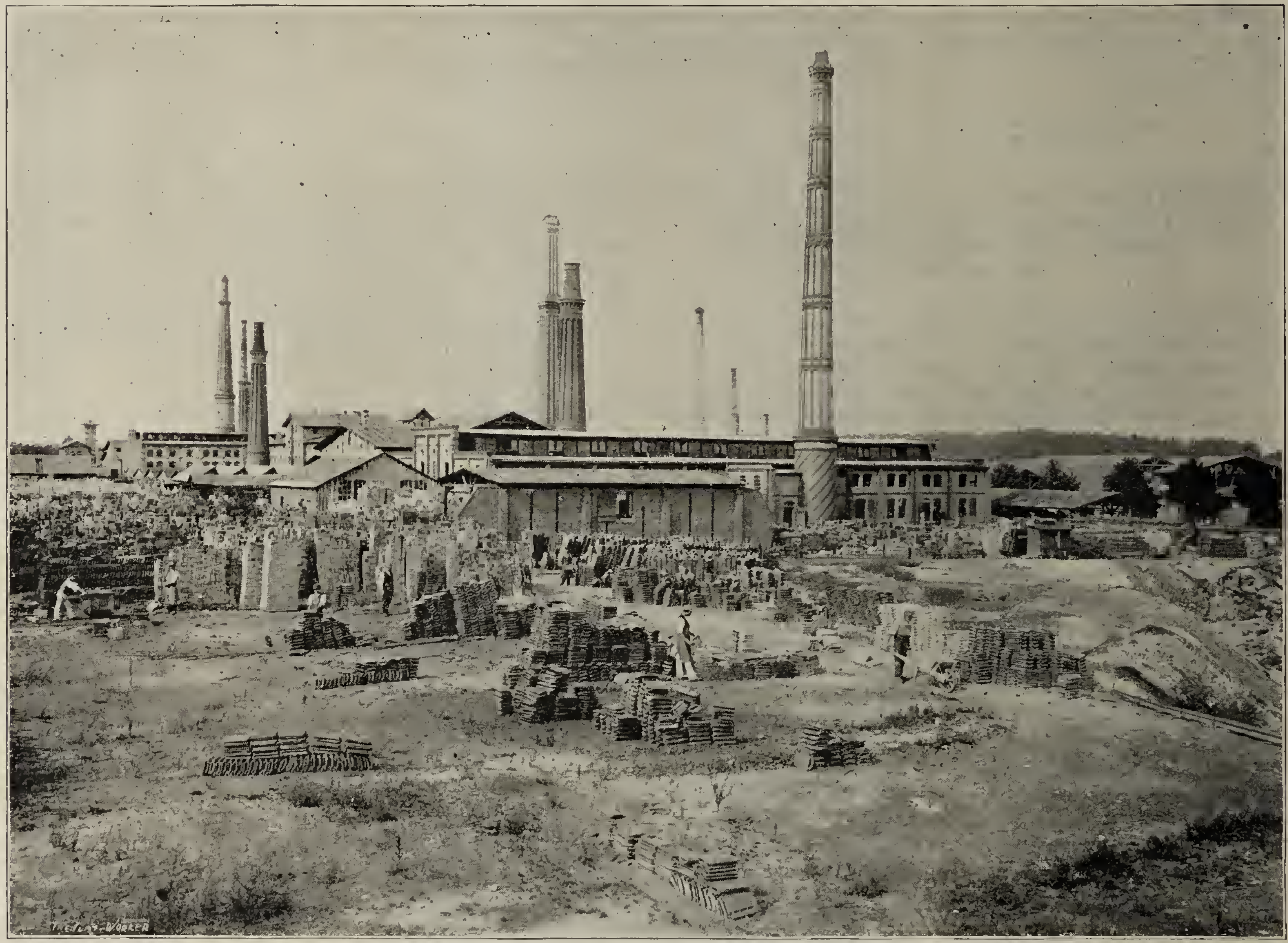
This arrangement may seem complicated and impractical, and perhaps it is, but the specifications for face brick set by the authorities must be considered. The brick must have a vitrified surface, uniform color, sharp corners and edges and exact measurements. In order to fill these requirements the material must be thoroughly prepared and the produced handled carefully in all stages of manufacture. The cost of preparing the clay being thus increased, it is the endeavor of the manufacturers to reduce the quantity of material to the minimum. This is, of course, accomplished best by perforating the brick, at the same time enabling the makers to burn them easier, with less fuel, and effecting a saving in the freight charges. Considering the close margins of profit and the competition between the manufacturers, it is not surprising that every chance of saving even a trifle is eagerly seized.

Let us now return to the making of the face brick. The auger machines are of the usual type, the column of clay being cut into brick on a hand cutting table. The brick are handled with wooden forks and taken to another table standing near by, where they are recut, giving them straight edges. This is a very simple contrivance, consisting of a movable platform, on to which the brick are placed, which is pushed along between two or three stretched, vertical wires, trimming the brick to the required size. When halves are made three wires are used, cutting a whole brick in two. The arrangement is fastened to a solid wooden bench. Bracket elevators convey the brick up to the drying floors. Eight auger machines are in use, making the different kinds of brick and slabs for the pressing of roofing tiles and paving tiles, besides various other kinds of ware.

Grog, ground in a dry pan and a ball mill, is extensively used for reducing the fatness or plasticity of the clay, especially for such ware, where the shrinkage has to be reduced to the minimum, as, for instance, roofing tiles. Every cull from the kilns is ground up for this purpose.

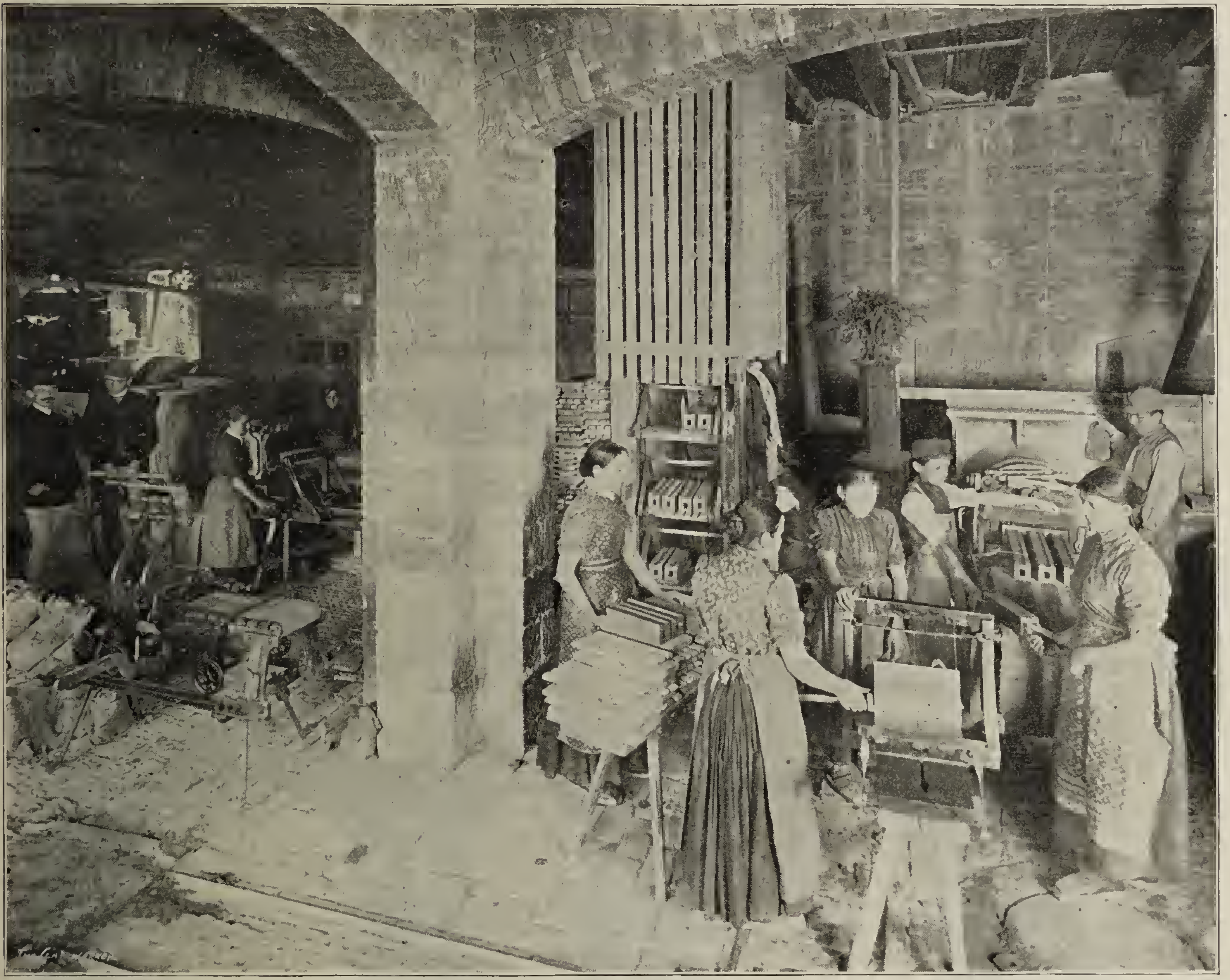
—Making Roofing Tiles, Paving Blocks and Dry-Pressed Floor Tiles.—

Let us now leave the ground floors and ascend the upper stories, containing the drying rooms, molding and pressing rooms. It is characteristic of German brick factories to have the drying floors constructed above the continuous kilns, and this one is not an exception. The finished ware, as brick, conveyed up from the machine rooms on the bracket elevators, is set on to tram cars and taken to the different sections of the drying rooms, and, as usual, put on racks to dry. The tramway tracks run all around the floors, one track going down an aisle at the middle of the floor, the others traveling around the outside. The racks extend across the rooms and are eight shelves high. Considering the fact that every brick is handled separately and that a considerable distance has to be traversed from the tram cars to the racks, it is obvious that a large number of employes are required to handle the brick. Woman labor is exclusively employed for this kind of work, the wages of a woman never exceeding 30 cents per day. The buildings have two stories above the kilns. The drying rooms are heated only by the heat radiated from the continuous kilns, although in winter it is found necessary to use steam heat in order to keep the temperature sufficiently high. Owing to the comparatively low temperature attainable merely by the radiated heat of the kiln, the drying takes place slowly and irregularly, depending on the weather, in moist weather requiring several weeks. This being the case, large drying spaces are necessary, and, in fact, the drying rooms contain enormous areas, drying floors being constructed above every kiln. The accompanying view will give an idea of their extent.



THE SIEGERSDORF CLAY WORKS—The Largest Face Brick Plant in Germany.

The roofing tiles are of the lock-joint pattern, and pressed out of prepared clay slabs on revolving power presses. The construction of these presses coincides with the one described in the preceding article; in fact, these machines seem to be built on one stereotyped pattern all over the continent. The five-sided prism, bearing on each side a mold box, is peculiar to all. The pressing mechanism is worked by a cam. The average capacity of a revolving power press is 5,000 tiles per day, and the force needed to run it consists of two men for feeding and taking off and four girls for trimming the tiles. The power required does not exceed a horse power. As might be supposed, the molds, being made out of plaster paris, require frequent renewal, and it is surprising that no metal dies have been constructed to take the place of the plaster ones. Of course, we are aware of the objection urged against the metal dies, that they require oil for lubrication of the molds, which, as it is claimed, forms a coating on the surface of the roofing tile, giving rise to discolorations and retarding the drying. Yet we think that these objections will be overcome and that metal dies will be used in the future. Fifteen of the standard-size roofing tiles cover a square meter, three lengths and five widths.



Interior View of Siegersdorf Clay Works—Making Face Brick with Stiff Mud Machine.

Walking on, we came to another press making square paving tiles, about six inches square and one and a half inches thick, having a ribbed surface. The repress is a screw power press, the alternate raising and lowering of the plunger being accomplished by means of friction discs, which, turning first in one direction, at certain intervals, reverse their motion, thus raising or lowering the plunger. The tiles are pressed out of blanks like the roofing tiles. As to the material, it is of a kind permitting complete vitrification, and when burned it has the appearance of the so-called blue brick, showing that characteristic vitreous gloss peculiar to perfect vitrification. These tiles are used for stable floors, cellars, slaughter houses and similar purposes.

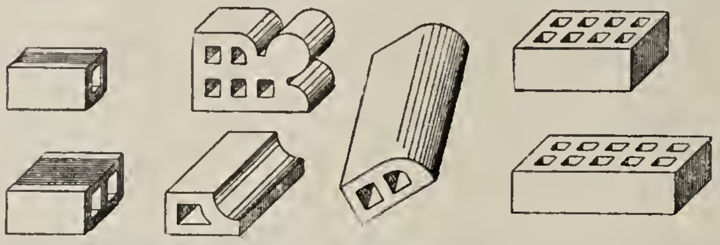
The dry-press process was represented by a number of hand presses (screw presses). These were used to press floor tiles for interior use, the material being usually a white burning clay. The tiles are treated by several processes. Some of them are glazed with different colored glazes, requiring two firings. Others have the colors incorporated in the body, and are burned to vitrification in a single firing.

Of special interest were the die rooms, where new dies are constantly being made for the daily varying shapes of brick and tiles, and where the old dies are stored. Some 2,000 patterns are required every year. An elaborate system of checking keeps track of every shape and die, in or out of use, so that it can be traced at a few minutes' notice.

We did not fail to pay the terra cotta rooms a visit. Building terra cotta of all shapes is produced here, and artists are employed to do the modeling. But as we do not pretend to be art critics we could do nothing but admire the ware. Before descending to the kilns we took a look at the glazing department. Glazes of all colors and shades are compounded, the easily fusible lead and the hard fusible spar glazes. The glazes and colors are ground in ball mills. The prepared glaze is kept in tubs. Roofing tiles are glazed by pouring the liquid over the surface with a dipper after the tiles are carefully brushed. Other wares are glazed by either dipping or pouring, according to their size and shape. Platform elevators are used to convey all the green ware to the kiln level.

—The Kilns.—

The concern has six continuous kilns, three of which are fired with gas, and six periodic glaze kilns. The gas needed for the gas-fired kilns is produced in eight generators, and is introduced into the kiln at the top through movable iron pipes, which are fed from a main line running parallel to the kiln. At each chamber valves are provided controlling the inflow of the gas, which is forced into the kilns by steam jets. All the kilns are muffle kilns, the fire flues being built of hollow fire clay blocks. As far as we could see, the goods were burned perfectly uniform, and without fear of contradiction it can be said that the face brick made at this factory represent the highest type of stiff-clay brick. It might be mentioned that Seger cones are used, giving good satisfaction.



German Ornamental and Hollow Brick.

We could not help observing that the continuous kilns, with their thick walls, showed very few cracks. To the American clayworker who has experienced the endless trouble caused by the cracking of kiln walls, in spite of iron bands and iron rails, it appears extraordinary that the German continuous kilns, built by the expert kiln builders, crack so little. But this is readily explained if one considers the methods of construction employed by those kiln experts. The principle under which they prevent fissures in kiln walls is to allow the kiln to expand as freely as possible. This is accomplished by building the foundation on a layer of stamped sand, by using dry joints between the parallel walls of the kiln, between the walls of the smoke flues, between the kiln walls and the doors and in the lining, and, lastly, by constructing expansion joints at certain distances all around the arch. The mortar joints in the arch are made as close as possible. The pressure of the arch towards the outside is transmitted to heavy, slanted walls from three to five feet in thickness. Alternate layers of clay and sand are piled above the arches, a layer of clay being next to the arch. In this construction no bracing and binding is employed, and yet it seems to prevent cracking and splitting satisfactorily.

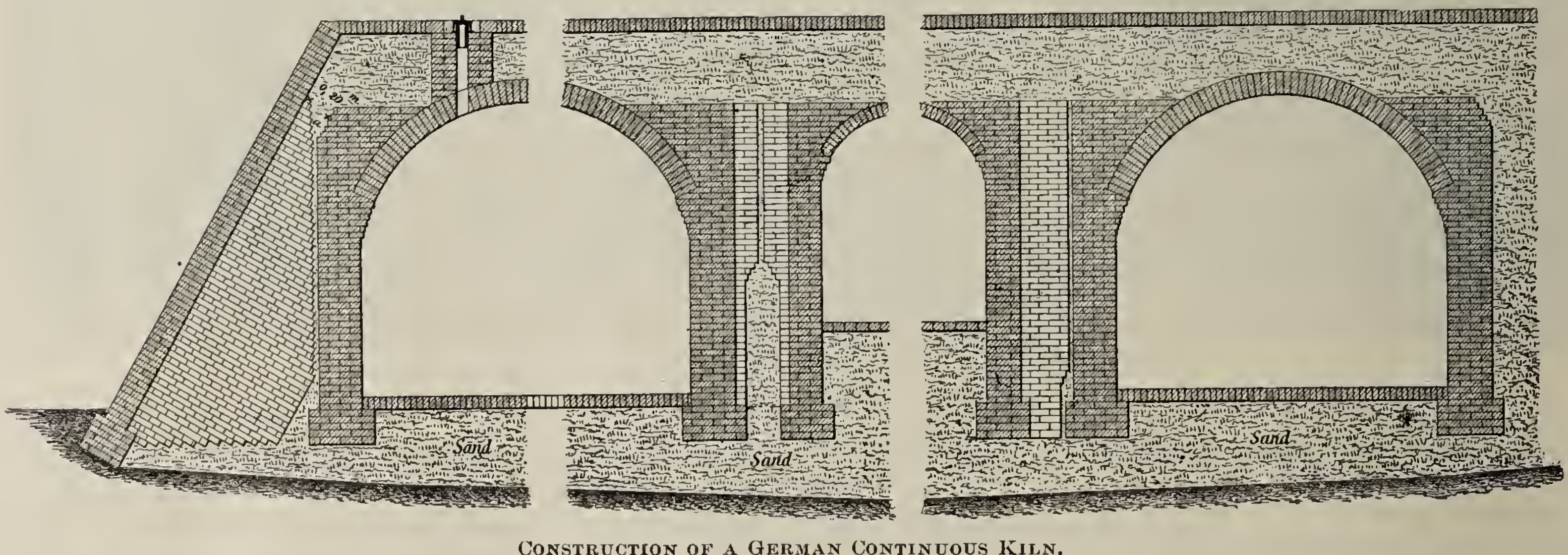
But we must return to the factory we are inspecting and conclude our trip. Extensive sheds hold the thousands of brick which every front-brick concern is obliged to keep in stock. Glazed brick are handled with the utmost care, and wherever the glaze has run over the edge it is ground off. In a special grinding room the flooring tiles and similar articles are ground to their proper dimensions, giving them perfectly true edges.

Returning to the office, we passed through the engine rooms, taking a look at the elegant compound condensing engines, which are good enough for a New England cotton mill.

The Siegersdorf Clay Works employ 600 hands, and have a capacity equal to 100,000 brick per day.

While we were doing the works we met a tall old gentleman, with silvery white hair, who was walking briskly through the rooms, seemingly taking a good deal of interest in the work. Noticing that the workmen saluted him respectfully, we wondered who it might be, when Mr. Sachse took us up to him, giving us an introduction, and we learned that we were speaking to Mr. Hoffmann. He soon started an interesting conversation, telling us about the beginning of the German face-brick industry, about the difficulties he had to encounter in introducing the continuous kiln and the steady progress the German brick industry has made in the last forty years. It has always been, he said, his greatest desire to do his best for the advancement of the art. He was prompted by this motive to send Mr. Duemmler to the United States, thus gaining for Germany a store of information. Mr. Hoffmann complimented the American industry by expressing his admiration for American appliances and machinery, especially dry presses. It might be, perhaps, of interest to the readers of the Clay-Worker to give a brief sketch of Mr. Hoffmann's life.

Mr. Frederick Hoffmann was born at Groeningen, near Halberstadt, in the province of Saxony, on the 18th day of October, 1818. His father being a school teacher, he was prepared at home for the gymnasium, and entered such an institution at Halberstadt in 1833. In 1837 he left the gymnasium and went to Switzerland, where he perfected himself in the French language. In the year 1838 he came to his eldest brother, who was employed in the government department of construction, in Posen, as a pupil of the art of building. He passed his first examination in 1841, and was appointed assistant in railway work in Westphalia. In 1843 Mr. Hoffmann entered the Royal Technological Institute, and in 1845 he was employed on the construction of the Berlin-Hamburg railway. He remained there until 1857, occupying in the last years the position of assistant director. In 1845 he married the daughter of Mr. Fluegel, an inspector of hydraulic works. Owing to domestic sorrows, having lost four children within a month through sickness, he resigned his position in 1855 to look for a new field of activity that would give him more work. In 1858 Mr. Hoffmann applied for a patent for his continuous kiln, and he was granted a Prussian and an Austrian patent. The first continuous kiln was built at Stettin in the years 1858 and '59.



Construction of a German Continuous Kiln.

In 1865 he founded a Brickmakers' Association, and in 1870 the German Brick and Pottery Gazette. He also established a chemical laboratory for the clay industry, having appointed Dr. Seger its first director. For his continuous kiln Mr. Hoffmann was awarded prizes at London, Paris, Moscow, Vienna and Chicago.

We are aware that our sketch of the Siegersdorf Clay Works does not do justice to the concern, by any means. It would require as many days to look over the works as our stay numbered hours. After having accepted a kind invitation for dinner, we prepared to leave, and bid our courteous hosts farewell. Mr. Hoffmann's last words were a greeting to the American brickmakers. With a hearty handshake we parted, and his elegant turnout conveyed us to a railway station several miles distant. Our visit was timed fortunately, for several weeks after that some of the buildings connected with the glaze kilns were destroyed by fire.

Written for the CLAY-WORKER.

MISTAKES OF BRICKMAKERS.

BY CHARLES H. MELCHER.

A MAN who can truthfully say "I have never made a mistake in my business" must be sprouting pinions for celestial spheres. He is certainly fitted for a higher civilization than earth affords, and is entitled to a transfer to some loftier plane of being. That such a one does not, never has nor ever will adorn this world of ours is too palpable to be argued.

The projector of an enterprise may be endowed with an intelligence far beyond that given to the average man; his capabilities may be such as to make him worthy of the closest emulation from those in the same calling; yet his mistakes, while they may not be as weighty or as manifold as others', are bound to occur, his superior knowledge on the subject making them more apparent to his inspection than do those of inferior judgment.

It is safe to presume that no man has yet constructed a building but what, on completion, he has seen some deficiency of omission or commission that would be remedied in a fresh attempt.

The skill of the artisan has never yet executed a piece of work perfect in every particular, and, as long as man continues a fallible being, never will. Every piece of such work is educational to its producer, and continually develops possibilities he never dreamed of before.

The model representing the mechanical ideas of an inventor in almost every instance suggests some important alteration, and such alterations are continually developing, if not to the originator of the idea himself, then to the posterity that uses it.

If the most successful men in the brick business were called upon to state in writing the blunders made during their continuance in the same, I apprehend considerable space would be required in the Clay-Worker to contain their declarations, and there can be no doubt it would be profitable reading to others in the trade.

I was told by a man that had accumulated quite a fine fortune in the brick business that the first mistake he made was not buying the ground on which he constructed his plant, instead of paying rent through a long series of years and having the owner of the land make a much larger profit than his own through the advanced value of the real estate. Unless the land used for this purpose is so remote from civilization as to make it beyond the reach of development, no successful business man ever selects such an unmarketable place, there is almost sure to be a steady increase in value that adds very materially to the fortune of the owner at the expiration of the tenancy. It is true such ownership may make a very substantial increase to the rent required, but if such increase can be comfortably carried it rarely fails to be a sure source of profit. A brick manufacturer, long since deceased, left a fortune of two and a half million dollars made chiefly in this way.

If a capitalist can acquire a profit from a real estate investment by allowing the land to remain unproductive for a long term of years, yielding nothing whatever toward the payment of interest and taxes, how much greater is the opportunity afforded the one that uses the land, and thereby saves a handsome sum in the way of rent.

I am aware that on account of the advanced value of lands adjacent to large cities a considerable sum of money is required to get a title, but usually a fraction of the consideration is accepted and the greater portion allowed to remain on mortgage. I would not be understood as favoring a rash rush into a project that cannot fail to end in serious financial discomfort, but simply say: if possible, with any degree of safety at all, own the land on which you place your plant, and it will largely pay you.

If a man goes into the business with everything to justify him in the belief that he can clear at least $5,000 a year, let him apply all over and above his absolute requirements to the burden entailed by the ownership of the land, and it will be strange, indeed, if he does not get a startling amount of interest on the same.

We sometimes hear the exclamation, "I made a grievous mistake when I took a partner in my business. I would have been worth double what I am had I avoided that painful division of the profits. I was crazed when I did it." These expressions have frequently been made when the truth of the matter was a partner with money was really necessary to save the business from financial ruin—it was his money that saved it from the clutches of the sheriff. Unless this condition does exist, of course it is a mistake to oblige one's self to divide the proceeds with one whose services are valueless, and whose money is not at all needful. A sane man does not take a partner from any sentiment of sociability—for the pleasure of his companionship in the journey along the commercial highway; it is entirely too costly for such indulgences. Partners have been taken into business concerns for the purpose of dividing the responsibilities of the same, but the healthy tradesman does not suffer from such nervous prostration—he feels himself competent to battle with circumstances alone.

A mistake of frequent occurrence is the starting of a business entirely disproportioned to the amount of capital on hand—the establishment of the largest of plants on the smallest of means. One indulging in such a plunging course may, by some strange combination of circumstances, disentangle himself from the net he has woven, but it is a dangerous experiment, and should be shunned as carefully as the mariner does the breakers of the sea.

The adaptability of the material to the purpose designed, the demands of the market you are depending upon for patronage—these, together with the facilities for the transportation of your products, are points that, if left unstudied, are sure to culminate in disaster.

Many in the brick business have been so short-lived, probably through the non-observance of some of the plainest precepts of the trade, that they remind one of the quaint epitaph written of an infant of but a few days' duration:

"Seeing I so soon was done for,
I wonder what I was begun for."

Failing to properly know one's self on entering a profession or trade is often productive of failure therein—the disastrous end of an effort to put a round peg in a square hole. By some sort of self-communion one is able to form an idea of his fitness for a certain calling, at least a partial idea, and great deference should be paid to his intuitions in this regard. I know of a man in the brick business whom almost anyone, after the briefest acquaintance, would declare admirably adapted for the ministry, and he often remarks had he been better acquainted with himself he would have been there.

Then, too, is it not true that a search among the pulpits of our land would undoubtedly develop many far better fitted for the rude precincts of a brickyard than for the rectorship of a church?

This self-examination is, therefore, of the highest importance, and proper regard to mental admonitions may avoid the application of capital and talent to a wrong purpose. Perhaps the most potent preventive of mistakes is the information we derive, or should derive, from the successes as well as failures of others in the same business.

Valuable suggestions are imparted by the calamities of our contemporaries; they hoist the red flag of danger, and are cautionary signals of the highest value.

It is also well to note the successes achieved by others, realize, if possible, the source of their sunshine, and, with due discretion, imitate them.

But, notwithstanding the strict observance of all the rules the best of prudence may dictate, mistakes will be made—made, too, by the wise as well as the foolish, and any article on this subject, if written by one of any experience in the brick trade, could fitly be captioned, "Blunders by a Blunderer."

Written for the CLAY-WORKER.

ROOFING TILE.

The Renaissance of Roofing Tile.

HOW STRIKINGLY the architecture of a people manifests their culture, intelligence, and even religious spirit. The Convent of La Rabida is a fit exponent of the artistic spirit of the age that produced a St. Simon Styletes, and the beautiful church in our illustration of this article of that more truly religious era that gave to the world a Florence Nightingale and the Society of the Red Cross. The Convent is utterly destitute of ornament, and, I might say, of even a form or line of beauty, and the church, while remarkably free from ornamental pieces of terra cotta, has the higher merit of architectural skill in being all beautiful from foundation to spire. We hail with delight the achievements of architect and terra cotta manufacturer that have made the roof, hitherto dull, dark, monotonous, the crowning beauty of an edifice. The terra cotta colors and the lights and shadows of the tiles are incomparably more pleasing than any effect that can be produced by any other material. Any other material is not pleasing, but, like a black hood on a beautiful woman, covers and conceals beauty. We could give many illustrations of our subject in views of private residences and churches, but we cannot give the terra cotta colors, and therefore can show only half their beauty. Enough can be shown, however, to prove that great progress has been made in the art of making roofing tiles within the last twenty years. Much of this progress has resulted from the use of heavy power machinery, but the large piles of broken and deformed tile at every factory are evidence that unfailing patience, painstaking and untiring skill and a large expenditure of money have been necessary. Their experience would seem to indicate that there are more difficulties to overcome than in any other branch of clayworking. To be almost successful is to fail. A brick, a drain tile, a crock, if somewhat defective in form and color, may be sold, but a lot of poor roofing tile are of no use. All the bearing surfaces of a roofing tile must be in the same or parallel planes—"out of wind," as carpenters say of a board they have planed to a true surface. If it is a poor pattern it will invariably warp. If the pallet is not true, the tile will be like it. Every detail must be right, or failure will ensue. One of the most important considerations before embarking in the manufacture of roofing tile is the selection of suitable clays.

It is very desirable to have works located where clays may be obtained that will burn to a variety of colors. This art should not be fettered with the idea that an Indian red is the only suitable color. The art of brickmaking suffered greatly from such a misconception. It is commonly supposed that red is the only terra cotta color, but encaustic tiles and ornamental bricks show us a great variety of colors. The architect and the cultivated taste of the people may demand that these colors be shown in roofing tile. These colors are the richest and best we have for building purposes. When will we learn to appreciate them? It is painful to notice the attempts to color clays. One of the first is called the Obsidian, which might be suitable for a house in mourning for thirty days. Do not think we could bear it any longer. A homogeneous clay will burn to a smooth and uniform color, but any admixture of clays seems to give the surface the appearance of having been washed with some coloring fluid, and this is true when oxide of iron is used to color the clay. All such attempts within the knowledge of the writer have been unsatisfactory. The manufacturer should have a variety of clays, each of which should, after a thorough preparation for molding only, burn to a rich uniform color of some kind.

Clays should be selected that will hold their form and substance to the point of vitrifaction, such as will make stoneware, sewer pipe and vitrified paving brick. Do not understand by this that we consider a vitrified body a necessity or a glazed surface desirable. To obtain a vitrified body greatly increases the cost and the losses of burning. The tiles would have to be burned in seggars or in compartments of seggar blocks. But what is a more serious objection is that the heat destroys the beautiful terra cotta colors. The development of these colors should be the great object of the manufacturer, second only to the making of a weather-proof tile. Glazed tiles, excepting for ornamental courses or pieces, do not appear to be desirable. They are dazzling, and, therefore, unpleasant to the eye. There is, however, a demand for them, and the glazes used for earthenware are used.

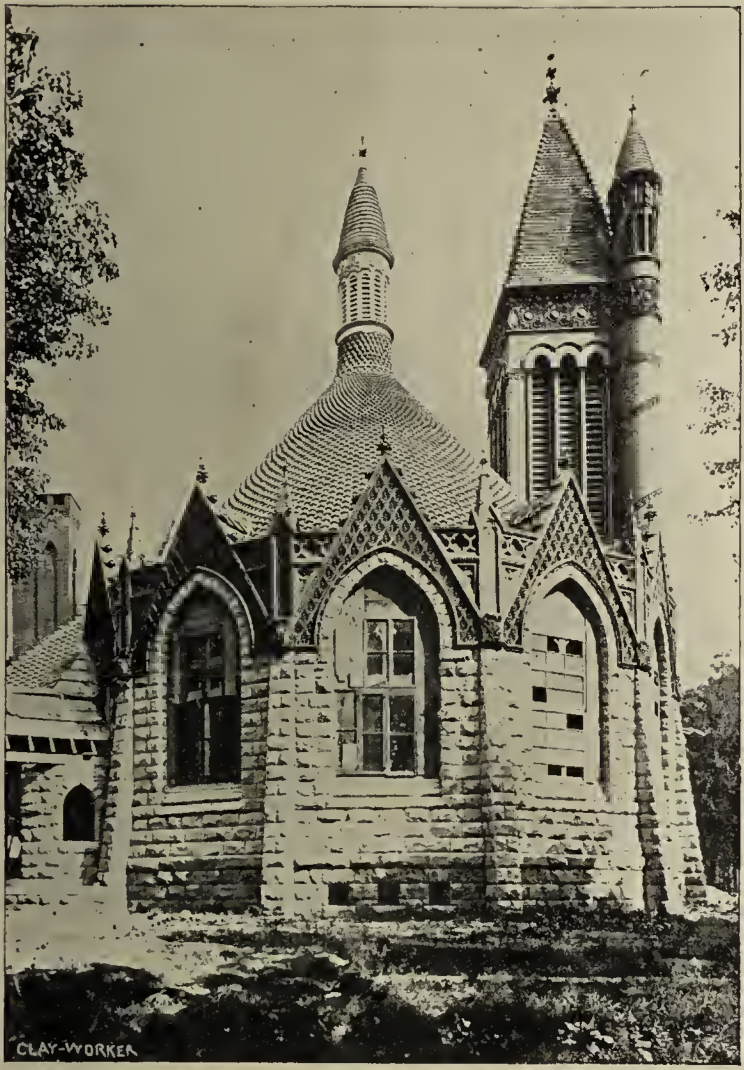
S. D. B. CHURCH, Plainfield, N. J. Roofed with Celadon Tile.

—Efflorescence.—

Clays that are mined or excavated from deep banks are liable to make ware that is subject to efflorescence. It is exceedingly annoying to the manufacturer after he has made apparently perfect ware in body and color, and to the owner of a residence, after he has embodied it in his home, to have it disfigured by this unsightly stuff. We find that clays of but little depth, and, therefore, exposed to air, frost and rain, are usually free from the nuisance. One would judge from this fact that the wintering and washing of clay is a preventive. We know of no manufacturer of tile in this country that has adopted the process of washing the clay, but as it is the process generally used by potters in connection with the filter press, it would seem to be a very suitable process for the manufacture of roofing tile, where uniformity of color and freedom from efflorescence cannot be obtained without. And if colors are to be used, we know of no better way to apply them than in the agitator tank, from which the liquid clay is pumped into the filter press.

—Bloaters.—

There are bloaters in tile as well as in brick, and, as in brick, they only appear when the kiln is at a heat sufficient to cause vitrifaction. They indicate the presence of an objectionable element in the clay, which, at the heat required for stoneware, volatilizes, forming a gas which expands the body of the ware, sometimes so much as to cause a rupture. When the gas escapes the expansion subsides and the rupture partially closes. Good earthenware tile may be made from clay that at a vitrifying heat will make bloaters, and clays are quite abundant that will make good earthenware tiles. Indeed, it is more than probable that the vitrified tiles made in Europe bear but a very small proportion to the earthenware tiles. Nevertheless it is desirable, in selecting a clay for a factory, to obtain that which will make vitrified tile. The advantage of using such a clay, even if you want to make earthenware tiles only, is that there is a greater margin between the heat that will make that body and the heat that will destroy the ware, and the color is less liable to be injured by heat.



ANOTHER VIEW OF THE S. D. B. CHURCH, Plainfield, N. J.

—Tests of Clay.—

Clays that will effervesce on being treated with acid may make good earthenware, but are not to be depended upon for stoneware. The use of acid is a good preliminary test, but by no means conclusive. There is no test or analysis that is so good as a trial by fire. Subject clay from various parts of the bank and a mixture of clays from such parts to a heat that will produce vitrifaction, and if the specimens produce a vitreous body, free from air cells, the clay may be considered good for roofing tiles. We have tried many specimens of clay that would make good brick in a kiln of salt-glazed sewer pipe, and found them nearly consumed or full of cells. It is not true, as has been stated in some of our Conventions, that any clay may be salt-glazed. Salt is never put in a kiln until a vitreous surface appears on the ware, and there are many clays that will not produce a vitreous surface.

—Analysis of Clay.—

An analysis is supposed to be the acme of scientific knowledge in regard to it, but it simply shows us the proportion of the elements that compose it. That is not important. What we wish to know is whether it will dry and burn safely. What color and what kind of body will the ware have when burned? Chemistry recognizes no varying conditions in the elements of a clay, yet we find that silica may exist as a sharp, coarse sand, or sand of almost impalpable fineness, or in which the grains have been made smooth and rounded by attrition. In the first case it will dry and burn safely; in the latter give constant annoyance and loss by the ware cracking in both processes. There may be changes in the condition of alumina not shown by an analysis that would affect the working of the clay or the body of the ware.

Professor Mapes once delivered a lecture entitled "The Progression of Isomeric Compounds," in which he maintained that certain rocks, though rich in phosphates, would, if applied to land, produce barrenness, because they were not in condition to be assimilated by plant life. There are some things the presence of which cannot be detected in a laboratory. Dr. Chalmette, of the school of Pasteur, said that the analysis of the virus of the cobra was the same as the white of an egg. An analysis will give you certain facts from which you can form a conjecture, but if you wish to know that a certain clay will dry safely, burn safely, have a good color and a good body, there is no other way of knowing than to mold it, dry it and burn it. No small specimen will answer for trial. There are a great many clays that will make a miniature brick, ½x1x2 inches, that are not in the least suitable for making common brick or a roofing tile 9x16 inches.

When a submerged and dangerous rock is discovered in the course of navigation the government places a buoy or erects a lighthouse to warn seamen. So we have marked some of the dangers that beset your craft on this sea of business enterprise. We would not underestimate the dangers or lead you to believe that you are to be wafted by gentle breezes into the harbor of success. You should have something more than a knowledge of the dangers and processes of the art. A young lady said: "I think I know how to be polite, for I have read a large book on etiquette through." Without a love for others one cannot be very polite. Without a love for your work you cannot be very successful. G. S. TIFFANY.

SLIPPERY ASPHALT PAVEMENTS.

These are the days that try horsemen's souls. Beware of the asphalt pavements. They are so slippery that even with sharp calkins and leather or rubber pads horse traveling on the asphalt is frightfully dangerous. The American Society for the Prevention of Cruelty to Animals would do well to station its merciful agents along Nassau street, and at the junction with Broad and Wall streets, to help the poor dray horses when they fall. They should also compel every driver to provide his horse with some sort of protection. As the Rider and Driver has frequently pointed out, the asphalt pavement is delightful in mild and dry weather, cleanly, smooth and noiseless; but in winter, time of snow and sleet, and alternate thawing and freezing, it is a barbarous abomination and outrageous cruelty to horses and a disgrace to civilization. The authorities, when making contracts for placing asphalt, if they must have that kind of pavement, should compel the contractors to not only keep the pavement in repair, but also sprinkle it with sand in freezing weather.—The Rider and Driver, January, 1896.

Written for the CLAY-WORKER.

ANOTHER IDEA OF SETTING AND BURNING COMMON BRICK.

THE FIRST THING NECESSARY to obtain a good burn is to see and insist on having your green brick uniformly dry before setting in the kiln, not bone dry, but as dry as your clay will permit, whether dried in open air, under sheds or by artificial dryer, and see that each succeeding bench set in your kiln is just as dry as the one set previously, or as near so as possible, recollecting all the time the more evaporation obtained before going into the kiln the less afterwards, and, according to my experience, at less trouble and expense, and less risk in burning, especially if you have an impatient burner in watersmoking a wet kiln, who, by crowding his fires just a little too much in order to gain time, is liable to either scald the brick or choke the kiln, especially if watersmoking with bituminous coal.

Secondly, if you are starting to build a kiln on new ground, see that your kiln ground is reasonably dry and kept so, and raised about twelve inches higher than surrounding ground and tamped solid so the weight of your kiln won't settle it out of shape before putting your fires in it, or a sudden rainstorm will not overflow it; also, a good idea is, after your ground is leveled off for one bench, pave it with a course of green brick or bats before putting your stringers down to start your setting on, and so on continuously for each bench, until your kiln is complete. You need five rows of stringers only for a four-brick bench, lapping your brick half way on center courses, thus leaving a space under your bottom brick for draft to help burn your bottom courses.

Third, in setting in kiln (and I have tried every way that I have seen or read of), set bottom course a little looser than you would to break joints over second course; set skintling so as to allow three-quarters of an inch space between each brick, with header of five brick on two courses next wall. Third course set straight, three-eighths inch space between brick as near as practical, then hack by breaking joints until you have got nine brick high. Set fifth and ninth courses inside of arch tight, to keep your bench upright when you have a white heat, and to spring your arch on. In turning your arch set your brick in pairs, i. e., two close together, then two-inch space. Set all your projecting courses perpendicular over each other, about a two-inch projection each time, and then fill in behind so it will bind the arch together. For a twelve-inch arch three projecting courses will cover one-half the arch; for a sixteen-inch arch it will, of course, take four, with a half-brick binding course set same way over your projecting courses to bind your arch together; then a cross course, set three on three or eight on three lengths, as the size of your brick will permit, so as to give you a three-eighths inch draft all through your setting above your arches. You can set them a little looser for two courses next kiln wall if you wish, but I find that is immaterial either in clamps, Dutch kilns or up-draft furnace kilns.

I find about forty courses of brick in height is about the nearest medium to go by in the height of an up-draft kiln, with one course of good, hard-burned brick flatwise on top.

It is immaterial whether a kiln is set skintled or in cross tiers, as to the results in burning, providing draft space in setting is the same.

To obtain best results it is necessary to have good kiln walls. If you intend to burn wood a dead bottom is best; if soft coal, I would recommend, for a clamp or Dutch kiln, grates four feet long, with ventilating furnace and ash-pit doors; if a furnace kiln, would recommend dead bottom for either wood or coal. But furnaces must be specially constructed in each case and adapted to the kiln on which you intend to use them.

Now, a few words in respect to burning, in order to qualify my assertions as to brick setting as given above. My first experience in setting brick this way was in 1870, on the yard of S. McHose, Geneseo, Ill., and the kilns were set expressly to burn with soft coal, dead bottom furnaces, fired from top, using no doors. I was setting and burning for him at that time, and we had good results, so much so that I adopted that mode of setting for all kind of up-draft kilns afterwards that I had anything to do with, either in setting or burning. I found the result to be this: the heat escaped from your arches almost as fast as generated, consequently your kiln dried off quicker. When your top brick were redhot your arches were very little hotter, so when your kiln was redhot all over the top you were in first-class shape to raise your fires and start burning in earnest, without any danger of getting your arches out of shape before your kiln was finished.

Now, of course, it would not do at this time, in some kinds of clay, to make all the heat you could and trust to God for results, but it would do to keep your platting tight and increase your heat gradually, until you could see your top course white hot under your platting, allowing draft enough through your doors to obtain this result, and keep your bottom and arches back, which you would do so long as you let draft through your doors.

With your kiln in this shape it is time to fire light and often, keep your doors tight, keep all the cold air you can from striking your arch brick, and note the result through your peepholes, also along the outside walls on the top of your kiln, which will inform you that your bottom is very hot, your arches a uniform settling heat, your outsides getting hotter by the heat from the center crowding your walls from the kiln, thus creating a draft to help burn the outside courses, also putting the burner in mind there was some propping to do in order to save escaping heat, or possibly his kiln walls.

Finally, when your kiln is stopped up, or firing ceased, and given a reasonable time to cool off, and the counting-out process is so far under way that you have moved four, five or six benches, and find your overhangers and bench brick all good, sound and straight, and the best and most saleable brick in your kiln, you will say, as I said twenty-six years ago, I will adopt this way of setting and burning so long as I use an up-draft kiln, whether it is a clamp, Dutch or furnace kiln. The principle is the same, but the application may be a little different, but which I can study out, and know I am right and profit by it.

RICHARD HIBBERD.

CATHODE RAYS ON A BRICKYARD.

A foreman, a little box, a clay bank full of bowlders;
A focus, a button pressed, no trouble left for molders.
A kiln of brick, a settling heat, don't lie awake at night, sir;
That little box, it tells you facts—those brick are burned just right, sir.
The mill is broke; what could it be that busted things to pieces?
Turn on the gas, uncork the rays; all guessing, then, it ceases.
A man will kick, say he was on, a dead sure thing last "Winsdy."
Bring out the card, scan all the mugs. Ah, Mike, you were on a "shindy."
A load of brick looks straight and sound as to the job it goes, sir;
Clickety, click, the fraud is found—the bats are all below, sir.

Written for the CLAY-WORKER.

THE CERAMIC ASSOCIATION OF THE OHIO STATE UNIVERSITY.

THIS AGE is essentially one of organization. There is scarcely a trade or profession in existence to-day that has not its local, State, national and even international organization. The truth of the old adage, "In union there is strength," is acknowledged by every one. This is proven not only by the workings of societies, but also by the great trusts, combines and monopolies that tend to control, and do in many cases, the particular lines of trade with which they are connected. Although associations antedate history, yet the world has continued to advance from time immemorial, whether aided or retarded by their existence, but statistics show that the results of most organizations are beneficial.

The question of forming a Ceramic Association was frequently discussed among the students during the first year's existence of a ceramic course on American soil. Although this question afforded much controversy, yet the promoters failed to accomplish the desired effect at that time. One of the leading arguments advanced for organizing was the "fun" which would arise in the initiation of the new members, but the more reserved heads opposed an organization for such very inadequate reasons, and concluded to wait until a more favorable time presented itself.

When we considered the benefits and progress resulting from the various organizations that come within the scope of the clay industry, and foreseeing the inevitable good which would result, we felt that a similar organization was essential if we wished to be kinetic, so, early in December, 1895, the members of both classes met and the question of organizing under the title of the Ceramic Association of the Ohio State University was at last settled, and it was decided to form such an association. The constitution was then drafted to meet the demands of the association, which was adopted at the following meeting and the officers elected for one year. From that time the interest manifested among its members has steadily increased, and each meeting is looked forward to with eagerness and anxiety. Although this association emanated from an humble beginning, yet its future possibilities are such as will not admit of prophecy.

The term "Ceramic Association" is vague and somewhat misleading in the broad sense in which it is used. One of our number interested in the manufacture of clay ware, while in Chicago, spent a little time to visit the Ceramic Association of that city. He was dumfounded when he discovered that it was composed of only a few ladies who deftly flourish the brush in the decoration of porcelain. Would it not be more appropriate had they called themselves "china painters?" This kind of artists cling to this sort of a name wherever we find them. To avoid any possibility of mistaken identity, and to receive cognizance, we debated whether or not to adopt the name which most properly applies to our association.

The following paragraph from the preamble of the constitution will readily show to what end this movement was directed:

"We, the undersigned, students in the ceramic department of the Ohio State University, being desirous of forming an organization to widen and broaden our views pertaining to the clay industry, to afford mutual assistance, to bring the different classes into closer relationship, and to stimulate a more brotherly feeling among the members, do hereby pledge ourselves to be governed by the following constitution and by-laws."

The regular meetings are held every three weeks, at which

S. GEYSBEEK, FIRST V-P. E. J. JONES. A. S. FREEMAN. A. Z. DELONG, SECOND V-P. A. V. BLEININGER. J. W. WOLFLEY. W. W. WORCESTER.
J. C. ADAMS. PROF. EDWARD ORTON, JR. E. E. GORTON, PRES. E. F. BRADDOCK. CARL GIESSEN, SEC. AND TREAS. D. C. THOMAS.

original papers, containing as much of the writer's personal experience as possible, are read. Besides, debates occur on various topics which fall within the range of our work, and particularly to questions of the day, followed by a general discussion of queries appearing in the question box. The interest in these meetings has been aroused to such an extent that it is found desirable to hold special meetings between the regular meetings of the association. Even the "practical" men about Columbus feel that an afternoon could not be more profitably spent elsewhere, as is shown by their presence at these meetings.

The ceramic library consists of all available works on the market pertaining to the ceramic art, besides all the current literature and periodicals, including German and British publications. The entire list of members constitutes the Paper Committee, each of which is assigned a paper, from which he reports all the important articles contained in such periodical to the Executive Committee three days prior to each meeting. The Executive Committee keeps an accurate account of these reports by recording them in the index book. Thus the latest discussion on any topic can be traced without loss of time. It has been the aim of the department to secure all the best publications with a view of binding the same as the accumulation increases.

Shortly after the organization was perfected Professor Orton, Jr., was elected the first honorary member, and at a subsequent meeting he addressed the association, giving them valuable advice along the lines of work, expressing what the association might achieve, and of the ultimate good which would result from organization. He not only regarded this movement as being one from which the best results could reasonably be expected, but indicated why and how it could be made effective; and closing, he complimented us in the step we had taken, and particularly so because the idea originated with the students and was carried out by them.

The motto of the association, "Ex Argilla ad Argillam," appears on the insignia of the association, which is represented at the heading of this article. We regarded this weighty motto quite applicable because it applies to the anatomy of the clayworker himself and coincides with Scriptures, which say, "From dust thou art and unto dust shalt thou return." The pin is of solid gold, the raised portion being of black enamel, with the exception of the kiln, which very lustrously represents the college colors—scarlet and gray—the flame and fire holes being scarlet. This little pin of unique design, which is the pride of every wearer, has already acquired respect, and it has become fairly well known by the "clay" men in Ohio, especially at places visited by members of the outgoing class while on their inspecting tours. As the years roll by it is needless to say that this emblem will be worn by countless numbers who look to the Ohio State University as their Alma Mater.

E. E. GORTON.

MORTAR OF BRICK DUST.

IT WILL NOT be without interest, says the Moniteur de la Ceramique, in a recent issue, to make a note of the application of brick dust for the making of mortar. Why not, indeed, use this substance if it is good, and even economical in certain cases, as a substitute for cement? Experiments have been made with a mixture of this substance with quick lime, and blocks made of such composition, thirteen millimetres thick, after having remained submerged in water for four months, have sustained, it appears, without cracking or breaking, a weight of 10,500 kilograms per square decimetre. One part in ten of the brick dust was sufficient to give ordinary mortars a remarkable cohesive power. This composition was serviceable for the construction of drains, reservoirs, cisterns, the tops of terraces, etc. The best proportion is one part of brick dust, one of lime and two of sand, the whole mixed dry and wet with the water necessary.

The brickmakers are especially interested in this subject. They are usually overburdened with brick debris, which otherwise is of no value, and experiments with the material are certainly worth the trouble and expense involved.

Written for the CLAY-WORKER.

ARTIFICIAL DRYING.

BY R. B. MORRISON.

I READ WITH INTEREST the excellent paper entitled "Improved Methods of Drying Brick," read before the Ohio Brick and Tile Association by my esteemed friend, Richardson, of that State. The principles of construction advocated in his paper were, first, it must be fire-proof; second, it must be a tunnel dryer of the progressive type. * * * Third, the heated air must be supplied at the discharge end of tunnel, and not throughout a large part of the tunnel, unless the clay is one not subject to checking. Fourth, the draft should be artificial and under control of the operator at all times; that is, the circulation should be produced by fans instead of by stack. Fifth, the heat must be obtained from the waste heat of kilns from combustion of fuel in furnaces. Sixth, from steam pipes, preferably, in the order named. The second and fifth propositions are not quoted in full.

I remarked at the beginning the excellence of the paper, and it is well known to members of the N. B. M. A. that what Brother Richardson says about brickmaking usually goes. I will simply review some of his "principles," and should it appear to the readers of this article that there is difference of opinion, understand there is distinction without a difference. I entirely agree with his first proposition; almost entirely with the second. With the third, viz.: the heated air should be supplied entirely at the discharge end of tunnel—here there is a "distinction."

Heated air will rise. This is a well established fact, and should a tunnel seventy-five feet to one hundred feet in length be heated entirely from one end, the heat drawn the entire length, the heat at the top, after it had traversed one-third this distance, would be higher by several degrees than at the bottom, and I cannot see how the tunnel could be uniformly heated its whole length unless the bottom was kept hot from beneath. Brother Richardson may have some plan which he does not explain in this paper.

The fourth proposition: that the draft through the tunnel should be forced or artificial rather than natural. There are some objections to this plan. One is it requires keeping steam and running an engine to operate it. If a draft stack of sufficient height is used, I think it will answer all purposes, and requires no expense to operate it. The condition of the atmosphere does affect the draft of stacks to some extent, but they always draw. So make the stack with greater capacity than is required when conditions are favorable and close the damper partially, then, when conditions are not so favorable for good draft, open the damper, and in this way still control the draft power of the stack.

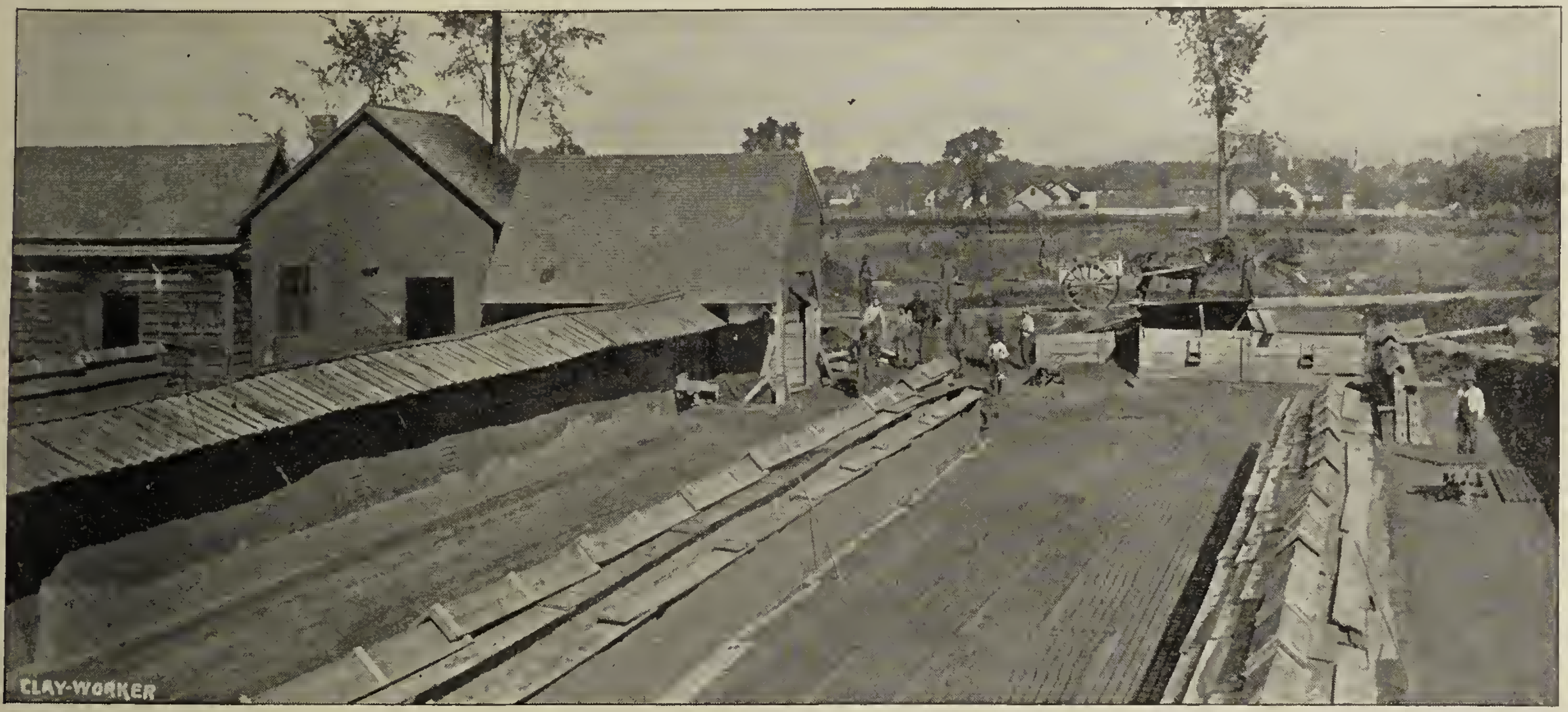
Again, I do not think it is best to take out a car of dry brick at one end and move the train and put in a car of green brick at the other. I believe a tunnel should be heated uniformly top and bottom its entire length. The tunnel should be filled as rapidly as possible with green brick, then close it up and leave it with moderate draft until every brick on every car was heated well. Then increase draft as much as desired. In this way each brick would have an even chance to expel its moisture, while, by continuous filling and discharging, with a strong draft, bricks on the surface of the carload are half dried before those in the center are well heated through. In my opinion this method would prevent checking of tender clays.

As I have stated before, the great mistake made in drying is putting too many brick in the space allotted to a car in the tunnel. Heat cannot and will not filter uniformly through a car of brick in a tunnel with a forced draft, unless there is ample space for its free passage. Bricks on the surface of the load are dry, while those in the center are only half dry. Heat, in passing, comes in contact with dry bricks and is wasted, while those that could utilize the currents of dry air get only a small percentage.

Water will move slowly through obstructions in its channel and move smoothly. If, however, it moves rapidly through the same obstructions, it will eddy and foam and break in waves. Heat moves on the same principle. Let it move slowly and it will permeate the center of the car and move steadily through the interstices between the bricks, while if forced rapidly through the tunnel it will eddy and rebound, and seek a passage where there is least resistance.

To dry brick economically in a tunnel heat must be supplied to every brick on the car at the same time and at the same degree. Then, when one brick is dry all are dry. When one-half the load is dry in twelve hours and we must keep these dry bricks waiting until the other half is drying another twelve hours, we are wasting heat. What is needed is space, rather than greater draft, to obtain best results economically.

The first proposition, viz., a dryer should be fire-proof, is the foundation upon which all dryers should be constructed.



Portion of Plant of Geo. W. Ball's Sons, Keene, N. H.

Here I think Brother Richardson should have dwelt a little longer. The proposition is so reasonable and sensible that it does seem that it is unnecessary to argue this point, yet dryers have been built that have destroyed, and others yet to be built will destroy, many valuable plants. They can be built safely with little more expense than one liable to burn down. Too little thought and attention is given to the details of construction.

I wish to congratulate my distinguished friend on his able paper, and I have no doubt the readers of the Clay-Worker would be pleased to hear further from him in reference to his plan of utilizing kiln heat to dry his brick. This would not only be interesting, but profitable knowledge to all who dry brick.

Voluntary patronage from subscribers who trust and respect and from advertisers who base confidence upon proof of value is the most precious and enduring foundation for newspaper success.—Newspaperdom.

Written for the CLAY-WORKER.

DEVELOPMENT OF THE AMERICAN BRICK.

BRICKWORK became common in this country in the early part of the eighteenth century, and, until the trouble between the colonies and the mother country, bricks were mostly imported from England. There was not much inducement to produce home-made bricks previous to this time, as vessels sailing with light cargoes for the colonies would finish out with bricks, which commanded ready sales at moderate prices, rather than with stone ballast, which would have to be thrown overboard before receiving their heavy return cargoes of tobacco and other exports of the colonies.

In this way a number of brick buildings were constructed on the tide waters of the Atlantic coast in the times which preceded the troublesome period of the revolution.

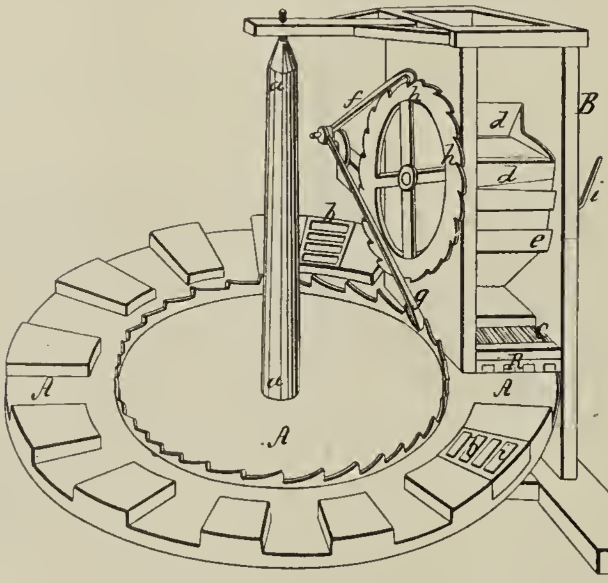
At the time immediately following this war there was but little done in the line of building. The generally distressed condition of the industries and the finances of the country was a bar to any improvements except such as were in the nature of repairs necessary to make buildings habitable.

The condition of things after the adoption of the Constitution greatly changed. Churches and other buildings of a public character, which had remained in an unfinished state during the entire period of the war, were completed, and a few houses of a substantial character were erected in some portions of the country, home-made bricks being generally employed when they could be obtained and the character of the building admitted, which was but seldom, as wood and stone entered largely into the construction of the greater proportion of all the buildings.

The inventive genius of the new nation was not much stimulated to improving on the manner of the mother country in the production of bricks. In fact, those that we then made were poorly molded and burned, and compared unfavorably with the common building bricks of English and Dutch manufacture. But at the present time, both for quantity and quality, we have no equal in any nation of the world, and for this we are largely indebted to the American patent system, which greatly fosters and encourages development in this line, as in other and kindred arts.

Improvements in modes or machines for manufacturing common bricks received but little attention until about 1835. Previously they were remarkable for being unique in some special point of but small importance rather than for any generally good achievements; that is, no attention was paid to the resulting brick after it came from the kiln. The whole idea seemed to be to shape or mold it in some manner. For instance, one machine was made like a box now used by plasterers to run off their lime. It was elevated slightly, and the mud, which was mixed in the box, allowed to pass through a grate into a large framework, having sides about three inches high, and divided by wires stretched lengthwise and across it, which lay upon the bottom, and when the clay in the box was somewhat hardened the wires were raised and the bricks thereby cut and formed into shape. The box, when emptied of the clay, could be easily moved on wheels running on a plank gangway to the next shallow mold box, and so on. But the slush stock made in this way was very inferior. It would dry unequally, be full of cracks, and was subjected to no packing, as in the pug mill, or pressure, as by machines of to-day, or a blow, as is done by the hand molder, who dashes the tempered and packed clay into the mold with great force, and again drives it down and closer together with the hands and plane. When the bricks came from the kiln they were light, very open or porous, therefore absorbed water readily, and were entirely unfit for building purposes.

The mode of manufacturing brick has been revolutionized during the last twenty-five years, and it seems almost like a miracle when we note the present development of this art, and then recall that the first crude brick machine which was made in this country was invented in 1835 by Nathaniel Adams, who died at Cornwall, N. Y. The machine was simply a hand molder, but he afterwards, about 1840, invented a power machine. It proved quite successful, and a few of them may still be seen in use. Mr. Adams was also the first to invent and use the iron tempering wheel. The model of his brick machine can be seen in the Patent Office, at Washington, D. C. It is related that in the forties Mr. Adams undertook to establish a brickyard at Philadelphia, and built a power (probably horse-power) machine, but he was not allowed to start it, as a mob destroyed the machine and drove Mr. Adams and his family from the city. They took refuge in Camden, where they remained two weeks or more, until the workmen had quieted down and it was safe for them to return. In the year 1840 many of the people in Philadelphia could not get work at any price, and they did not like to recognize anything which they thought would take the physical labor out of their own hands.



N. Adams Brick Machine, Patented 1836.

The enlarged and more convenient methods of making brick, as practiced in the vicinity of the larger cities of the United States, came from necessity to meet the increased demand, owing to the growing of our building interests incident to the increase of our population.

With the increased demand for building material in the Eastern and Northern portion of the country came a decrease in our lumber supply. Something had to be found to take the place of timber, and nothing could be so serviceable and durable as brick, or that would withstand the action of the elements as well.

The business of manufacturing bricks, like any other calling, demands, in the present age of machinery and competition, the closest attention and personal supervision, even in details, in order to insure success, and the measure of prosperity is small to the brickmaker whose heart is not in it and whose mind is not upon his business. In this craft there is no sentiment; on the contrary, the brickmaker's life is one of laborious application, unremitting watchfulness, with large and constantly increasing responsibilities. From the moment the clay is dug in the bank to the time the brick is delivered to the building there is not a single step or move but what demands the individual supervision and exacts the watchful eye and constant care of the brickmaker who expects and desires success. Before long the old-time typical brickyard, with its primitive outfit, will have become a tradition of the past, and will have scarcely a place in our memories. It has answered the purpose for which it was designed, has performed its part in the building and improvement of this marvelous land in the early struggles of the people of this country to provide shelter and homes for their families; it has filled no unimportant place. Up to within a few years ago the hand brickmaker did not recognize the logic of wants or yield to the restless genius of the minds engaged in the persistent purpose of inventing machinery that would make a better brick cheaper than could be made by manual process. We cannot blame him if he still loves the sound of the walk dropping in the mold, the peculiar smell of the poplar slider and the cracking of the Penmouth fire, all of which have a charm for the old-time brickmaker.

We have thus reviewed, in a general way, the early history of brickmaking in this country, and in the next number of this paper we shall begin to treat the subject as relating to modern times. The author has seen fit, in discussing this question, to divide the country into several sections and treat each one separately. Next month we will follow the progress of brickmaking in New England, and, after that, take the several sections in their turn till the whole ground is covered.

R. N. BUELL.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 43.

—Puddling Continued.—

THE FURNACE described in my last paper has the fire-box separated from the working chamber by a bridge wall. When the furnace is hot a "charge" of about 500 pounds of pig iron is thrown into the basin above described, and, along with it, a few shovelfuls of roll scale or hammer slag (a fusible oxide of iron, containing some silicate of iron). In about half an hour the pig iron is melted, and the hammer slag, too. During melting the damper is opened to its full extent and the fire is urged to its utmost. When all the iron is in a thin liquid state the damper is lowered to bring it on the boil, and "rabbling," or puddling, begins in earnest. This consists of agitating the liquid metal with an iron tool called a "rabble," a strong iron bar, with one end turned up like a narrow rake. In a short time the metal begins to swell up like foam, and blue jets of flame shoot out all over its surface. This was at one time thought to be sulphur flames on account of their color. Chemistry rectified the mistake, and informed the ironworker that the flames were carbonic oxide, not sulphur. Presently the iron, which lay placidly in a pool at the bottom of the basin, and only covering it to a depth of about two or three inches, is boiling over the top, and little sand-like grains appear in the liquid, which increase in number until the liquid becomes stiff with them. The damper is now raised again and the boiling subsides, leaving the bottom covered with masses of snowy white crude iron. This is collected with care and skill into suitable balls, taken to a hammer or squeezer and shaped for the rolls, where it is rolled into flat bars called "puddled iron," or "muck bars." These require reheating and rerolling for finished iron.

—Heating Furnace.—

Heating furnaces are of the reverberatory class, and are usually flat-bottomed. The bottom is made with refractory sand, which is fused solid before charging iron upon it, and slopes gently from front to back, and from fire bridge to flue, to allow the cinder (oxide of iron) formed during heating to flow to an outlet at the lowest point of the furnace. This oxide or flue cinder combines with some of the sand of the bottom, and is to some extent a silicate of iron, and of little further use in iron works. It is used sparingly at the blast furnace with better ores, but invariably lowers the quality of pig iron when so used. There is also considerable oxide or cinder made at the puddling furnace. This is also a silicious oxide, but not to the extent of the flue cinder just described. The puddler taps out the superfluous cinder he has left in the furnace after taking out all the iron. This is run into an iron pan on wheels, called a tap wagon, where it is drawn aside and allowed to solidify, and is called "tap cinder." This is also used in the blast furnace when the quality of the pig iron is out of consideration. I would here remark that the cinders described above are iron ores in every sense of the term, just as much as are those dug out of the mines; of inferior quality, of course. When the blast furnace is working on cinders alone, or nearly so, the pig iron produced is called "cinder pig," and is the lowest priced pig iron on the market.

—Chemistry of Puddling.—

To the casual observer puddling appears to be a very laborious and entirely mechanical process, something akin to pugging clay, but simply agitating liquid cast iron will never produce wrought iron. Nevertheless, many practical puddlers are quite unaware of the beautiful chemical phenomena occurring daily in their furnaces, every heat furnishing optical demonstrations of the fact. The escape and burning of carbonic oxide during the "boil," said and thought by them to be sulphur, they claim to be driven out by their skillful use of the "rabble," whereas a much greater power is at work inside the furnaces than any human power outside—the power of chemical affinity.

I mentioned in a former paper that pig iron contains a variable percentage of carbon and silicon. For puddling purposes it ought not to contain more than 2 per cent. of each, while less is more desirable. The object of puddling is to deprive the iron of these two elements, and, incidentally, of sulphur and phosphorus. The affinity of carbon for oxygen at high temperatures has been alluded to before in the combustion of fuel, which is an example of affinity pure and simple, and a combination only is the result. In puddling, however, there is another reaction, that of decomposition, caused by the carbon asserting its preference for oxygen over iron; also of oxygen manifesting its superior affinity for carbon over iron.

The lining of the furnace—both bottom and sides—is oxide of iron, as stated above, and the few shovelfuls of roll scale—thrown in with the charge of pig iron—is also an oxide. Here, then, is our reservoir of oxygen. When the pig iron and the scale are both melted, the iron, by its superior specific gravity, sinks to the bottom, while the cinder or scale floats on top. The puddler, with his rabble, agitates the liquids, mixing them as much as possible, thereby causing as much surface contact as possible. In this way the carbon of the pig iron and the oxygen of the cinder are brought in chemical contact, and both immediately leave their partners—the cinder and pig iron—to form the new partnership, called carbonic oxide. On emerging from the bath of metal and cinder they are met by another member of the oxygen family, who is immediately taken into the firm, with the resulting blue jets of flame, which announce that the firm is now known as carbonic acid. This is, briefly, how the carbon of the pig iron is disposed of. The rabbling or puddling of the iron is simply to bring fresh surfaces in contact, and so hasten the process.

The silicon is similarly disposed of by the bath of cinder. Here, again, oxygen prefers silicon to iron, and silicon has a stronger affinity for oxygen than iron, therefore the oxygen of the cinder combines with the silicon of the iron, forming silicic acid; then the oxide of iron (the cinder bath) unites with the silicic acid and a double compound is formed, called silicate of iron. These combinations and double or compound combinations may, to a certain extent, be illustrated in a homely way by the way companies are sometimes formed. A and B combine and run a brick plant; C and D unite and go into the tile business. The two plants are on adjoining properties; the two parties are brought a good deal in contact with each other; friendship strengthens, and finally the affinity is so strong they join, or combine, their interest and become one company or combination. This silicate of iron, or mixture of silicate and oxide of iron, when done with by the puddler, is returned to the blast furnace and subjected to the same process of reduction described in a former paper, and is returned to the puddler in the shape of pig iron, and thus the process is continued in a cycle, like everything else.

The slag, roll scale, etc., found and used in the iron and steel works is the result of unavoidable waste—leaving out of consideration the willful and deliberate waste by neglect and the destructive consequences of ignorance and incompetence. These slags, scales, etc., are oxides and silicates of iron. The oxides form very rapidly while iron is hot and exposed to atmospheric influences or to an atmosphere of carbonic acid, such as that of a heating or puddling furnace when rushed to its full extent; that is, when any attempt is made to reach the maximum of temperature, then, of necessity, carbonic acid must be made in abundance, and it will oxidize iron as quickly, if not more so than common air. I may incidentally mention that an atmosphere of carbonic oxide will act just the opposite way and reduce iron.

It remained for the late Sir William Siemens to teach iron and steelworkers the nature and effect of oxidizing, neutral and reducing flames. In such works, of course, it is of the utmost importance, both practically and theoretically. He it was who taught puddlers how to build and operate an almost perfect furnace, and, instead of wasting by oxidation from 8 to 12 per cent. of the iron charged, to produce a few pounds in excess of what was charged, or effecting a saving of from 500 pounds to 700 pounds of iron per single furnace in twenty-four hours.

I can imagine some clayworker saying: "Yes, it seems to be an all-important matter that the ironworker should have an intimate knowledge of the nature and properties of heat, flame, etc., but I cannot see where oxidizing and reducing comes in in burning clay goods."

Well, if there were no other consideration but simply producing a high temperature, then there would be but little gain, except the pleasure of knowing these things, but when working clays containing iron ores, and the color of the product is of much importance, as in the case of red front bricks, when the nature and effect of reducing flames are alike in importance to the clayworker and ironworker. Again, in the proper distribution of heat in a kiln it is of paramount importance. A change in the direction of draft is all very well in its way, but that alone will never equalize the temperature of top and bottom of kiln.

Under ordinary circumstances the source of heat is the hottest place. The furnaces or arches of an up-draft brick kiln are much hotter than the top of the kiln, and the consequence is black heads in the arches and salmon on the top, especially where they are set forty or fifty high. With an adequate knowledge of properties of the several flames, and how to produce them, it becomes an easy matter to scorch the top and leave the arches comparatively soft, if it were necessary, or, in other words, it becomes a matter of little difficulty to reverse the order of heat in the kiln, and consequently an easy matter to practically equalize the heat from top to bottom.

As I have said in a previous paper, a study of iron ores and the phenomena of their reduction by carbon is of the utmost importance to the brickmaker in connection with the coloring of his product, for on the changes of the iron ore in the clay depends the resulting coloring of the bricks. It will also show the real value of mixing coal dust with clay for producing bricks apparently hard burnt, but in reality only very dark colored bricks, with salmon strength and hardness, and sometimes even softer, notwithstanding their deep, dark redness, leaving the impression of high temperature effects.

There is an amazing amount of delusion in the world caused by trusting to our senses, to the exclusion, in a great measure, of a higher and nobler faculty—reason. Some one has truly said that "the senses are only the channels by which the mind is supplied with food," and I may add that, like the stomach, the mind has to object to what is sometimes deposited in it. This idea was prettily set forth by Professor Brooks a short time ago. He said: "Sense knowledge is the material for subsequent action and production. Had the mind no other products than those afforded by sensation and perception there would be no science, art, literature or history in the world. Brain action may account for sense knowledge, but it fails to account for the achievements of human thought and imagination." WM. WAPLINGTON.

Written for the CLAY-WORKER.

PAVING BRICK—ITS MATERIAL, MANUFACTURE AND USE.*—Fourteenth Paper.

BY DANIEL W. MEAD.

—Brick Drying.—

A GREEN PAVING BRICK, manufactured by the stiff-mud process, contains, as it issues from the machine, about 23 per cent. of its own weight of moisture, or otherwise it contains moisture amounting to about 30 per cent. of the weight of the finished brick. From one-half to two-thirds of this moisture should be removed by drying before the brick are set in the kilns for burning, and even a larger portion may be removed if the drying is very thoroughly done. Thorough drying adds much to the efficiency of the burning and is an important factor in the manufacture of paving brick. The drying of any material is in general the removal of the moisture from the material by evaporation. The moisture is driven from the interior by heat or brought to the surface by capillary attraction, and then evaporated from the surface.

—The General Principles of Drying.—

The principles which govern evaporation, and, in consequence, those which must be observed in any successful system of drying, are as follows:

1. The amount of aqueous vapor which can be contained in a limited space is always the same whether the space be a vacuum or whether it be filled with air, provided the temperature be the same in both cases. Evaporation, however, takes place rapidly in a vacuum and much more slowly in air.

It will, from the above statements, be seen that the presence of air is in reality a detriment to the process of evaporation or drying and renders the process more slow than it otherwise would be. Advantage is taken of this principle by the use of vacuum pans in the evaporation of liquid solutions, but this has not been utilized to advantage in other drying operations.

Aqueous vapor is not absorbed by the air, as is sometimes stated, but forces itself into a mixture with the air by its natural elastic force.

Air is always present during the process of drying brick and most other substance, otherwise than as above stated, and it is necessary to consider the process under atmospheric conditions.

When any space contains all the vapor which it can contain at the existing temperature it is said to be saturated, and the same term is used to express the same condition relative to the mixure of air and vapor. That is to say, when air contains all the vapor it can hold at the existing temperature, it is termed saturated air.

2. Evaporation into dry air takes place quite rapidly at first, and more slowly as the air approaches saturation, at which point evaporation ceases. As time is an important element in drying, it is frequently unadvisable to await complete saturation, more satisfactory results being often obtained by passing off the air and its contained vapor before this point is quite reached.

3. Evaporation increases in rapidity with the extent of surface from which it is taking place. No more vapor will, however, pass into a given space under such conditions in order to saturate it, but the rapidity with which saturation is attained will increase with the exposed area. For this reason small brick will dry more rapidly than large brick, and drain tile and hollow ware can be dried at a very rapid rate.

4. Evaporation increases with the temperature. This may be seen from the following table:

—Data Concerning Saturated Air at Different Temperatures.—

Temp. Fahr.	Weight of cubic ft. of dry air, lbs.	Weights in pounds of a cubic foot of saturated air.			Cubic feet of vapor from 1 lb. of water.
		Weight of the air.	Weight of the vapor.	Total weight.	
32	.0807	.0802	.000304	.080504	3289
42	.0791	.0784	.000440	.078840	2252
52	.0776	.0766	.000627	.077227	1595
62	.0761	.0747	.000881	.075581	1135
72	.0747	.0727	.001221	.073921	819
82	.0733	.0706	.001667	.072267	600
92	.0720	.0684	.002250	.070717	444
102	.0707	.0659	.002997	.068897	334
112	.0694	.0631	.003946	.067046	253
122	.0682	.0599	.005142	.065042	194
132	.0671	.0564	.006639	.063039	151
142	.0660	.0524	.008473	.060873	118
152	.0649	.0477	.010716	.058416	93.3
162	.0638	.0423	.013415	.055715	74.5
172	.0628	.0360	.016682	.052682	59.2
182	.0618	.0288	.020536	.049336	48.6
192	.0609	.0205	.025142	.045642	39.8
202	.0600	.0109	.030545	.041445	32.7
212	.0591	.0000	.036820	.036820	27.1

From the above table it will be seen how rapidly the amount of vapor, which is necessary to saturate air, increases with the temperature, saturated air at 212 degrees containing over thirty times as much vapor as at 72 degrees and over 120 times as much as at 32 degrees. It should also be noted from the above that saturated air is less in weight than dry. Consequently moist air tends to rise and dry air to settle, and this tendency increases rapidly with the temperature.

From the above it follows that if a saturated air be heated to a higher temperature its capacity for vapor increases, and if, in its heated condition, it passes over the material to be dried, it will take up and carry away an additional amount of moisture. If, on the other hand, a saturated air be cooled, it will of necessity deposit some of its moisture. The point of saturation, or the point at which the air will deposit some of its contained water, if the temperature be reduced, is called the dew point.

Normal air is always charged more or less with aqueous vapors. Saturated air is damp. Air containing from 65 to 70 per cent. of the quantity of vapor necessary to saturate it may be considered as moderately dry. From 45 to 50 per cent. is called dry, 30 to 35 per cent. very dry, and 20 to 25 per cent. extremely dry. With ordinary variations in temperature, however, the same amount of vapor in the air may give rise to all of the above named conditions.

The following table will illustrate the conditions of dryness due to the presence of .000304 pounds of water in a cubic foot of air at various temperatures:

—Condition of Air, with .000304 Pounds of Vapor per Cubic Foot, at Different Temperatures.—

Temp. of air.	Degree of Saturation.	State of Air.
32	1.00	Saturated.
42	.69	Moderately dry.
52	.48	Dry.
62	.34	Very dry.
72	.25	Extremely dry.

5. Evaporation is increased by a circulation of air over the surfaces from which the evaporation takes place. The air in immediate contact with surfaces of evaporation becomes quickly saturated with vapor, and unless it is displaced and fresh unsaturated air takes its place evaporation will be much delayed. With rapid circulation, fresh, unsaturated air is brought into contact with the moist surfaces, and rapid evaporation takes place continuously.

On the above general conditions the science of successful drying must be based.

—Necessary Conditions in Drying Brick.—

In drying brick it is not only necessary to remove the water, but also to remove it without injury to the structure of the brick. Many clays are of such a nature that rapid or unequal drying will crack and destroy them, and a too rapid removal of water will injure the structure of any brick. To a considerable extent, therefore, the details of the method of drying brick must depend on the character of the clay. Some will stand hot, dry air and rapid drying; others must be dried in warm, moist air, and very slowly.

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The direct application of a high heat vaporizes the water within the brick, and the expansive force of the vapor passing rapidly from the interior of the brick disintegrates and destroys it. This is often seen where brick are partially or entirely destroyed by the heat in watersmoking. The same thing often happens in drying, where the heat is improperly applied. With gentle heat and a circulation of air not too dry, the brick is slowly heated, the moisture is evaporated from the surface, and moisture is slowly drawn from the interior to the surface, where it is evaporated in turn, all without injury to the structure of the brick.

—Heat the Active Agent in Drying.—

Careful consideration of the general principles previously stated will show that for drying it is necessary both to increase the temperature and to remove the saturated air. Also, that in order to remove a certain amount of moisture a large amount of air can be used at a comparatively low temperature, or a comparatively small amount of air can be used at a high temperature. The relations of the amounts of air necessary in all cases are clearly shown in the table previously given.

In all cases of drying it should be observed that the active agent utilized is heat, and that this is true whether the drying be performed at either a high or a low temperature, or by artificial heat or by the gratuitous heat received from the sun.

—Theoretical Amount of Heat Used in Evaporation.—

In the eleventh paper of this series it is stated that it takes 966 heat units (B. T. U.) to evaporate one pound of water from and at 212 degrees Fahr. The total heat units required to evaporate one pound of water from 0 degree Fahr. would therefore be 966x212—1178 B. T. U., and the heat units required to evaporate a pound of water from any temperature would be B. T. U.—1178-t where t—temperature of the water. The actual work of evaporation is therefore readily computed.

If a factory manufacture 100,000 six-pound brick per day, the total weight of brick will be 600,000 pounds, and the total moisture will be 180,000 pounds, of which at least 100,000 pounds should be removed by drying. If the brick come from the machine at a temperature of 60 degrees Fahr. the actual heat units required per pound of water would be 1178-60—1118, which, for 100,000 pounds of water, would represent 111,800,000 heat units.

This amount of heat, however, represents only the amount actually consumed in evaporation. A considerable amount in addition will always be used in the necessary physical operations and conditions concomitant with drying, such as the loss in furnishing the necessary heat to the dryer, the power required to force or draw air through the dryer, whether by natural or artificial draft, and the loss through radiation, etc. These items will largely reduce the efficiency of any dryer, and will greatly increase the amount of heat needed beyond the amounts actually required for evaporation. The amounts of heat used or lost will vary greatly with the method of drying used, with the detail construction of the dryer and with the rapidity with which drying is accomplished.

—Air Used in the Dryer.—

The amount of air which should be used in efficient systems of drying, in which air is forced or drawn through the drying room, may be determined in the following manner:

Assume there are 1,000 pounds of water to be removed from the dry room in ten hours, or 100 pounds per hour. Assume, further, that the air enters the heater at 62 degrees and is 90 per cent. saturated, and leaves the dryer at 112 degrees and is 80 per cent. saturated.

From the previous table it is seen that saturated air at 62 degrees will contain .000881 pounds per cubic foot, 90 per cent. of which will be .000793 pounds. It is also seen that saturated air at 112 degrees will contain .003946 pounds per cubic foot, 80 per cent. of which will be .003157 pounds. In increasing from 62 degrees to 112 degrees each cubic foot of air will expand to about 1.18 cubic feet, each of which will contain .002364 pounds of water, or a total of .00279 pounds for each cubic foot of air entering the dry room. Hence there will be required 35,842 cubic feet of air entering the room each hour, or about 600 cubic feet per minute, and there will pass from the room about 1.18 times as much air, or about 700 cubic feet per minute.

—Necessary Temperature of the Air.—

The method of determining the temperature to which the air must be heated is as follows:

Assuming the temperature of the brick to be dried to be 52 degrees, the heat units required to evaporate each pound of water can be determined as previously shown.

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Thus: B. T. U.—1178-t—1178-52—1126. For 100 pounds per hour this will equal 112,600 B. T. U. per hour, or 1,876 B. T. U. per minute. From Table I, in the eleventh paper of this series, it will be found that the specific heat of air is .2375, which means that one heat unit will raise 1-.2375 pounds of air, or 4.2 pounds of air, one degree. Hence 1,876 B. T. U. per hour will raise 1876x4.2—7879.1 pounds of air one degree.

We have, however, 600 cubic feet of air each minute, which weighs about .075 pounds per cubic foot, or a total of about 45 pounds of air. Hence each pound of air must be heated 7879-45—175 degrees, and the air must enter the dry room at 175x62—237 degrees.

In the above assumed case it will be clearly seen that the applied heat is both utilized to change the water into vapor and to carry the vapor away. The heat used is not only the actual heat consumed in evaporation, but also that consumed in raising 45 pounds of air from 62 degrees to 112 degrees. This amount of heat will equal 45x(112-62)x.2375—534 B. T. U. per minute. In addition to this there will be the heat units consumed in forcing the air into and through the drying room, as well as the loss in the furnaces or other means used to generate the heat for both heating and power purposes.

—Use of the Hygrometer.—

To carry on the operations of drying in an intelligent and economical manner it is necessary to determine the percentage of saturation of the air which passes into and away from the dryer. For, if the issuing air is too dry, an unnecessary amount of heat is being used, while, if it is too wet, drying will be progressing too slowly, and the brick may even be injured by the presence of too much moisture. To determine the humidity of the air a hygrometer is used. This instrument is made in several forms, but the most common, and, perhaps, the most satisfactory form, is that which is sometimes called the wet and dry bulb thermometer. This consists of two thermometers, one of which is exposed to the air in its ordinary condition. The bulb of the other is kept constantly wet by means of a piece of a cloth or wick, which extends into a vessel of water. When the air is saturated with moisture the thermometer will read the same, for no evaporation will take place from the wet bulb. If, however, the air is not saturated, the thermometers will show different temperatures, and the percentage of moisture present will be in proportion to the natural elastic force of aqueous vapor at the two temperatures.

In the following table is given the natural elastic force or pressure of aqueous vapor at various temperatures from 32 degrees to 212 degrees Fahr. The following will serve as an example of the use of this table:

What is the degree of saturation when the dry bulb indicates 70 degrees Fahr. and the wet bulb 65 degrees Fahr.? The elastic force corresponding to 65 degrees is .3033 and that corresponding to 70 degrees is .3602. Hence the humidity of the air—.3033-.3602—.84—84 per cent. of saturation.

—Table Showing Natural Elastic Force of Aqueous Vapor at Various Temperatures Fahr. (Peabody.)—

Temp.	Pressure.	Temp.	Pressure.	Temp.	Pressure.	Temp.	Pressure.	Temp.	Pressure.	Temp.	Pressure.
32	.0890										
33	.0926	63	.2829	93	.7605	123	1.8287	153	3.9913	183	8.014
34	.0963	64	.2929	94	.7844	124	1.8797	154	4.0903	184	8.192
35	.1002	65	.3033	95	.8090	125	1.9318	155	4.1914	185	8.373
36	.1042	66	.3140	96	.8342	126	1.9852	156	4.2946	186	8.558
37	.1083	67	.3250	97	.8601	127	2.0399	157	4.4000	187	8.746
38	.1126	68	.3364	98	.8867	128	2.0959	158	4.5075	188	8.937
39	.1170	69	.3481	99	.9140	129	2.1533	159	4.6172	189	9.132
40	.1216	70	.3602	100	.9421	130	2.2119	160	4.7292	190	9.330
41	.1264	71	.3726	101	.9709	131	2.2719	161	4.8435	191	9.532
42	.1313	72	.3854	102	1.0004	132	2.3333	162	4.9601	192	9.738
43	.1364	73	.3986	103	1.0307	133	2.3961	163	5.079	193	9.947
44	.1417	74	.4122	104	1.0619	134	2.4603	164	5.200	194	10.160
45	.1471	75	.4262	105	1.0938	135	2.5261	165	5.324	195	10.377
46	.1528	76	.4406	106	1.1266	136	2.5932	166	5.450	196	10.598
47	.1586	77	.4555	107	1.1602	137	2.6619	167	5.579	197	10.822
48	.1646	78	.4708	108	1.1947	138	2.7321	168	5.710	198	11.051
49	.1708	79	.4865	109	1.2301	139	2.8040	169	5.844	199	11.283
50	.1773	80	.5027	110	1.2663	140	2.8774	170	5.981	200	11.520
51	.1839	81	.5194	111	1.3035	141	2.9525	171	6.120	201	11.761
52	.1908	82	.5365	112	1.3416	142	3.0292	172	6.262	202	12.005
53	.1979	83	.5542	113	1.3807	143	3.1076	173	6.407	203	12.254
54	.2052	84	.5723	114	1.4207	144	3.1877	174	6.554	204	12.508
55	.2128	85	.5910	115	1.4618	145	3.2696	175	6.704	205	12.765
56	.2206	86	.6102	116	1.5039	146	3.3532	176	6.858	206	13.028
57	.2237	87	.6299	117	1.5470	147	3.4387	177	7.014	207	13.294
58	.2370	88	.6502	118	1.5912	148	3.5260	178	7.173	208	13.565
59	.2456	89	.6711	119	1.6364	149	3.6152	179	7.335	209	13.841
60	.2545	90	.6925	120	1.6828	150	3.7063	180	7.500	210	14.122
61	.2637	91	.7146	121	1.7302	151	3.7993	181	7.668	211	14.407
62	.2731	92	.7372	122	1.7789	152	3.8943	182	7.840	212	14.697

Subject continued in next paper.

Mr. William Kent gives the following table of chimney sizes for different boiler horse-powers, estimating on a basis of five pounds of coal for each horse-power per hour:

SIZES OF CHIMNEYS, WITH APPROPRIATE HORSE-POWER BOILERS (Kent).

Diameter in inches.	Height of Chimneys.											Effective Area, Square feet.	Actual Area, Square feet.	Side of Square of Approximate area. Inches
	50 feet.	60 feet.	70 feet.	80 feet.	90 feet.	100 feet.	110 feet.	125 feet.	150 feet.	175 feet.	200 feet.			
	Commercial Horse-Power.													
18	23	25	27	...	...	....	....	....	....	....	....	0.97	1.77	16
21	35	38	41	...	...	....	....	....	....	....	....	1.47	2.41	19
24	49	54	58	62	...	....	....	....	....	....	....	2.08	3.14	22
27	65	72	78	83	...	....	....	....	....	....	....	2.78	3.98	24
30	84	92	100	107	113	....	....	....	....	....	....	3.58	4.91	27
33	..	115	125	133	141	....	....	....	....	....	....	4.47	5.94	30
36	..	141	152	163	173	182	....	....	....	....	....	5.47	7.07	32
39	..	...	183	196	208	219	....	....	....	....	....	6.57	8.30	35
42	..	...	216	231	245	258	271	....	....	....	....	7.76	9.62	38
48	..	...	...	311	330	348	365	389	....	...	....	10.44	12.57	43
54	..	...	...	363	427	449	472	503	551	....	....	13.51	15.90	48
60	..	...	...	505	539	565	593	632	692	748	....	16.98	19.64	54
66	..	...	...	...	658	694	728	776	849	918	981	20.83	23.76	59
72	..	...	...	...	792	835	876	934	1023	1105	1181	25.08	28.27	64
78	..	...	...	...	...	995	1038	1107	1212	1310	1400	29.73	33.18	70
84	..	...	...	...	...	1163	1214	1294	1418	1531	1637	34.76	38.48	75
90	..	...	...	...	...	1344	1415	1496	1639	1770	1893	40.19	44.18	80
96	..	...	...	...	...	1537	1616	1720	1876	2027	2167	46.01	50.27	86

[This table was given in the preceding issue but by an oversight the headings were omited, hence the repetition.—Ed.]

THE PORCELAIN CENTENNIAL AT LIMOGES.

THE CITY of Limoges, France, is preparing to celebrate this year the centennial of hard porcelain (porcelaine dure) in France. This great industry is, in fact, only about one hundred years old, and the time seems opportune now, when few centennials are to be celebrated, to show the progress accomplished and the degree of perfection attained by this admirable product of French industrial art.

The Society Gay-Lussac, which originated the idea, has joined the city in the organization of the centennary. There will be opened, therefore, on July 1 next, in the City Hall, an exposition of porcelain under the auspices of the city, this exposition being designed to trace by the exhibits the progressive history of the industry from its origin to this day; to differentiate the successive steps of its development, and to show the gradual perfection of the raw materials used, the methods of working these materials, the firing and the improvements made in the forms and decoration of the product.

Not only will hard porcelain figure conspicuously in this exposition, but the committee, in order to heighten the interest, have decided that an important section shall be open to the exhibition of all decorated ceramic products for architectural uses—stonewares, terra cottas, faiences, etc.

There is no doubt the exposition will be a great success. The Moniteur de la Ceramique says that the great houses of the trade in Limoges are taking an active interest in it, and that many potteries, French and foreign, have already engaged space for exhibits. Those in America who may be interested may obtain information by addressing M. le Directeur de l'Exposition du Cenetaire, a l'Hotel-de-Ville, Limoges, France.

BOTH FOR PLEASURE AND PROFIT.

Publishers Clay-Worker:

Inclosed please find check for $2 to pay subscription to the Clay-Worker. This we ought to have sent sooner. The Clay-Worker is always welcome here, and should be read by every member of the clayworking fraternity. Yours truly,

Knoxville, Tenn. THE JONES BRICK COMPANY.

Written for the CLAY-WORKER.

MODERN BRICK WORK—STEEL LINTELS.

WE OFTEN CONTINUE to do one thing or another in the same old way because we do not fully realize that differences are possible, or it may be that we do not think about the matter that far. We do it without thought. It is habit, and habit is stronger than reason. A habit often continues after the reason for it has ceased to exist. For instance, in building work we often do without the use of steel and continue in the use of old forms of construction, not because steel is not better and cheaper, but rather because of the habit formed before steel came into the new uses for which we now find it particularly adaptable.

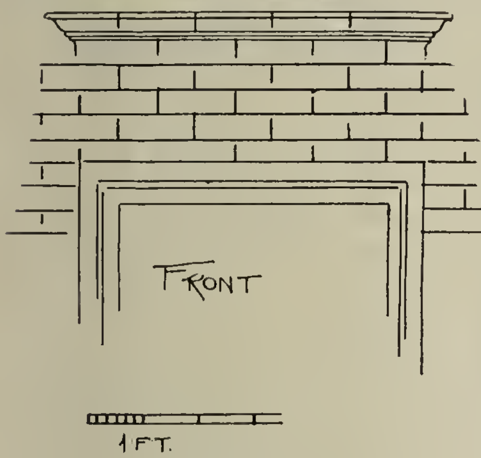


Figure 1.

Here are a few simple cuts showing some changes in ordinary methods of construction. They do not pretend to be distinctively original with the writer, though he has used them to some extent, and may be personal without the justification of a precedent. Figure 1 represents the idea quite as well as either of the other two. It is to be noticed that the courses of brick continue to run across the opening, as though in a dead wall, and without the intervention of the arch or the visible lintel. Above is a molding, which emphasizes the position of the opening and gives decorative interest to the composition. The section in Figure 2 shows just how this is done. Over the head of the frame is cut in a T-iron, which carries the weight of the superincumbent brick work. Above are shown the courses of brick and the form of the molded brick work above. At the point A is shown a deeply recessed joint. This joint is recessed in this way in order to emphasize as strongly as possible the line which comes below the fillet. This way of carrying out this idea is relatively simple. It is strong, is more satisfactory than a straight arch, and quite as cheap as a straight arch properly put in. Again, the undersurface of the brick work shows their natural color. When we are laying up a straight arch with ordinary brick there must be the ground surface, and this ground surface is never the same color as the body surface of the brick. This is even true in pressed brick of many grades. The surface formed by grinding is never, or rarely, the same as that formed in the burning and the molding of the brick by natural processes. Thus it is that we have cheapness, utility and appearance, which certainly favor this form of covering an opening. It is not suggested that this is the one and only way to be adopted in preference to all others, but, on the other hand, that it is one good way, unquestionably so, and by proper decorative means may be made as rich and profuse, or otherwise, as one cares to make it. It is interesting because it appears well; is interesting because it is new, or relatively so.

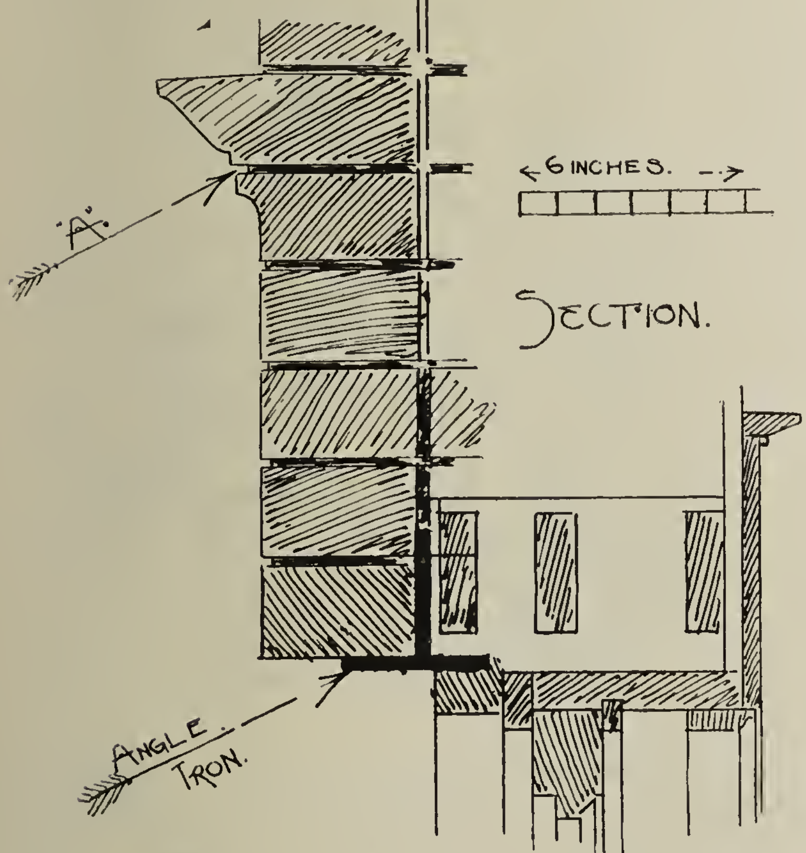


Figure 2.

Figure 3 shows the formation of an opening where there are triple windows, having a strong molding of stone in place of the one of brick shown in Figure 1. Above this is a Dutch arch of alternate courses of stone and brick. This form is frequently used in Holland, but instead of the brick lintel form or the use of the T-iron, there is the stone lintel, with the stone molding and the stone and brick arch of the form indicated above.

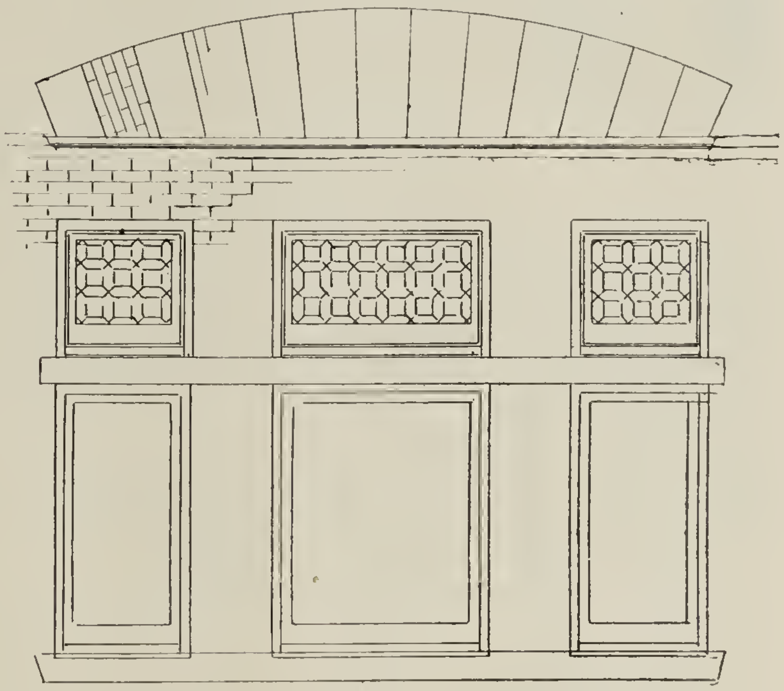


Figure 3.

Where the wall is eighteen inches in thickness there is required, in addition to the T-iron, an angle iron, and this material, where it shows below at the head of the opening, is painted a proper color. The writer has used this method of covering openings where pressed brick, Roman and common red brick are used. Not that he uses it universally, or very commonly, but, where the circumstances appear to justify it, it is used as one satisfactory means of covering an opening. Another advantage is that he avoids the use of a large amount of stone. Where one has a nice piece of brick work it is not always desirable to use stone profusely. The red and white tyrannies which we often see are not always pleasing. Where one has a brick of good texture, uniform color, and cares to have a few molded brick made, a splendid architecture may be developed through the use of the brick alone, and the disadvantage of a wide variation of color and profuse cutting of brick may be avoided through the use of T-irons and angle irons, as herein suggested. Where one is using the buff, gray or others of the new colors, this form of construction works in a very happy way to show this material to its best advantage, and relieves one from the embarrassment of constantly repeating an old story in construction.

LOUIS H. GIBSON.

HOW IT ALL HAPPENED.

A TALE OF A NEW ENGLAND BRICK YARD.—Chapter Tenth.

IT MUST HAVE BEEN an interval in time of about one issue of the Clay-Worker after our last dissertation with Ebenezer before we happened to meet again, and then, by a curious coincidence, it occurred in front of the cashier's window of the bank. Ebenezer had the right of way just ahead of us, and, while waiting our turn, we had a good chance to note whether his manners of doing business at that institution ran in parallel lines with his operations at his clay bank. Have you ever stopped to think, fellow-brickmakers, what a great disparagement there is in the volume of business as between the banks at which you make and withdraw your deposits? Just think of it! It takes about two cubic yards of clay—or perhaps three good one-horse cart loads—to make one thousand brick, and this thousand of brick, when turned into gold, would weigh about one-fifteenth of a pound. When, therefore, you start to make a little deposit of twenty-five pounds in weight of gold, you will be carrying what, at the other end of the brick business, filled 2,500 cart loads.

It was at the end of some such a chain of thought that we slapped Ebenezer on the back and said: "See here, old man, how long have you been depositing brick in this institution?"

"Wa'al," said he, "I reckon goin' on forty y'ar."

"And how long," we remarked, "are you going to continue to do it?"

"Jist as long," said he, "as ther clay bank an' I continer to hold out tergether."

"Jest like you, Ebenezer," we replied. "You're a hoss for pulling steady, whether it is pulling the same old tempering wheel in the same old pit, and to make the same old mud brick, or whether it is trying to draw one dollar and a half out of the bank, into which you have deposited but one dollar and forty-nine cents. In regard to the drawing out we do not blame you, and have frequently tried the game ourselves, but somehow they catch us at it every time."

"Wahl," said Ebenezer, "there's sumthin' about this bankin' business, eneyway, thet we don't jist kerectly understand in her 'versified operation. With these people at this 'ere bank nuthin' makes them frown ser much as when a man withdraws his deposit. With me the greater ther deposit at ther bank ther broader we smile. Down at our bank we let every feller draw to his heart's content, an' here, if a feller attempts to overdraw, he gits a short notice to see thet it's put back mighty quick. With us we raise the d—l if a man don't send ernough out frum ther bank, and here they raise ther d—l if a man sends out er cent too much. No doubt," continued Eben, "these fellows know what the'r' about, but, like ther heathen Chinee we read of, ther mighty peculiar, and perhaps yer ken understand them, but reckon I jist can't do it."

"Well, Ebenezer," said we, "we have long ago come to the conclusion that there are a good many things connected with both the brick and financial institutions of the country which are difficult to understand, and that it is about as hard to successfully manage the one as the other. The only particular difference that we know of between the two is that a financier could run a savings bank if he never heard of a brickyard, while a brickmaker could not run his yard a half hour unless he could both see and handle the contents on the inside of the savings bank.

"Speaking of money, Ebenezer," said we, "what kind do you prefer—paper, silver or gold?"

"Heven't ther least objection to eny on 'em," said Eben. "It's not quality I'm lookin' arter; it's quantity. Jist as leave hev silver dollars as gold ones, an' paper dollars as silver ones. No siree, it don't make a gol darn bit of diffirance what kind er money we hev, as long es ther coal man will take it in exchange fer fuel, or the Dago can pay it out in exchange fer maccaroni. Ther kind er money I'm arter is jist sich stuff as filled the widder's ile jug an' meal bar'l, an thet never runs dry, no matter how much yer take out, an' thet fills itself up ag'in jist as often as it fills yer pockets up. P'r'aps when yer were trampin' roun' ther kentry last winter, down ter Atlanta, ye foun' ther, or hearn tell of among them conventional brickmakers, where sich a bank kin be foun', an', if so, I'm ready to pull up my old brickyard an' move to thet kentry at once."

"No, Ebenezer," said we, "we cannot at present direct you to where you can find that kind of an Eldorado of fortune, but if you are not in any hurry to get home, and will accompany me to the Eldorado of club rooms, we will, while taking a smoke, endeavor to tell you of a way in which you can fire this bank here so that it will answer all practical purposes in furnishing you with all the money you will call for."

At the end of these remarks we started across the street, with Ebenezer close in our rear, and after taking a little free lunch, etc., etc., we soon found ourselves where, in comfort, we could meditate upon the evils of smoking and drinking, and moralize upon the ways and chances of making and saving money in the brick business.

"Now, Ebenezer," said we, "in order the better to call forth our best abilities in the line of argument, let us, like the wise young man in the graduating class at college, place the question to be debated in proper form, and ask ourselves which, to the successful brickmaker, has contributed most: perfect manufacture or skillful financiering."

"Wahl," said Ebenezer, "es I told yer afore, I hev been nigh on ter forty years in ther business, an' I've often hed feelin's like our ole black cook when she sings, 'Noboder knows what troubles I've got; noboder knows but Jesus,' an' sumtimes they hev cum from heven' too many poor brick, an' sumtimes from heven' too little good money. Every time we go by yer brickyard we are after noticin' that ye hev a plenty of bad brick thar, and don't seem to know how not to make 'em and how to git rid of 'em after bein' made, an' as yer doan seem t' know eny more about that part of the business than ourselves, we don't care fer yer opinion on that part of ther subject; but as we've hearn tell that yer willin' an' able to borrow money at ther bank, we should jist like ter ax yer how yer do it."

"Well, Ebenezer," said we, "if the bank is ready to loan us any money you can rest assured that the fundamental reason for their doing so is because that in the first place they have faith in our ability to pay back what we have borrowed, and, what is of greater consequence, they have faith in their ability to get it back from the security we have put up, in case we fail to pay it back of our own free will. As this whole question of financiering in connection with a successful brick business is one of our hobbies, and as you have given us a chance to ride the animal, we will mount at once, and when you think we have ridden long enough, why, just pull us off."

"All right," said Eben, "let her go; but I expect yer beast is stiff, an' lame, an' blind, an' when she tumbles yer off I'll be thar ter pick yer up."

"Very well, Eben," we replied. "There is quite a brood of this particular line of hobbies, and we will mount and give each one but a short shift and a limited chance to dump us. To that end let us get back once more to the question, which is: To the successful brickmaker which has contributed most, perfect manufacture or skillful financiering?

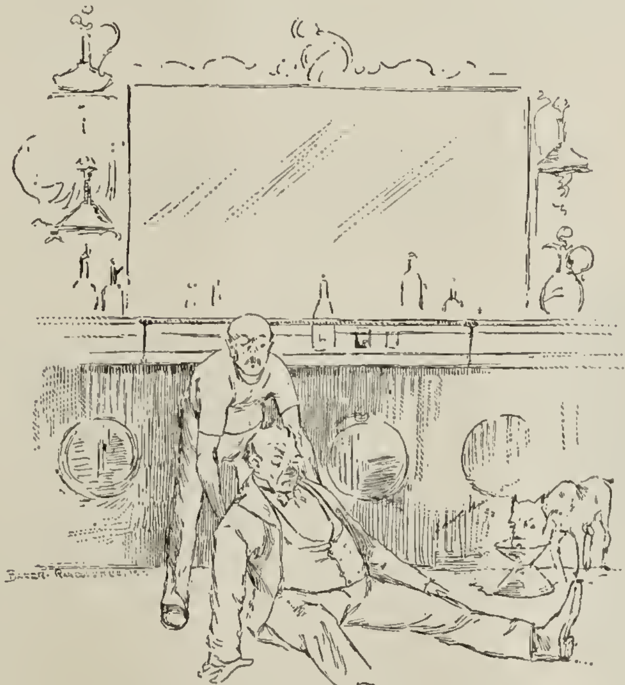
"It is not a question of whether a brickmaker can make a success of his business without being both a good manufacturer and a good financier, but of which is the most important; of which, at the end of a series of years, is most apt to find him in the possession of a plant in good shape for continual business. A good credit at the paying teller's window at the bank, and especially with a good and heavy balance in his favor at that same bank, and where there are none of his demand notes, which could devour that balance without warning.

"In our opinion there is no doubt, Eben, but what a man can be a good brickmaker, and yet not be a successful one. He can make brick which are so good that his yard can always be found emptied of them, and yet his bank will be fully as empty of any money which belongs to him. It therefore is as 'clear as mud' to us that a good brickmaker will be of no earthly use to himself unless he is a good financier, and that it is really more important that he should be able to keep some of the money which he exchanged for his brick than that he made brick which sold for the highest price.

"All very well, we hear you say, but tell us how it is to be done. Well, we do not profess to know all about how it is to be done, but we will tell you of a few ways which will help to do it, and take them up in the order of their occurrence.

"In the first place, Eben, there is a law in the financial part of the brick as well as any other business which is as unalterable as that of the Medes and Persians, and which is that you cannot subtract something from nothing and have anything left. There is just one condition in life in which you can subtract one from two and leave three, but that will not work when counting brick. In other words, you must sell your brick for more than they cost if you are to keep your bank account good, and, if possible, we will put it in a stronger light, and say that if you do not know what your brick are costing you during the season, your bank account will show at the end of the season that while you may have been fooled during that time it most certainly was not.

"Do you tell me that the cost cannot be determined accurately? Well, I deny it most emphatically, and declare that it can be, and is determined by many brickmakers right along, and some day, if you should become hungry for information in this line, we will figure out for you our plan for obtaining it. It is also important, Ebenezer, to separate the cost of your brick in two departments, the first being that of the manufacturing proper and the second that of those expenses connected with the office and selling. As just now we are driving at the financial part of brickmaking we will not meddle with the manufacturing cost any more than to say that we have noticed, Eben, that around your yard you have a generous supply of reserved stock in the shape of bats, etc., and as these are of more practical value for filling up depressions around your yard than for filling out deficiencies in your inventory, it is well to keep track of what goes into and what comes out of your kilns as you go along, and add the percentage of difference to your manufacturing cost. Where skillful financiering of a certain order comes in, in our business, is the cutting down and keeping down of office expenses, and in diplomatically succeeding in establishing long distances between and short drinks with, instead of long drinks with and short distances between ourselves and the contractors.



"Many a fool brickmaker, Ebenezer, makes his principal deposits and heaviest dra—ughts at the banks from which he can never again carry them out, but from which he is often carried out himself."

"Yeas," broke in Eben, "thet's er fact; an' we were after noticin' when we come in here that ye knowed the way about as well as ther fellers inside seemed ter know yers after ye got here."

"Possibly you are right, Ebenezer," said we, "but 'a man is known by the company he keeps,' and if one is once seen in your company the doors of any such a place as this will always fly open to receive him. You are not going to make a drink by this interruption, however, and so we will go on and say that after you have sold your brick at the right price and deposited your money in the right bank—"

"Stop right thar," said Ebenezer. "If yer hev got ther money in ther bank, jist leave it thar, and let us wind up and go hum, but afore we start jist tell me, if yer kin—an' as yer said yer would a couple er hours ago—how I was to fire my bank so thet I could git all ther money I want, an' not do it with er crowbar."

"The plan, Eben," replied we, "like most other effective things, is simple but inflexible; not a difficult way to travel, but an unalterable one. When you start for the bank, in the beginning of your career, and whether it be where your clay or money has been deposited, be sure and carry this passport in sight, and where everybody can see it, and which reads: 'I know how to succeed and I know I shall succeed.' It is just barely possible that people will help you, even if they are not quite certain that you know just how; but you can gamble your last dollar that they will never trust you if you let them feel that you haven't confidence yourself in your ultimate and complete success. Do not deceive yourself and believe you are making money when you are not, but, with the full knowledge of your condition and difficulties, strike straight away for the goal of success, and, even if you are swimming in deep water, hold your head high as possible, and make people think you are floating along on the full tide of prosperity. Having faith in you and your prosperity, the bank will loan you money with which to do business and upon your brickyard as security, and without which faith they would never trust either you or your brickyard for a cent.

"Finally, Eben, when you have gained credit through confidence and money through credit, then, in the strong, if not very polite, saying of the good old South, 'Hang on to it like grim death to a dead nigger.' Do not fail to realize that the bank will never loan you any money if it does not think you have some of your own, nor that when once your credit with them is lost that you will ever find it again, and even if, as the Bible says in a still more important matter, 'that ye sought after it with tears.'

"Now, Ebenezer," said we, "we have managed the financial side of the brickmaking business in a rather one-sided argument, and if we have wormed any good out of it to our mutual benefit let us take a rest from the subject—and the rest from that bottle—and the next time we meet, if we feel like it, we will take up the business side of a brickmaking manager."

(The continuance will depend.)

BRICKMAKING—HOW TO GET AT IT, HOW TO LEARN IT AND SUCCEED—A BIT OF IDEALISM—BUSINESS SUGGESTIONS.

BY J. W. CRARY, SR.

THERE IS NOTHING in the range of arts and sciences more difficult to master perfectly than clay work. From the inception to the finish the effort is beset with phenomena and doubt. The great variety of clays in their structural condition and the different ideas and modes of their manipulation make the clay art one of the most intricate and subtle. If all clays were composed of silex and alumina in certain fixed and unalterable proportions, as, for instance, hydrogen and oxygen (water), we could soon arrive at a regular formula for mechanical operation in the manufacture of all kinds of clay goods.

—All Clay Beds Are More or Less Stratified and Chemically Different.—

Each stratum is different in thickness, chemical composition and color. Now it is clearly obvious that in order to make the best products of this clay there must be a regular, uniform cutting and mixing of it from top to bottom. Say the bed is twenty feet in thickness and five or six strata, varying in proportions of mineral oxides and fluxes. The only practicable way to get a uniform mixture of these strata is to cut or cave the bed, and then throw it out in a bed, from which it is to be hauled to the machine for manufacture. If this is not done, the products will vary in size, strength, color, tenacity and market value.

—Disintegrating, Mixing and Tempering Clay.—

After clay has been properly prepared for machinery, the most important part of the work then is to thoroughly mix, pulverize or temper it. If a dry-press machine is to be used the clay must be dry enough to pulverize. It will not do to run it through a screen and leave it in shot-like particles. It must be reduced to a fine dust and well mixed before it goes into the dies. No amount of pressure, or skill in setting and burning, can produce a good brick without these prerequisites.

—Preparing Clay for the Stiff-Mud Process.—

The clay must be handled the same as for dry-press until it comes to the machine. When it goes into the machine hot water from the boiler should be used to soften the large, tougher particles, so that the "pugger" will thoroughly masticate and mix it to a stiff and semi-plastic condition. The "forming die" of a stiff-mud machine should be kept hot; in fact, a single die will not do good work. Two dies, set an eighth of an inch apart, with a suitable arrangement for a jet of steam between them, is the only reliable way to form a perfect, uniform, good "bar" of clay. The outer die should be a little smaller than the inner one. I had to improve the stiff-mud machine I use in several ways, and the double die is one of them.

—All Soft-Mud Machines Require the Same Preparation of Clay as Other Machines.—

In all cases, clay must be thoroughly intermixed before going into machines. The great distinctive difference between brick machines is that a soft-mud brick can be made of any kind of clay, while it is impossible to make good brick with dry-press or stiff-mud machines unless the clay is suitable. So the universal brickmaker must use the soft-mud machine. If we properly review the three kinds of machines above mentioned we can easily see their defects, and, perhaps, how to provide a remedy for them.

—The Theory of the Dry-Press System of Making Brick—

Is that the particles of clay are held together by the cohesion of pressure, instead of natural crystallization, as in the case of soft-mud brick. This theory cannot be successfully disputed, provided that the true maximum pressure is uniformly applied to each brick, and here is the difficulty in all (now commonly used) dry-press machines. These machines have two inherent defects. One is that the molds or dies cannot be equally filled in weight of clay. The measure may be exactly uniform in each mold, but the weight will differ from one to three or four ounces. The other defect is that there can be no equal maximum pressure. For instance, if four molds be filled exactly alike in measure, and one or two of them get two or three ounces more than the regular required weight, it is evident that the heaviest brick is overpressed and the lightest ones underpressed. It is said that springs are so applied to the levers that this trouble is obviated. That is impossible to do, and at the same time maintain a uniform thickness of brick, and give each brick an equal and sufficient amount of pressure. I will name one other defect, which is a serious one, viz.: when the molds are filled and the top struck off, the clay is not packed alike in the molds; it will be more dense in one part of the mold than in the other. Of course, the result is that the structural condition of the brick is imperfect. Now, if the dry-press machine men can overcome these inherent faults in their machines, I think they will fully solve the problem of dry-press brick.

—The Difficulties in Stiff-Mud Machines and the Remedy.—

In the first place, stiff-mud machines must have a strong, plastic clay; then the "pugging" must be thorough; then there must be a plunger that will plunge, or force the finished tempered clay out, through proper dies, at a right angle with the pugger. This will, to a great and sufficient extent, prevent lamination in the clay bar and brick, as is now the case with all auger machines. This can be done and an excellent brick made at little cost, if the clay is suitable and the brick properly handled and perfectly burned. But in no case are dry-pressed brick or stiff-mud brick equal to soft-mud brick in strength and durability, unless they are burned thoroughly, and that means semi-vitrification. A half-burned, well-made soft-mud brick will stand frost, but not so with dry-press or stiff-mud brick. The dry-press brick is an aggregation of particles held together by pressure. The stiff-mud brick is the partially crystallized aggregation of particles. So, in order to perfect either of the two forces that give body and consistence to these brick, there must be a partial fusion, or welding together of the particles, and therefore brick made by any other than the soft-mud process must depend chiefly on perfect burning.

—The Peculiarities of the Soft-Mud Process of Making Brick.—

As I have said, any kind of clay that will do for brickmaking can be successfully used by the soft-mud process. It is the natural process of forming bodies of clay. If we take a dry-press brick or a stiff-mud brick and reduce them to a liquid, then pour the liquid into a box, the size, in length and width, of a brick, and evaporate the water, the process of crystallization will begin, and, when complete, a perfect brick will be the result. Now, when this brick is burned, whether it be hard or soft, it is a perfectly homogeneous body, and can be cut to smooth, sharp edges, without flaw or fracture.

Now, this is an important matter for brickmakers in the soft-mud process to think about. We hear you talking about perfect "pugging." (I don't like this word pug; it is inelegant and inappropriate. Temper or mix is better.) I know of about all the pugging machines in common use. I have not seen one that perfectly disintegrates and tempers clay. The common pug machine takes the clay in a sufficiently wet condition to turn out soft, moldable clay. It is one single process of tempering. No water is added after the first movement of the clay, from the feed to the discharge end of the machine, so it is impossible to complete the disintegration and plasticity of the clay. Although the mixing may be sufficient for making good brick, yet a little additional work would make a perfect brick. To accomplish this the pugging shaft must be horizontal, working in an open top box. It should be ten feet long. The top of the box at the discharge end should be covered about two and one-half feet. As the clay passes from the feed and to the discharge end of the box it should be watered at about the middle of the box. This gives it increased plasticity, and adds textural strength to the brick. Another good way is to give the pugging shaft reverse motion when the clay gets too stiff and throw water on it. I have experimented in this way, and found that clay could be watered three or four times in the process of tempering, showing conclusively that clay cannot be thoroughly disintegrated and tempered by the single process of watering and mixing.

—Old-Time Methods of Tempering Clay.—

I claim no discovery in repeating the watering of clay while in the process of tempering. The practice is as old as the clay art. When a little boy I have seen mud tempered in a rectangular pit by driving oxen around in it. Water would be added three or four times during the process. Then there was the "crab," or, as some called it, the "hedge hog." This was a wooden shaft, or log, about fourteen feet long. Eight feet was filled with pegs, set in six rows. At the "hub" end the pegs were fourteen inches long; at the other end they were twenty-eight inches long. This crab was put in a round pit. sixteen feet in diameter. It was fastened to a "hub" in the center of pit by means of an iron swivel pin, inserted loose in the "hub" of the pit. The pit was floored and rimmed with plank, and held clay to make three thousand brick. When the pit was filled and watered the "crab" would be rolled in it on a broad plank, the "swivel pin" inserted in the "hub" and a yoke of oxen hitched to the outer end of the "crab." It took two to three hours to temper the pit of clay, and during the process water would be scattered over the pit several times in order to get the temper needed for hand molding. These old brickmakers knew that the more the clay was tempered the more plastic and smoother it was, but they did not know why it became so. In experimenting I found that clay was a body of infinitesimal particles, crystallized in form and bodies, according to conditions, and that the more it is tempered the more plastic and unctuous it is. But there are some clays that, if repeatedly watered while being tempered, will crack in drying. These clays are largely impregnated with lime or sand, and are termed "carboniferous clays." I have tried to make brick of this kind of clay by the old process of repeated watering and tempering, but could only do it by adding sand in proportion; that would weaken the brick, and so I used the common upright pug mill and succeeded in making good brick. These clays suit the dry-press or stiff-mud process, and, if well burned, make an excellent brick.

—The Right Kind of Brick Machine for Untried Clay Beds.—

When one has a good clay bed and determines to make brick, he must start with the fact that the machine for making the brick must suit the clay. Some people who start to make brick change this postulate, and say, I will use a certain favorite machine, and I must manipulate the clay to suit it. This is the beginning of a woeful failure.

The only wise and safe way is to take a fair sample of the clay to the best expert brickmakers, who are using, every one, a different machine, and have each to fairly test the clay. If the test is satisfactory, the machine that has given the best result, of course, is the one to decide upon as the best for the clay. One of the chief causes of failures in "green" brickmakers is in a pet notion about either the clay bed or the machine to be used in working it. If a party desires to make brick as a business he had better spend his first money in fair and reasonable experiments. First, the clay bed should be thoroughly examined and the clay tested. Sufficient excavation should be made to know to a certainty that a full and lasting supply can be had at a fair maximum cost. Then comes a thorough test of the clay. This being satisfactory and the right machinery selected, the next thing is real, true, reliable, expert skill to take charge of, manage and insure success. All this should be done before machinery has been purchased, so that the expert employed will approve of the machinery. Indeed, it would be best to secure the services of the expert in the very start of the enterprise. Let him not only examine the clay bed, but superintend all the tests made of the clay. Give him a small salary until the whole plant be in successful operation, then raise his salary to all that the plant can afford to pay, provided he will not quit work as long as his services are required by the interests of the "plant."

—The Best Way to Secure the Service of Such a Man.—

It is very true that the thoroughly skilled brickmaker is not easily obtained, but supply is always equal to demand, if a tempting price is offered. If an advertisement be properly published, the right man will respond.

A plant that can make 5,000,000 brick per year can afford to pay $2,500 salary to a competent brickmaker as superintendent. If the plant can make 10,000,000 brick per year, it can afford to pay $4,000 salary. The average difference between a first-class superintendent of a brick plant and the common, uncertain man is at least 50 cents per thousand brick. In fact, the incompetent superintendent is dear at any price The plant not only loses in the price of brick, but fails to establish a reputation for first-class products. It is the skill in manufacture that makes the market, and that is the first thing for a brickmaker to think of.

—And Now I Want to Tell You What You Should Be Sure Of—

Before you determine to be a brickmaker, and that is that you were born to be a brickmaker. You will naturally ask, how am I to know that? I will tell you. When you see a clay bank you will pause to look at it, and mentally inquire, Would that make good brick? When you visit or pass by a brickyard you will first notice the brick and kiln. You will not care so much about the men and tools at work. You will readily notice the difference in the qualities of the brick. Then you will step round to the kiln that is burning and have a chat with the boss burner. He is a fine expert and wedded to the business. You become fascinated and determine to be a brickmaker. You are eighteen years old and just out of school, with high character as a student. You tell your father that you like the brick business and want to learn to be a brickmaker. He wisely consents, and you at once engage as an apprentice in one of the best brick plants in the country. In three years you learn everything on the works, practically and mentally, from the clay bed to the brick kiln. At the age of twenty-one you are employed as assistant superintendent. You buy and subscribe for all the best current literature on brickmaking. You have become an expert in setting and burning, and at the age of twenty-four have full charge of it. There is no "haphazard" or "go-by-chance" in your setting and burning brick. Your practice is based on theory, method and science, which you have proved by your practice—I mean your own personal practice. You don't keep a "dullard" boss burner at your kiln, and after 10 or 11 at night tell the boss what to do, then go to bed yourself, and at 6 or 7 a. m. walk out to the kiln and ask the "dullard boss" "how she comes on." No, you don't do this, especially when your kiln gets hot. You are vigilant and careful, sleepless, untiring. You trust nothing to "hearsay." You may take a short nap occasionally, but you never keep your eye off of the kiln more than two or three hours. In fact, you can't sleep. Your mental anxiety increases as the crisis of the burning kiln approaches. You must see just how the fires and heat are working. You look in the "arches;" then you go on the top of kiln. The heat is constantly changing. You go by the color of the heat and color of the efflorescence of gases and sulphates on the edges of "plating." When these indicate a sufficient heat at any spot on the kiln the draft must be changed by "dampering" with fine clay, so as to force the heat to colder spots. (We hear talk of "pyrometic" instruments for gauging heat in a brick kiln. I will show in a future article that this is impossible.)

—You Are Now Burning Brick with Perfect, Uniform Certainty.—

The chief superintendent desires to change his position. You are the only one in sight that can take his place. The "output" of the plant is 10,000,000 brick per year. You are asked to take charge of the plant at a salary of $4,000 per year. You accept, and at the end of five years the plant has been so successful that you are urged to become a partner. You have saved $15,000 of your salary, and become a stockholder, still retaining your position as chief superintendent. Now, this is no overdrawn picture for the life of a true, born brickmaker.

—What Is Most Needed Now in the Brickmaking Business—

Is more skilled men with small brickyards and less unskilled men with large brickyards. We want the business more diversified and better skilled. Concentration of industries and combination of capital centralizes power and wealth, and thus individual enterprise and prosperity is forestalled or crushed. The mass of the people become pauperized and demoralized; then comes anarchy and its result—despotism.

Give the poor, well-skilled man a chance to show his enterprise. Let him make brick. Let him merchandise. Let him farm. Let him manufacture. Let him do any honest, legitimate business. Then, in turn, he will be able to patronize capital that is for rent, sale or loan. His interests will be identical with his rich neighbor, and his patriotism will be a sure guarantee for good, permanent government.

THIS DEPARTMENT IS DEVOTED EXCLUSIVELY TO INVENTION AND PATENTS RELATING TO THE CLAY INDUSTRY, AND IS EDITED BY MR. EDWARD C. WEAVER, ATTORNEY AND COUNSELOR, IN PATENT LAW, McGILL BUILDING, WASHINGTON, D. C. COPIES OF ANY PATENT WITH DRAWINGS WILL BE SENT AT COST, NAMELY: FIFTEEN CENTS FOR EACH COPY. ANY INFORMATION AND ADVICE IN REGARD TO PATENTS WILL BE GLADLY GIVEN. ADDRESS ALL COMMUNICATIONS TO THE EDITOR.

ANTICIPATION OF A PATENT.

According to the patent law an invention, to be patentable, must be new and novel as well as useful. As soon as the application is filed the examining corps of the Patent Office make a careful search of prior American and foreign patents and all of the publications bearing upon the subject that are accessible, to discover whether the invention is new or has been anticipated. There are, however, certain conditions to constitute a true anticipation.

The prior description in a printed publication or in a patent, in order to be a true anticipation, must be of such a nature as to constitute a valid patent if it had been in such a form. Moreover, the proof of anticipation must be of a clear and positive nature and be beyond a reasonable doubt. It is not sufficient that the device relied upon might by certain modifications be made to accomplish the function performed by the applicant's invention, if it were not designed by its maker, nor adapted nor actually used for the performance of such functions.

A foreign patent is evidence of a perfected invention if the description contained therein is sufficiently clear and definite, and reduction to practice is not necessary to constitute a title to receive an American patent based upon it.

A combination producing a group of useful results is not anticipated by several prior combinations of some of the elements, producing some but not all of said results, when the superiority of the new device results from the combination and arrangement of the parts as a whole.

550,667—BRICK PRESS CHARGER, by Bruce C. White, of Chicago, Ill. Filed April 26, 1895.

In combination with a mold and a feed box, there is a cutting-off knife, guided by the said feed box and operated by independent mechanism.

550,707—KILN, by Alfred Yates, of Arlington, Mass. Filed June 9, 1892.

The novelty consists of an air inlet to the bag, with a current dividing block.

550,708—DRYER, by Thos. B. Campbell, of Ithica, N. Y. Filed Oct. 17, 1892.

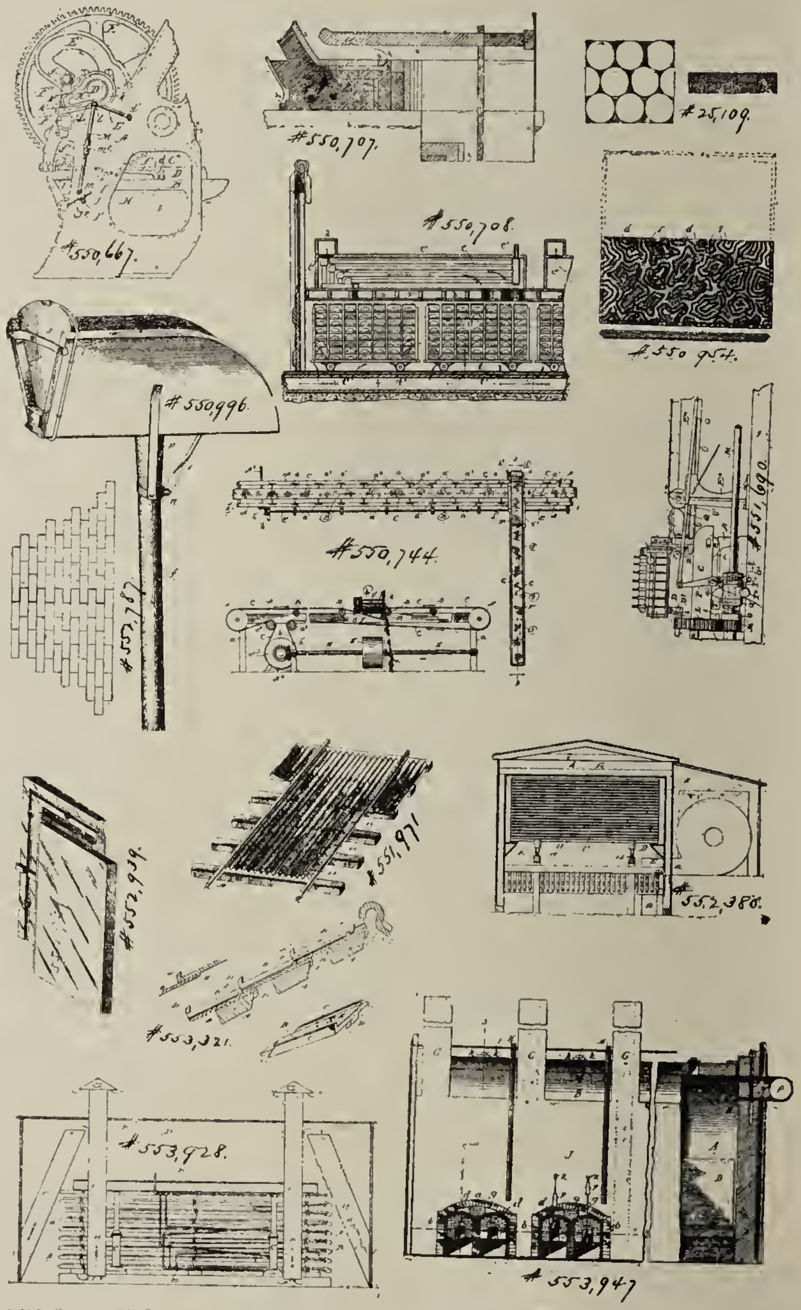
Steam coils are placed above the dryer tunnel, and the latter is operated on the down-draft system.

550,744—BRICK CONVEYOR, by Gustav A. Challam, of Lansing, Ill. Filed April 5, 1895.

The conveyor is an angled one; where one belt receives from the elevated end of the other.

550,954—GLASS-FACED BRICK, by Wm. Duxbury, of London, England. Filed Dec. 27, 1893.

The brick comprises a glass plate, with a cement or other compound backing, the face of the plate adjacent to the said cement being irregularly ridged.



550,996—HOD, by Wm. Mullen, of Chicago, Ill. Filed Feb. 6, 1895.

The hod comprises a rall or bumper plate attached to a handle, from the said rail arising the side parts between which the end plate is mortised.

551,690—BRICK OR TILE CUTTING MACHINE, by R. C. Penfield and W. W. Wallace, of Willoughby, O. Filed June 22, 1895.

The device is a wire cutter, and the wire frame is made with an adjustment in longitudinal direction.

551,971—CLAY BLOCK FOR CATTLE GUARD, by Ellis K. Kennedy, of Carrollton, O. Filed Feb. 7, 1895.

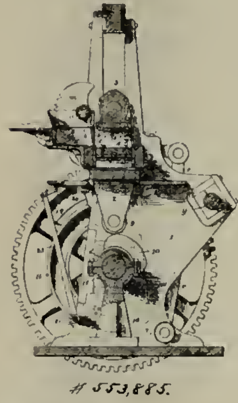
The blocks are provided with an inverted V formed upper face.

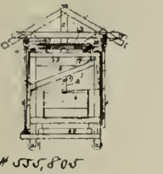
552,380—DRYER, by James C. Linnel, of Adrian, Mich. Filed June 10, 1895.

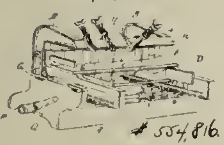
The device is for a circulation of heated air.

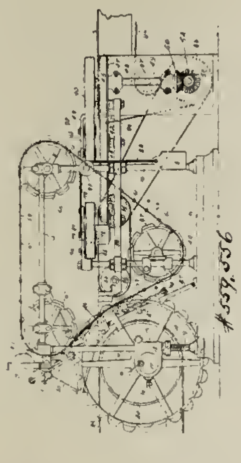
552,787—EXPANSION JOINT FOR BRICKWORK, by Seymour G. Smith, of Plainfield, N. J. Filed June 1, 1895.

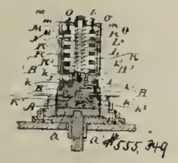
A sheet of non-combustible material, such as asbestos, is interwoven transversely with the brickwork.

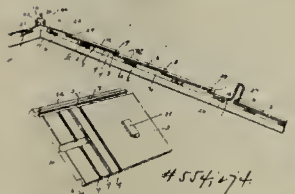


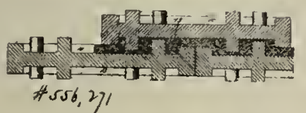


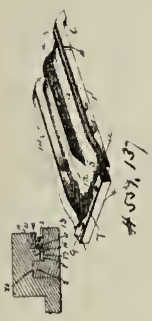


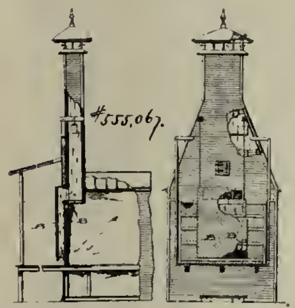


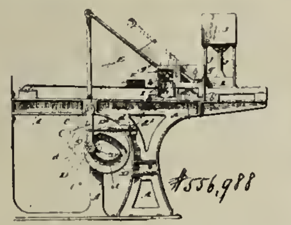


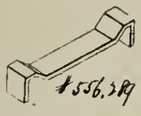


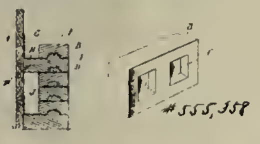


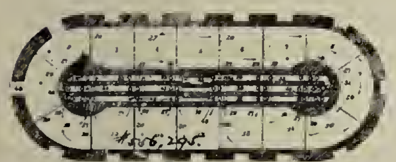


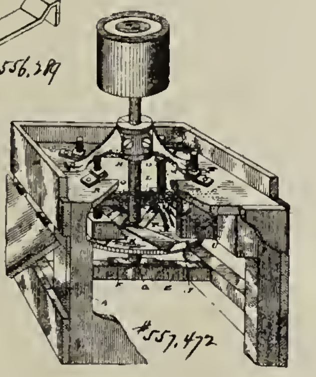












552,939—BUILDING TILE, by Karl Wahl and Johan Rixy, of Prague, Austria-Hungary. Filed June 13, 1895.

The tile has the form of diagonally shifted plinths, placed one upon the other, and the nether one has in its ledge grooves for wire, and holes for nails lying in these grooves.

553,321—ROOFING TILE, by George A. Taylor, of St. Louis, Mo. Filed May 23, 1895.

The tiles are provided with supporting hooks, and interlock in a dove-tail manner.

Design 25,109—TILE, by Chas. C. Alexander, of Bayonne, N. J. Filed Nov. 15, 1895.

553,928—DRY KILN, by A. S. Nichols, of Chicago, Ill. Filed Dec. 24, 1894.

553,947—DOWN-DRAFT KILN, by H. S. Wheeler, of St. Louis, Mo. Filed July 3, 1895.

Ports are placed in the ends of the kiln, directly below the crown, with pipes leading therefrom to an exhaust fan. There is an inner damper for the ports operated by an asbestos rope.

553,885—BRICK MACHINE, by Thos. T. Wood, of St. Joseph, Mich. Filed Oct. 5, 1894.

This machine presents little novelty except in a complication of power devices.

554,274—TILE ROOF, by Clinton Keiser, of Columbus, O. Filed Oct. 5, 1894.

The roofing tile is composed of plates of an intricate form for purposes of interlocking.

554,816—BRICK OR TILE CUTTING MACHINE, by James A. Frey, of Canton, O. Filed June 15, 1895.

A movable frame has secured thereto heads supporting the cutting wires, the wires being held by a pivoted holder, comprising a hook with spring controlled shank.

555,067—DRY KILN, by Albert T. Bemis, Indianapolis, Ind. Filed Dec. 3, 1895.

555,805—BRICK MACHINE, by William E. Damon, Pomona, Cal. Filed June 18, 1895.

555,349—BRICK REPRESSING MACHINE, by William W. Wallace, Willoughby, O., assignor to J. W. Penfield & Son, same place. Filed Oct. 17, 1895.

555,358—BRICK VENEER, by George S. Balsley, Detroit, Mich. Filed Oct. 8, 1895.

556,271—BUILDING BRICK, by Oscar Kleinberger, St. Louis, Mo. Filed Jan. 8, 1895.

556,289—DEVICE FOR PLACING POTTERY IN KILNS, by James Tams, Trenton, N. J. Filed Aug. 3, 1895.

556,295—BRICK KILN, by Peter L. Youngren, Washington, D. C., assignor to the Chisholm, Boyd & White Company, of Illinois. Filed March 2, 1895.

556,988—BRICK ROUGHER AND SANDER, by John G. Kerst, Springfield, Ill. Filed Sept. 27, 1895.

557,137—TILE, by John J. Merrill, Alfred Center, N. Y. Filed Sept. 23, 1892.

557,472—CLAY DISINTEGRATOR AND STONE SEPARATOR, by Byron E. Bechtel, Waterloo, Canada. Filed May 6, 1895.

559,556—MACHINE FOR CUTTING CLAY, etc., by John Winkelmeyer, Frankfort, Ind. Filed Feb. 21, 1895.

Written for the CLAY-WORKER.

CHEMICAL ANALYSIS.

Complete Dehydration of Hydrous Silica.

THE BRANCH OF CHEMICAL ANALYSIS which is employed in the laboratory for the examination of clays is called "gravimetric analysis." In following out this method our object is to convert the known constituents of the clay into combinations which, in the first place, will admit of their complete separation, and secondly, of their weight being accurately taken. The principal constituents of clay are silica and alumina, and to determine how many per cent. of each exists in the specimen we must invent some method for eliminating each—the silica and the alumina—from the clay in turn, either in their original state, or in combination with other elements, and taking their accurate weight.

Let me give you a rough illustration of an analytical method. Suppose, for instance, we had a mixture of pure white sea sand and granulated sugar, and desired to know exactly how much sand and sugar the mixture contains in percentage by weight. Take about an ounce of the mixture, weighed accurately, dissolve in hot water, and boil till all the sugar shall have gone into solution. Then, if the solution is filtered through a prepared filter paper, the sand will remain insoluble on the paper, and all of the sugar will be carried through the paper in solution. Cover the filter paper containing the sand with hot water three or four times, and finally we will have succeeded in accomplishing a perfect separation of the two substances. The weight of the sand can be easily determined, and if the filtrate (or solution of sugar and water) is evaporated to dryness in a weighed vessel, by difference we can estimate the weight of sugar. Of course, a mixture is much easier to analyze than a chemical compound; as there is no bond between the sugar and sand, or not united as one chemical compound, it is not a difficult matter to effect a complete disassociation and estimation of the constituents of such a mixture.

When we undertake the analysis of clay, however, there are substances to be determined which are united chemically so intimately and with such a strong affinity for one another that the most severe means must be employed for their separation.

The chief compound in clay is silicate of alumina, consisting of silica and alumina, with a definite quantity of water, all of which must be determined by weight. If the clay is treated with even the strongest acid, in some cases there will be a partial decomposition of the clay, but this reaction can never be depended upon as being complete unless the clay is thoroughly fused with sodium and potassium carbonate. Without going into the details of the manipulation of such an analysis, suffice it to say that the silicate of alumina is split up in the clear fusion, and the sodium oxide of the sodium carbonate goes to the alumina and silica, forming two distinct compounds:

1. Sodium silicate.
2. Sodium aluminate.

From this point on the method grows more simple so far as chemical separations are concerned.

But I wish to call the attention of my readers and other friends who may be engaged in chemical work to a point of interest that I have observed many times, but which I do not think is generally known.

Perhaps I have succeeded in making these few introductory words so simple that, as far as I have gone, all my readers have been able to follow me. This being so, I will try to continue in the same elementary language. The interesting feature in relation to clay analysis which I refer to is the complete dehydration of the silica, accomplished just previous to its separation.

In the clear fusion of clay and sodium carbonate, silica is in the form of sodium silicate. The next operation is to take the sodium away from the silica. If we treat the fusion with hydrochloric acid, this end is reached, but the silica, instead of being in the anhydrous condition, is left principally hydrous silica (or silica acid).

The best example of anhydrous silica is pure sea sand. It is a very insoluble substance even in the presence of acids. Hydrous silica, on the other hand, is soluble; hence it is desirable to convert all the silica into the anhydrous (insoluble) state, in order that it can be successfully separated from the constituents of the clay in the same manner as was employed in the case of the sugar and sand, with the exception that the water employed is strongly acidulated with hydrochloric acid.

Now, the difference in chemical composition of hydrous silica and anhydrous silica is this:

Hydrous silica equals anhydrous silica (quartz) plus water.

Again, if we heat hydrous silica to 130 to 135 degrees Centigrade, the water of constitution is driven off, and the hydrous silica is converted into anhydrous silica (quartz). It will remain in this state unaffected for an indefinite period. Now, referring again to the method employed for the analysis of clay, as far as we have taken it up, after the silica and alumina have been separated and the compound, as it exists in clay (silicate of alumina), has been broken up, the silica and alumina combine with sodium oxide of the fusion to form two definite compounds. Then we treat the fusion with hydrochloric acid, thus decomposing the sodium silicate and leaving the rest of the silica as hydrous silica, or silicic acid.

Evaporate to dryness and heat the residue to 130 to 135 degrees Centigrade. Theoretically, all the hydrous silica will be converted into insoluble anhydrous silica, but practically not. I have invariably found hydrous silica to the extent of .7 to 1 per cent. in the filtrate which was only supposed to contain in solution all the other constituents of the clay excepting the total silica; therefore, to insure accurate results, I evaporate twice and dehydrate a second time; then I am more confident that my silica has been separated. In most of the schools young chemists are taught to dehydrate their silica, in the analysis of clay, only once, but if the old method is used which I have just outlined, it seems to me safer to repeat the operation; for, no matter how carefully you work at this stage of the analysis, and when a large quantity of silica is present, one dehydration seems insufficient.

There has been some discussion among chemists in relation to the exact temperature at which the dehydration should be effected in a case of this kind. In the presence of such a large excess of sodium, and possibly potassium salts, I have heard good authorities say that, in their opinion, at 140 degrees Centigrade the silica and fixed alkalies would recombine and form soluble silicates. In the analysis of clay I find that at 130, 135 and 140 degrees Centigrade the first dehydration is incomplete; therefore, a difference of 10 degrees in temperature does not increase the amount of silica which fails to become anhydrous in the first operation; hence I do not believe that this is a satisfactory explanation of the problem. To me it seems simply impracticable to dehydrate such a large amount of silicate at once. There are other methods for determining silica in clay, and ways of disposing of the silica completely, but I have brought this criticism up only in relation to the dehydration from a hydrochloric acid solution of the fusion.

I will tabulate results in a subsequent paper which show to what extent the silica remains unaffected at different temperatures varying from 125 to 140 degrees Centigrade, and also the anhydrous silica obtained by evaporating the filtrate from the first separation of silica to dryness, and heating the residue again to the same temperature as was employed in the first dehydration. In detail, the method for determining silica in clay that I pursue in the laboratory, and to which I have particular reference, is as follows:

Weigh into a platinum crucible 4 to 5 grammes of the clay to be analyzed (this having been dried at 100 degrees Centigrade), mix with about 10 grammes of sodium carbonate containing a very little potassium nitrate, and heat over the Busen lamp till the fusion is complete and clear, and with no solution of carbonic acid when in the molten state, and during the operation of cooling turn the crucible well upon its side and at the same time revolve it slowly. This will leave the cold fusion in a concave shape, which will expose the maximum amount of surface of fusion to be treated with water and hydrochloric acid.

The crucible containing the fusion is placed in a platinum dish covered with a watch-glass, and a hundred cubic centimeters of water, containing about 15 cubic centimeters of hydrochloric acid, is added. Heat quietly until the fusion has been thoroughly disintegrated. As soon as possible relieve the dish of the platinum crucible, but be very careful that its entire contents has been transferred to the platinum dish by rinsing with hot water. Be sure that the fusion is completely decomposed; then make strongly acid with hydrochloric acid, and, after breaking up the mass very finely, heat for an hour at 135 degrees Centigrade in an air bath. Treat the residue with 25 cubic centimeters strong hydrochloric acid, and heat on steam bath for half an hour. Dilute with 100 cubic centimeters of hot water, and continue to heat over the steam bath for fifteen minutes. Allow silica to remain in the bottom of the platinum dish and transfer the clear liquid on top to a prepared filter paper. Treat silica residue twice in the same way with hot water made slightly acid with hydrochloric acid. Heat on steam bath for fifteen minutes and filter. After washing the silica by decantation three times, transfer the residue to the filter paper and wash thoroughly with hot water till a few drops of the filtrate gives no precipitate with silver nitrate solution.

The method, as described, has been used and taught in our best schools as being the most reliable method for determining silica in minerals containing silicates which are not completely decomposed by acids. For a chemist who carries on a great deal of this sort of work it is a cheap method. The chemicals used in the manipulations are not expensive, but the difficulty in question has caused a great deal of annoyance, especially among some iron and steel chemists of my own acquaintance. Dehydrating a second time is a very tedious task, but is a means of arriving at reliable results in the analysis of sands and clay. If hydro-flouric acid were a cheaper reagent, and its fumes not poisonous, it might be used to great advantage in solving this problem; but when such an expensive acid is used extensively the cost of the supplies in a laboratory is materially increased.

As a student in college I remember distinctly that the determination of silica by the "hydrochloric acid method" in highly silicious minerals was considered one of the most difficult analyses to make with satisfactory results.

By that I mean if two analyses of the same substance were carried along together, instead of checking off, as they should, within a few tenths of 1 per cent., the results would vary by 1, 2 and sometimes as much as 3 per cent. This would often be the experience of a large majority of the most careful and accurate manipulators in the chemical course, though perhaps by repeating the work several times the two analyses carried on in duplicate would agree. Because such harmonious results are reached, it is no sign that all of the silica in the specimen has been determined. I remember of once discovering what seemed to me a short method for estimating the amount of pure metal iron in an iron ore. Many of my results by this method checked off surprisingly close, but when compared with those obtained from the old reliable bichromate or permanganate method, I became convinced that the results which my rapid method afforded me, while very similar, were erroneous and untrue.

Be very careful that you do not draw the impression that I am underrating, even in a mild way, the value of "duplicate work" upon any substance to be analyzed.

Results for silica in a mineral may agree, but if after all the constituents have been estimated they do not foot up to 100 per cent. when properly arranged, it is very possible that some of the silica has not been rendered insoluble by dehydration.

In investigating this subject it is well to bear in mind the fact that many chemists hesitate about dehydrating at a temperature higher than 130 degrees Centigrade, for fear of a union between the silica and sodium salts, yielding soluble sodium silicate.

Likewise, that other authorities believe even from 135 to 140 degrees would not effect such a reaction between the sodium salts and silica, but regard the above-mentioned difficulty wholly attributable to incomplete dehydration of the silica acid. In other words, the large amount of hydrous silica which exists in the residue renders it physically impossible for the entire mass to be thoroughly treated.

Breaking up the dry residue as finely as you may, these chemists believe that there will always be small lumps of residue, the silica of which will be dehydrated on the surface, but for physical reasons the combined water cannot always be driven off from the hydrous silica in the center of the lump.

It is very similar to the complete ignition of a precipitate of alumina. If only a Bunsen lamp is used for burning a precipitate of alumina, the heat employed will not be sufficient to drive off all the last traces of water. Aluminum hydrate is so very gelatinous that each particle of precipitate seems to retain a very little water in its interior, being held back mechanically, perhaps by a tiny crust or shell through which the water cannot pass. At the heat of a blast-lamp flame, however, even the small trace of water is evolved. No doubt all the hydrous silica could be rendered anhydrous at a much lower temperature, but even at the heat of the Bunsen flame, of course the silica and sodium salts would reunite. The principle is the same, however, in either case—the water is "combined" and held back by the silicic acid in the same mechanical way. CHARLES FERRY.

DOWN IN JERSEY.

BUSINESS in the clay line is picking up here in Jersey. Factories are running almost full time. All the common yards at South River and Sayreville are in full blast. April is ahead of last year, so far, for brickmakers' weather. The sun has shone every day for the past two weeks, and a brisk wind dries the brick very fast.

My remarks in a former note regarding the whitewashing of the brick in our new school building still hold good. A trip past the building this morning shows the east and south walls very white, with very little, if any, on the west side. I did not go to the back, or north, side to examine the wall, but have noticed this building particularly and many others. Some person told me years ago that more "whitewash" would show on the easterly side of a brick wall than on any other. Since then I have looked more particularly for this idea, and I must confess it is a fact according to my own observation. The brick in this school building, I believe, came from Haverstraw. The terra cotta, which is dark red and burned very hard, was made here in Perth Amboy, and does not show the "whitewash," although built right in with the brick as belt course, window caps, etc. The building looks to-day just as it did the day the photo was taken two months ago.

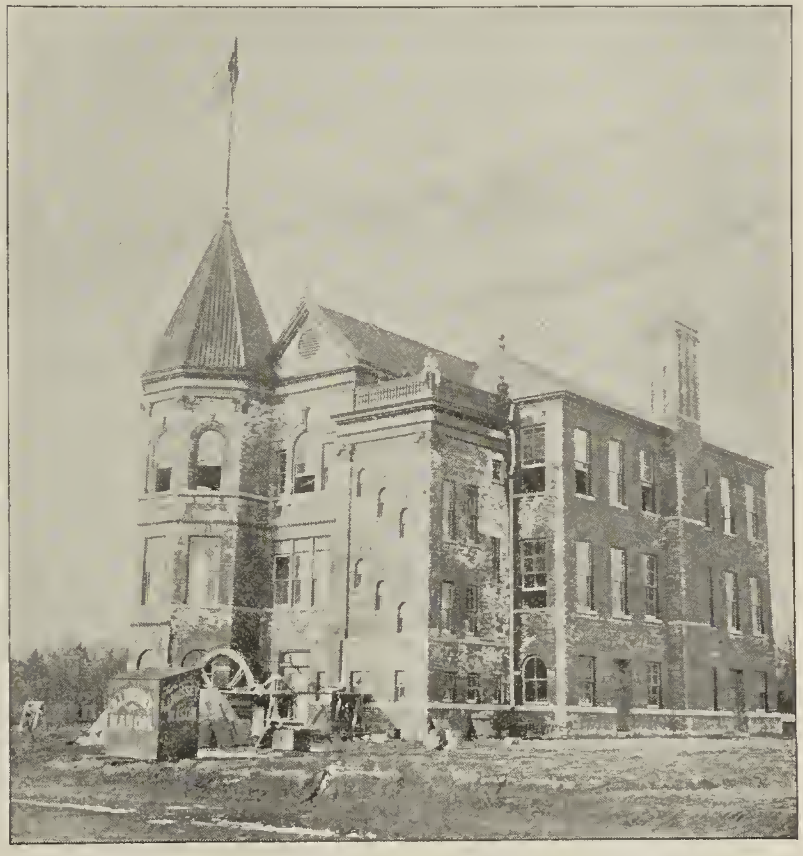
My esteemed friend, B. Jaquart, manager of the American Enameled Brick Factory, South River, writes me, under date of the 25th, that they have lately added on to their main building to allow them to carry a larger stock. This firm is very busy working upon large orders for enameled brick for various buildings. Among the lot is an order for 100,000 for Nos. 5, 7, 9 and 11 Broadway, New York; 80,000 for Hotel Wellington, New York; 150,000 for Altman Building, New York; 50,000 for Schenectady Water Works, New York; 50,000 for New York Mutual Life Insurance Building, New York, and 70,000 for Philadelphia. This is a very good record for a firm not yet two years old. Brother Jacquart desires the address of "I. H.," the enameler, that he may order some of his wonderful enamel to be used for enameling the fire boxes in his kilns. I fear Brother Jacquart is a little sarcastic over this "enamel that will not run." Now, please do not jump upon my back, I. H., for really I have not even read your article as yet. But very little escapes Jacquart's eyes, and if he says "I. H." is dizzy, why, dizzy he must be. Many of the enameled brick made at the American works are finished at one firing. Some of the architects prefer them this way.

Mr. John Whitehead, the gray-haired veteran brickmaker of South River, must have neglected his Bible somewhat, for when he built his kilns on marshy ground in order to be near his boat landing, instead of kilns standing up as they should, they settled, and the result was the whole machine went overboard into South river. But "Uncle Jack," being a Whitehead in name as well as in appearance, did not sit down and suck his thumb, but gave orders to rebuild. Result: Everything lovely again, with dock room enough now to load three schooners at one time. And "the road gang is still on top."

Mr. Theo. Willets, a brickmaker of South River, also has some "sand." Lately the street commissioners of the town undertook to open up a street through Mr. Willets's property, without saying so much as "with your leave." Result: The whistle blew and about eighty brickyard hands turned out with pick and shovel and street men flew for their lives. Mr. Willets holds the fort without spilling a drop of blood.

Mr. Wm. Weir, formerly Superintendent of the C. Pardee sewer-pipe department, now has charge of the sewer-pipe department at the Staten Island Terra Cotta Lumber Company's plant. This department has been idle for months on account of low prices, but the wheels are now moving, with Mr. Weir at the head.

Robert W. Lyle, formerly Manager of the above plant, has severed his connection with the same, and is now, we are informed, giving his attention to the Standard Hollow Brick Works, of which firm he is a member.



A Bad Case of "Whitewash."

The hollow brick department of the Staten Island works is now closed down, undergoing needed repairs.

A trip to the factories of the M. D. Valentine & Bros. Company finds all the wheels moving to their full capacity and shipments fair.

Hon. Mr. Milton Edgar, one of the heaviest shippers of clay in this county, has taken up office quarters with your scribe, and Mr. Wilson, his bookkeeper, formerly of South River, now resides in this city. Consolidation of facilities no doubt works as well in clay as in any other business.

Your correspondent has just finished for Mr. A. H. Lupton, of New Castle, Del., a well which was drilled through 113 feet of clay, finding a large supply of water in gravel below clay strata. Evidently Brother Lupton won't work all that clay out in his lifetime.

Building is now on the boom in this city, with prospects of more building than last year, which had a record of over two hundred buildings.

Mr. Philip Gibson is still with us, taking life easy, but a recent talk showed him as becoming restless again. Query: What is there in the manufacture of clay goods that makes a man always desire to work at it? W. R. O.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

BUTTON-HOLE TALKS—WHY STONE IS USED WHERE BRICK AND TERRA COTTA OUGHT TO BE.

YOU KEEP THAT LABEL on or you'll get lost." I had been wandering around the hotel lobby, or, more properly, standing around, until my hip bones seemed to have become hopelessly tangled among my shoulder blades, when I was accosted as above by a well-kept, prosperous-looking man, wearing a bright eye and a smooth tongue.

"No, don't you lose the label," said he, fingering my badge, "or you won't be safe." Then, in an introductory way, he continued: "I am no brick man, but am down here taking in the Exposition, and to-night, in the lobby here, I ran across a brickmaker friend of mine from our town. While we were talking he pointed you out to me and told me all about you. Said you were mainly noted for the ready way you absorbed. Said every one poured in all sorts of yarns into you, and that later on something in your anatomy would click and you would reel the yarn off just like one of these here phonographs.

"He was going to introduce me, but a kiln man came in and he had to run, but stopped long enough to tell me that it wouldn't make any difference. Said you were a mark for everybody, anyway, and that was one reason why you always wore the badge.

"I have been sizing up your crowd here, and I am really astonished. They class mighty high and seem awfully wide awake in picking up points in their business. I can't understand how such wide-awake, sensible fellows as they appear to be can be so backward in pushing their business.

"Now, look here, I'm going to tell you something, even if you are a phonograph, for you can't tell it in time to hurt me. I am a stone man! Hold hard! No, not an ossified man; not a marble heart, but just a stone quarrier and dealer. Now, of course, I am on hand to get any new idea as to handling and preparing stone, but is that all? Do I stop there? Well, I guess not. I work up business. That's what I do, and I do it, too. Why, it makes me almost snicker when I think what a lamb that brick friend of mine is, anyway, and you all seem just like him. Here's an instance: We are going to have a government building down in our section. What do we do? Why, he goes on planning how to make brick cheaper and quoting prices or cutting prices when any one comes and asks his price. Do I do the same? Not much, Mary Ann! I get busy on our Congressman and load him up. Home product, you know. Got quarry. Employ home labor, and all that sort of thing. Votes! That's the thing.

"Then, when I have him worked up and enthused, he just waltzes around and hits all the Washington folks in the same way, and there you have it. Popular movement. Everybody satisfied. Stone building. Great thing. Say, wouldn't brick fill the bill about as well? Home product and home labor, I guess, and, honestly, lots of argument in their favor that we stone men cannot urge. Nobody wakes up to the situation, however, but the stone man, and if you will just look around you will find that pretty much all the government buildings, particularly the larger ones, are stone, and that, too, in lots of cases, where the stone has to be brought in from distant quarries and when brick can always be procured at home.

"Now, this all comes about because you folks walk around wearing labels and smiles and things, instead of waltzing right at your Congressman and getting in your material where it actually belongs. Why, if every one of you fellows would go at your Congressmen and work with them, just a little, every one of these new government buildings would be fire-proof monuments of the clayworkers, for you have arguments to spare." GATES.

Light Wanted on Grinding Wet Clay or Shale.

Editor Clay-Worker:

The experience of brickmakers is that of always learning and still more to be learned. If this were not so we might dispense with the perusal of the Clay-Worker. Whilst I have learned many things during the past twenty-five years, I am far from proficient, and dare not say I know all about clay grinding, screening, making into brick, drying, setting, burning, sorting, etc., and whilst I am able to speak on some points (at one time misty) with much confidence, yet there are some points that are not quite clear. One I will mention in this connection and draw on the light and knowledge of the fraternity generally for some information on it, namely, the best mechanical appliances for pulverizing or grinding plastic clays or shales that are too wet for the dry pan because of gumming up the meshes of the screen.

I have tried rolls, and know that in such cases they are a source of annoyance. If set close enough to grind sufficiently fine they fail to feed fast enough. If set wide enough to feed fast enough, then they fail to grind fine enough. In either case they gum up or mud up elevators, etc., and make everything nasty about that part of the work, so that we are not in love with rolls for grinding plastic clay. What, then, shall we use? The disintegrating machine is free from some of the objections urged against rolls, but my experience with one (amongst the first made) was not satisfactory, because it did not grind fine enough. This machine had an oscillating apron, and the modern disintegrator, having a large feed roll, may do better work. In fact, I should judge it would, from the nature of the case. Disintegrators, even where the work is satisfactory, are not free from serious objections. First, the necessary high rotary movement of the cutting cylinder has a tendency, by reason of the strong centrifugal force, to throw out the cutting knives, and so make it dangerous to those near the machine. Possibly this objection has been overcome. Second, the cutting bars wear off rapidly. The wet pans will possibly do the best work, but are necessarily slow. But we cannot speak from experience, as we never had any with a wet pan. For grinding shale rock there is nothing equal to the dry pan. For grinding dry clay, such as is used in dry-clay machines, there are a number of devices that are more or less satisfactory, but in the matter of successfully and satisfactorily grinding wet shale or plastic clays we are not clear as to the best machine to use, and we would kindly ask all parties, whether brickmakers or machine makers, to state what they know on this important part of brick-making. Let this be done through the Clay-Worker, that all may be benefited. The grinding of clays and the necessity of thorough preparation in order to have perfect goods is receiving very much more attention than formerly, and yet there is room for improvement, perhaps quite as much here as in any other part of the industry. If it is found impracticable or impossible to thoroughly grind wet or plastic clays or shale, then it may become necessary to devise a means of partially drying the material rapidly before it enters the grinding machine. If the clay is carried hot to the grinder and hot to the brick machine, and this heat will promote slipping in the molds, and the fresh-made brick, being hot, will dry more readily, so that it is possible to construct a comparatively inexpensive clay dryer, that will materially facilitate grinding, making and drying, and compensate in these the cost of apparatus and labor required. J. K. CALDWELL.

Enameled Brick.

Editor Clay-Worker:

In commencing a series of letters on the manufacture of glazed and enameled brick I will take up the production of pure enamel on unburnt brick. It is a common idea amongst persons not familiar with enameling that most any clay they happen to have is suitable for any particular enamel. I would state for the benefit of such that it is not so, as it is rather difficult to obtain clays suitable for this process. You may test a dozen different clays and not find one that will work all right, no matter how good a formula you may have. My experience has been, amongst brick manufacturers that have had no experience in enameling, that they probably have had a good formula, and after trying the same on their clay, with poor luck, have come to the conclusion their formula was of no account; also, they have tried their formula on burnt brick and found they have got better results on a burnt brick. It may not be generally known, but it is absolutely true, that with some formulas you may produce an entirely satisfactory result on a green brick, and yet may put the same enamel on a burnt brick and have no good results whatever, on account of lack of experience in trying to produce a good enamel, after having purchased recipes from any one that happens to come around, without having proper instructions concerning the same. The consequence is the formula is condemned, the man selling the same stamped a fraud, and general dissatisfaction exists all around, with the resolution that they do not wish to bother with enamels again.

The practical enamelers that have had successful experience with kilns of enameled brick for the American market are exceedingly scarce, and the thousands of dollars that are wasted annually in trying to produce a brick that is fully as good as the imported one should convince intending producers that it is a difficult problem to solve. The only way to solve the problem is to obtain the services of a man who has had such experience in the business that he can guarantee the best results.

Some one is always writing me, asking for information concerning enameling on a red brick. I generally inform them that I will give them an enamel on a red brick, but the brick must be first burned. This particular enamel has a good appearance, pure white, and, as far as looks go, it is as good as an inexperienced eye would wish. But I always tell them that it is a soft enamel and will not withstand climatic influences, as a hard enamel will on a green brick. Of course, it is possible to put the hard enamel on some red clays, but to thoroughly fuse the enamel the red clay would have to be submitted to extra heat, which would burn the clay, in some cases, out of shape.

I have lately received some very fine samples of clay from near Hockessin, Del. (burnt brick), that is the most refractory I have ever seen, and even these were discolored after being submitted to the heat required for a hard enamel. The only way to produce a brick that can be guaranteed in every way is to use a highly refractory clay and burn the enamel on the clay (or, I may say, in the clay). Then, and not till then, will producers be able to give satisfaction to the trade.

Most people have an idea that to produce a fine enamel the material forming the compound must call for something that is costly and troublesome to prepare. I have letters from persons using enamels that they say have to be fritted and ground, and afterwards raw material added, and that their enamel is good, but too expensive. I may say right here that there is no necessity for fritting if the correct materials are used.

I find there is a firm about to organize for the manufacture of enamels and glazes for the American manufacturers, to supply them with the same, with a guarantee that they will work successfully, but at the same time they will make a proviso that in no cases will they sell their goods to any one with a guarantee without customers first sending them a sample of the clay they wish to enamel. They can then try the clay, and, after trying, they will send them enamels they will guarantee will work successfully on their clays. I am glad to hear of such an institution starting, with the object in view of giving satisfaction, as with such rules they cannot help but succeed.

To any one commencing the production of these goods I wish to state, if they will correspond with me through the Clay-Worker I will give them all the information I can concerning clays, burning, etc., outside of actual recipes, and would advise them not to use either white lead, red lead, litharge or oxide of zinc only in minute parts.

In the case of burning enamels without these ingredients, it is possible to set the brick in kilns without the use of seggars, as they are an expensive outlay, and also say that any good up or down-draft kiln is suitable for the same, if the proper ingredients are used in compounding. Of course, a great deal depends on the man in charge of burning, as the percentage of loss is so great, if not burned properly, but given anything like a uniform burn from top to bottom of kiln, the loss should not be much.

—Staining.—

The colors generally called for in this market are pure white and ivory or cream color. There are several ways of producing the peculiar tint called ivory. It may be produced by staining the white base with a buff clay, or with introducing small portions of oxide of manganese (pure), or with introducing different proportions of Albany slip clay, such as used by stoneware manufacturers, but care must be taken to obtain the exact proportions. Different colors may be obtained with different metallic oxides that will stand extreme heat, such as the oxides of cobalt, manganese, copper, and, in some cases, iron, but in all cases of using these oxides it is better to frit them in kiln with other materials. In this case it necessitates regrinding, but better results are obtained, as fritting these oxides at extreme heat cleanses the oxides from all impurities. In all cases of staining or coloring the white enamel is the base for use. In fritting oxide of copper it is necessary to introduce a hard flux with same, say about eight parts ground flint, twelve parts ground feldspar and about two parts of carbonate of lead. This is necessary to produce the different shades of green which this oxide gives. The oxides above named are about the only ones that may be used for coloring hard enamel, on account of the extreme heat to which they are subjected.

By mixing these stains compound colors can be produced in many different ways, viz., manganese and cobalt in different proportions, copper and manganese, iron and cobalt, copper and cobalt, Albany clay slips and copper, and so on.

—Grinding.—

There are a variety of mills in the market that answer the purpose of grinding, but I must positively state there can be no hope of success without these oxides are thoroughly ground after fritting. It is often the case, where parties have no facilities for grinding, to use these materials without grinding. It is time and money thrown away. After these materials being ground, they should be put through a one-hundred-mesh sieve. If put through any larger size mesh there is liable to be trouble caused by pin holes, as they are called. I have always found it best to put these materials through as fine a sieve as possible. After sieving this material it should stand about twenty-four hours. Afterwards take off the water that accumulates on top with sponge or syphon and thoroughly stir the material, taking care in applying enamel to put it on the brick uniform. OPAQUE.

About Roofing Tile.

Editor Clay-Worker:

I was pleased to read several good and sensible articles in your last number on roofing tile. This is a branch of the clay industry that has not received the attention of the clayworkers that it merits. The competition in making brick has become so great that the cream has been taken out of it. The same is true of sewer pipe, drain tile, pottery and other branches. These have a local market, as their weight and freight charges prohibit long shipments. It is different with roofing tile. One factory has roofs of its make in every State in the Union. They stand shipping better than slate, as they are lighter. With the improved machinery it can be put on the market as cheap as slate, and every one will admit it is far superior in every respect. The writer believes that the reason tile has not been more generally made and used is because the proper effort has not been made. If one-tenth the capital required to carry on a large paving brick plant was put in tile works, backed with the same business enterprise and energy, they could supply the United States. The amount of business that can be done in this line has no limit. Every factory, railroad depot, church or other building that wants fire protection will use tile in preference to slate, if they can certainly get them when wanted. Tile can be made, and sold at a good profit, as cheap as slate, and will be. At the same price their beauty, lasting qualities and fire protection will give them the advantage and take the market.

Two or three gentlemen of my acquaintance are now ready to organize a company to control the roofing tile business of the United States. Their plan is to contract with from ten to fifteen factories at such points as have good clays and shipping facilities, so distributing them in the States that the freight to consumers will be light. The company will contract with these factories to take their entire output, paying for all tile made every sixty days. The tile will be made of one pattern, so that large orders can be shipped from different factories if necessary. All orders will be received by the company and filled from the nearest factory. All payments will be made to the company. An active agent will be employed by the company and put in the field for each factory, having a territory of two or three States to work in. This company will not be a trust, but will be organized and managed on as broad a basis as any trust, to cover the entire country and to ship to Central and South America. There is no experimenting to be paid for—they know what the tile can be made and sold for—the price and the patents will protect them from competition These gentlemen are now looking for the right man to put at the head of their company. They want energy, enterprise, integrity and business judgment equal to that required for the management of a railroad, a bank or any of the large trusts. They expect to pay for these qualifications. The business will justify it. Now, Mr. Editor, do you, or any of your readers, know the man with these qualifications that is open for such a position? If you do, put him in communication with us. We are looking for him. There will be no trouble or delay in getting the company in full working order, and all the capital required. ENTERPRISE.

In and About Philadelphia.

Editor Clay-Worker:

During the past three weeks your correspondent has visited nearly all the brickyards in Philadelphia, and finds that most of the manufacturers have already set and burnt from two to five kilns. Philadelphia still clings to the old Dutch up-draft kilns, and the results obtained in some of the yards are wonderful. I saw, a few days since, about ten of these kilns, where the owners got 95 per cent. of good, straight, hard brick. Can any of your readers beat this? I think that in this city more care is exercised in setting, and as good setting is essential to a good burn, I would advise those manufacturers who are not getting a fair percentage of hard brick to look after the setter, and not "roast" the burner. He is not always to blame for a poor kiln of brick.

F. D. Cummer & Co. have about completed the dryer they have been erecting for H. C. Carroll & Sons, and this plant will start up again in a day or two, after a shut-down of four weeks to allow them to add machinery mentioned.

The craze for buff brick fronts still goes on in this city. Car after car is unloaded daily at the various railroad stations. The Eastern Hydraulic Company, of Winslow, N. J., have the bulk of the trade. The Jarden Company are doing very little in buff brick line. What few they make is from clay shipped from New Jersey. This company keeps on jogging along, and that is about all. A big concern, not doing one-third the business they should do, according to the size of the plant. Mr. Wm. McCay is no longer President. He resigned that office some time ago.

The yard at Old Front street and Tioga, formerly operated by John M. Kennedy, has been leased by Phil H. Hoff, who is now running the plant to its full capacity—40,000 daily. J. D. Melcher is Superintendent, and Mr. Hoff is to be congratulated on securing the services of this thorough, practical brickmaker. I am sure Mr. Melcher will put the yard on a paying basis and keep it so.

The Attorney-general, a few days since, heard argument on the application for a writ of quo-warranto against the Pittston Press Brick Company, on the ground that it did not have 10 per cent. of its capital stock paid in when the charter was taken out.

Mr. A. G. Collum has purchased forty-three acres of first-class clay property near Walnut Lane, Germantown, and has built a plant which covers twenty acres that is equipped with one of Martin's latest machines and a Huyatt & Smith dryer. There are four well-built up-draft kilns. The stock sheds are large and roomy, and the plant is the most complete, for its size, in or around Philadelphia. The daily output is 35,000, and they have already turned out eight kilns (150,000) of first-class common brick. The railroad facilities are good. The bulk of the product is delivered by teams throughout the city. Mr. Collum informed your correspondent that the entire product for the season is sold. PENN.

An Old Subscriber Sells Out in Good Time.

Publishers Clay-Worker:

Inclosed I send you $2 to renew my subscription to the Clay-Worker, though not now actively engaged in the brick business, having disposed of the plant known as the Summerville Brick Works to Mr. A. W. Taylor, of this place. I still have a kind of hankering to keep posted on brick matters, and do not know how I could expend $2 in any other direction and obtain the same result. The Clay-Worker is pre-eminently the clay journal of the Western world. I have been a constant reader of this journal for eleven years. Whatever success I may have met with as a brickmaker is largely due to the Clay-Worker and its corps of able contributors, among whom I desire to mention R. Brick and the venerable patriarch who dwelleth in the land of flowers.

I turned over the plant to Mr. Taylor on March 10. April 2, at 2 o'clock in the afternoon, fire was discovered in the hip of one of the stacks to the dry house. The wind was blowing a gale from the southwest, and in a few minutes the flames were leaping out at the top of the stack, seventy feet high. In forty-five minutes the entire woodwork of the dryer, a large shed, 50x30 feet, at the receiving end of the dryer, three small houses formerly used for operatives, together with stables and barn, were in ashes. With the aid of a ten-thousand-gallon tank and hose attached to the steam pump the building containing the machinery was saved, the only damage being to the woodwork of the offbearing frame of the brick machine. The dryer was built in 1889 at a cost of $4,000, when drying brick by steam was in its experimental stage. In 1892 the dryer was overhauled and an addition of twenty feet added thereto, also fifty coils of piping, sixty-five new dryer cars, five tons of twelve-pound rail, the receiving shed above mentioned and a discharging shed, 30x25 feet. Total cost, $6,000, upon which there was $3,500 insurance. I estimate the actual loss to the plant at about $3,000. Mr. Taylor contemplates rebuilding at once. Before the smoke of the battle had disappeared a telegram was flashed over the wires to a prominent firm of your city, requesting them to send a representative on at once to arrange a contract for rebuilding. Mr. Taylor will be in the market for one hundred dryer cars. He will want a different style from those furnished when the dryer was first built.

In answer to your inquiry as to the outlook for the brick industry, I regret to say the prospects for this section, at least, are not flattering. The Piedmont section of South Carolina is on a big boom. Cotton factories are being built at almost every crossroad. Some of the Eastern mill men are pulling up and moving South, where labor is cheaper, strikes almost unknown, and a climate unsurpassed anywhere. These conditions, however, do not correspondingly benefit the larger established brick plants, the brick for most of the factory buildings being made right on the ground. We have here a beautiful little village of 3,000 inhabitants, twenty-two miles from Charleston, with an average annual output of four million brick, and, strange to say, there is not a brick building nor a foot of brick pavement in the town. While we have no brick buildings or brick pavements, we have that which thousands of sufferers are longing and seeking for—health. To those afflicted with pulmonary diseases I would say, when in doubt as to where to go for a change, try Summerville, whose official motto is: "Sacra pinus esto." T. W. STANLAND.

Summerville, S. C.

Way Down East.

Editor Clay-Worker:

The outlook for the season's business in Bangor and Brewer (Me.) brickyards is a little more favorable than that of a year ago. Owing to the small output of last year there are at present no great stocks on hand. In all, it is estimated that there are 2,500,000 bricks to meet the demands of the opening of the building season. There is no demand for Maine bricks from outside the State. The building projects so far made known that will call for bricks from this section are as follows: Eastern Maine Asylum for the Insane, in Bangor, 2,000,000; Eastern Manufacturing Company, paper mill, South Brewer, 1,000,000; proposed pulp and paper mill in Winn, to take 1,000,000 or more; paper mill in Montague, which will take another million or so. Beyond these there is nothing in view to warrant the seven manufactories in Bangor and Brewer making an output of more than half their capacity. Up and down lots are held at $5.50 per thousand net, but the bidding for some of the contracts in the above list will probably show quotations as low as $4.25. Under the most favorable circumstances, with the present methods of manufacturing, bricks cost the Bangor and Brewer manufacturers $4.25 per thousand, so that it is safe to prophesy that no millionaire will rise from an Eastern Maine brickyard this year.

Eastern Maine brickyard crews work fourteen hours a day, from 5 a. m. to 7 p. m. They work one hour before breakfast, one hour after supper, and take barely time to eat at noon. Two strikers will carry off not less than 8,000 bricks in a forenoon, and it is oftener 10,000. The best half-day's (six hours) record by two men at a Hobbs soft-mud machine is 13,000. Wages for old hands average about $35 a month, with board. Foremen are paid from $50 to $100 monthly, with board. Brick burners receive $3 per day, without board.

The brickyard in Gardiner, Me., which was operated for years by William Morrell, is now operated by H. W. Potter, of Gardiner. In this yard the departure from the old style of treading the clay is very slight. The clay is dug from a bank sixty feet in height, and dumped as it is dug down a sluice twelve feet into a pit, where it is wet. After soaking over night it is thrown from this pit into the tread, where the machine tender stands. The bricks made are undoubtedly the best specimens of soft-mud bricks manufactured in Maine. Mr. Potter will make but a few hundred thousand this year. The market is confined wholly to Gardiner City. YANKEE.

Better Times in Omaha.

Ed. Clay-Worker:

The favorable indications which I prophesied in January for a much better year in our building interests seem about to be realized. The turning point seems to be reached, and I think from now on we can look for better times.

Somehow, and I never could see why, spring has never been a good time for the building contractors of Omaha. Most people in this city who contemplate building prefer to put off letting their contracts until late in the fall, taking all the chances of an early winter, but spring, this year, has been an exception to the general rule, and has started out better than for several years.

The first four months of this year show a marked improvement over last year, with just the month of March excepted. In that month of last year we built the Creighton Theater, costing over $100,000. This amount we could not overcome in March, but outside of that permit we have gained on each month, and have more than doubled on last year's April permits.

There are several large buildings in contemplation which will most likely be completed during the summer months.

Amongst the most prominent contracts now let and approaching completion are the following: The Davidge Flats, corner Eighteenth and Farnam streets, $25,000; Omaha and Grant Smelting Works, $5,000. The Franciscan Fathers have decided to build a monastery and church, the monastery to be 85x48, three-story, of brick and stone, and church 137x66. It is proposed to build the monastery at an outlay of $18,000. The church will not be completed this summer, but will cost some $30,000.

The Booth Packing Company is adding a third story to its large brick building, also adding a cold storage plant, costing over $5,000.

Mr. W. H. Green is building a $5,000 residence and N. B. Rairdon a $4,000 residence.

There are over fifty dwellings being built, costing from $1,000 to $5,000 each. This, together with numerous repairs going on, shows a marked increase over last year's permits, and, we trust, is only the beginning of better times. W. S. WEDGE.

A Mexican Brickyard.

Editor Clay-Worker:

The Clay-Worker even finds its way to this part of the country, but in reading the letters from members of the craft in various parts of the globe it is not often that there is one from Mexico, and I thought that a few words from this quarter might be of interest. There is only one brickyard of importance here, viz.: the works of the Monterey Pressed Brick Company, situated on the line of the Mineral Belt Railroad, a short distance from the city. To draw conclusions from articles in current papers, magazines, etc., in the United States pertaining to the primitiveness of mining and manufacturing methods in vogue in Mexico, a visitor would naturally expect to find a very ancient yard, with full equipment for making bricks as in the time of Cortez. This is altogether wrong. We have a plant strictly up to date in every particular, and a long way ahead of many plants in the United States, and the quality of the output, which is over 100,000 a day, is attested by the fact that out of hundreds of samples sent to be tested for the San Antonio, Tex., sewer work the Monterey company secured the contract for several millions.

The clay bank is about twelve feet deep, and just dry enough to work well by the dry process without shedding. The clay is drawn up by a winding drum in cars, and dumped into two Ross Improved Disintegrators, in connection with the regular belt elevators, one of which feeds a pug mill, which supplies two Penfield Stiff-mud Machines. The other supplies a Ross-Keller Dry Press, which is the pride of the yard. This press was put in seven months ago, and at present writing is turning out over 40,000 of the finest pressed bricks a day.

The market is practically unlimited, and besides the large number of bricks sent to different parts of the United States, the company is constantly receiving orders from various points in Mexico, as far down as the City of Mexico.

The company uses eight of the ordinary furnace kilns, that are very well adapted for using the native coal, that being the only fuel obtainable at anything like a reasonable figure.

In addition to the ordinary square and front, or "stock" bricks, the company manufactures a full line of fancy shapes, that, for beauty and general finish, will compare favorably with those made anywhere. Mexican labor is used entirely, and, as a matter of course, the language is Spanish. J. A. C.

Monterey, Mex.

OHIO VALLEY NEWS.

THE LAST WEEK has witnessed more activity about the sewer-pipe works than for nearly two years. All of the works have been shipping from their large stocks as rapidly as cars could be secured and loaded. This activity is caused by the fact that six firms in this region have withdrawn from the Central Sewer Pipe Company, decided at a meeting held in the rooms of the Sewer Pipe Exchange, in Toronto, on April 29. The firms withdrawing were Kenneddy, Kling & Co., John Francy's Sons & Co., Great Western Fire Clay Company, Calumet Fire Clay Company, Empire Fire Clay Company and P. Conner, leaving only two works, the Freeman Fire Clay Company and the Ohio Valley Fire Clay Company, in the Toronto district, still in the combine, the Markle Fire Clay Company never having gone in the same. Although the withdrawal of the Toronto firms will considerably affect the Association, yet the remaining twenty-one firms will continue the Central Company the same as heretofore. There is evidently a wide difference of opinion among the pipe manufacturers, as the retiring members of the Central Company considered the organization a great hindrance and loss to their business, and hence desire to run on an independent basis, claiming that there was too much red tape in the methods of the combine, causing the filling and shipment of orders to be slow and delayed, and think they can do business for themselves in a much more expeditious and satisfactory manner. The firms still constituting the Central Company think that through the medium of such an association is the only way for sewer-pipe manufacturers of today to conduct their business properly—to combine for mutual protection and profit, as that is the only way to keep prices up to a paying basis and reduce the expenses of selling the products to a minimum by directing sales from a central office, thus having a few salesmen do the work for all the firms, whereas, by operating separately, each company is compelled to keep its own representatives on the road at a heavy expense. Leading members of the Central Company think the ones who have withdrawn will find they have made a mistake and will be glad to re-enter, stating that effective combination is the only method of the present day for manufacturers of any class of products to secure protection and maintain reasonable profits, and state that the success of all great manufacturing concerns of the country testify to this fact.

The pottery owners of East Liverpool are much interested in a railway from Canton to East Liverpool, which, when completed, will furnish them an outlet to the West for their products. The new road will be known as the Canton & East Liverpool Railway Company.

The new buildings of the Stratton Fire Clay Company, of Empire, are completed, and the company will be again manufacturing paving brick by May 15. Their plant was completely destroyed by fire in January.

The semi-annual meeting of the white granite-ware manufacturers was held at the Monongahela House, in Pittsburg, April 19. The subject of advancing prices and reducing the expenses were the main questions considered. They claimed the outlook for trade was not very flattering at the present time.

Messrs. Kenneddy, Kling & Co., at present operating the old Jefferson Sewer Pipe Works, at Toronto, purchased the Markle Fire Clay Company's sewer-pipe works, at Markle, O., near Toronto, for $15,000. These works were sold to a company of local capitalists about the 1st of January, at receiver's sale, and on account of some disagreement among the owners it was offered at private sale. Kenneddy, Kling & Co. now have both of their plants running to their full capacity. BUCKEYE.

THE NEW YORK MARKET.

APRIL 27.—All yards except one are molding, and that one will be working before the week is out. Why are they so anxious to start? I believe that if each owner was asked his reason for commencing before May his answer would be, "The rest are running, and I feel that I must follow." Certainly the market does not hold out any inducements to rush the season. It would point rather to an early stop, to judge from the market report as it appears in this number of the Clay-Worker.

A case in point: One of the vessels from Hackensack, carrying seventy thousand, was just two weeks on the last trip, ending Saturday, April 25; dull market the cause. The yard from which the vessel carries turns out about thirty-five thousand per day. How long would it be, at that rate, before the shed would be full and no room to set?

I am able to say that the good ship, "The Consolidated Brick Company," has at last been launched. If her voyage through the troublesome waters of the New York market is attended with the fear of failure that so seriously was felt during the three months of construction, the officers and crew will need the sympathy of all. It looked at one time as if she would be in about the same fix that the battle ship Indiana was in, less than a month ago, with the prospect of war, sent to Port Royal as the only dock in the country large enough to dock her. On her arrival there was water enough to enter the harbor, but not enough to get in the dock. After being docked and overhauled there was not enough water to get her out. After waiting two or three days she was released, and, when ready to sail, there was not enough water to get out of the harbor. Just so with the C. B. Co. She was ready, when one of the active members of the crew, and a director, concluded that he would not send all his stock by that ship, but carry water on both shoulders. That gentlemen you are personally acquainted with, and he is a member of the N. B. M. A.

In the last number I said that the meeting of the 30th of March would be a trying one, and it was in more ways than one. The commanding officer was to be chosen, and he was one whom all had confidence in. He, with his brothers, makes about thirty millions a year, and the major portion goes to his brothers' yard in Jersey City, and he wanted that stock taken from his shipments, and he was "coy as a maiden with her first beau." Another stick in the launching: The week the final meeting was called it was with many misgiivngs that many attended, as they thought that after all the trouble of building they would not be able to launch her, but they did, and elected George W. Washburn President and commanding officer. In maritime circles if a vessel sticks on the way when she is launched she will be unlucky. (Note the Texas.) I hope that no such mishap will befall the C. B. Co. during her existence.

—Articles of Incorporation.—

We, the undersigned, all being persons of full age, at least two-thirds of whom are citizens of the United States and residents of the State of New York, desiring to form a corporation pursuant to the provisions of the business corporation law of the State of New York, do hereby make, sign, acknowledge and file this certificate for that purpose, as follows:

First—The name of the proposed corporation is the Consolidated Brick Company.

Second—The purposes for which it is to be formed are the manufacture and sale of all kinds of brick, the purchase and sale on commission or otherwise of all kinds of brick, the transportation of brick and the regulation of the transportation of brick.

Third—The amount of capital stock is thirty thousand dollars.

Fourth—The number of shares of which the capital stock shall consist is six hundred shares of fifty dollars each.

Fifth—The amount of capital with which the corporation will do business is thirty thousand dollars.

Sixth—Its principal business office is to be located in the city, county and State of New York.

Seventh—Its duration is to be fifty years.

Eighth—The number of directors is to be nine.

Ninth—The names and postoffice addresses of the directors for the first year are as follows: Alva S. Staples, Kingston, N. Y.; William Hutton, Sr., Kingston, N. Y.; George W. Washburn, Saugerties, N. Y.; Homer Ramsdale, Newburgh, N. Y.; William Lahey, Newburgh, N. Y.; Theodore G. Peck, Haverstraw, N. Y.; Denton Fowler, Jr., Haverstraw, N. Y.; T. Maguire, Haverstraw, N. Y.; James W. Gilles, Hackensack, N. J.

Tenth—The postoffice address of the subscribers and a statement of the number of shares of stock which each agrees to take in the corporation are as follows: Alva S. Staples, Rondout, N. Y., 17 shares; William Hutton, Rondout, N. Y., 18 shares; Geo. W. Washburn, Saugerties, N. Y., 10 shares; Denton Fowler, Jr., Haverstraw, N. Y., 10 shares; James W. Gilles, Hackensack, N. J., 6 shares; T. Maguire, Haverstraw, N. Y., 11 shares; Theo. S. Peck, Haverstraw, N. Y., 10 shares; Frank Timmoney, Fishkill, N. Y., 8 shares; William Lahey, Newburgh, N. Y., 9 shares.

In witness whereof we have made, signed, acknowledged and filed this certificate in duplicate, dated this eleventh day of March, 1896.

ALVA S. STAPLES,
WILLIAM HUTTON,
GEORGE W. WASHBURN,
DENTON FOWLER, Jr.,
JAS. W. GILLES,
WILLIAM LAHEY.

State of New York, County of Orange. (Seal.)

On the 11th of March, 1896, this agreement was ratified before a notary.

SAILING ORDERS.

—By-Laws. Article I. Officers and Records of Company.—

The principal office of this company shall be in the city of New York, where its books and records, stock and transfer books shall be kept.

—Article II.—

The annual meeting of stockholders, after the year 1896, shall be held at the office of the company in New York, on the second Tuesday of February in each year, at 12 m. Written or printed notice of each annual meeting shall be given by the Secretary through mail addressed to each stockholder of record on the books of the company, at least two weeks prior to the time fixed for holding said meeting, and notice of said meeting shall also be given by publication thereof at least once a week for two successive weeks immediately preceding said election, as provided by law. Special meetings of the stockholders may be called at any time by the Board of Directors, to be held at the company's office in New York, upon five days' prior notice of such meeting, to be given through mail by the Secretary to each stockholder. At any such special meetings no business other than that specified in the call shall be considered. At all meetings of the stockholders each stockholder shall be entitled to one vote in person or by proxy for each share of stock standing in his or her name on the books of the company, but stockholder shall not be entitled to vote on stock not fully paid up.

—Article III.—

The management of the company and its business and affairs shall be intrusted to a board of nine directors, who shall be selected from the following localities: Three from Haverstraw, two from Newburgh Bay, two from Rondout and one each from the Hudson river above Rondout and Hackensack, who shall be stockholders of record at the time of their election, as well as owners, occupants or lessees of a brickyard, and who shall be elected by ballot at the first meeting of the stockholders. No person shall act as a director of the company after he has ceased to be a bona fide holder of record of some of the stock of the company. The said Board of Directors shall be elected at the first annual meeting, to be held on the second Tuesday of February, 1897, and shall hold office for one year from date of their election, or until others are chosen and qualified in their stead. The said election shall be conducted by two inspectors, appointed by the Board of Directors, and if any such appointees are not present the vacancy or vacancies shall be filled by the presiding officers of the meeting.

—Article IV.—

Immediately after the annual election, if a majority of the Board of Directors be present, and, if not, at their first meeting thereafter, the said board shall elect by ballot a President, Vice President and Treasurer from one of their own number, who shall hold office during the term for which the board is elected, and until their successors are elected and qualified. All other agents or factors of the company shall be appointed by the officers of the company, subject to the approval of the Executive Committee, who may also remove or suspend any such agent or factor.

—Article V.—

Regular meetings of the Board of Directors shall be held on the first Tuesday of each month at the company's office, but the President may call special meetings, or the Secretary, upon request of a majority of the Directors. Five Directors shall constitute a quorum.

—Article VI.—

The Board of Directors shall, by resolution, designate three of their number to constitute an Executive Committee, one to come from Haverstraw, one from Newburgh Bay and one from Rondout or points above, who shall, for the time being, have and exercise all the powers of the Board of Directors in the management of the business and affairs of the company, and have power to authorize the seal of the company to be affixed to all papers which may require it. The Executive Committee shall keep a record of its proceedings, and report the same to the Board of Directors at its next meeting. A majority of their number shall constitute a quorum. The President and Treasurer shall be members of the Executive Committee ex officio. The Executive Committee shall meet every Tuesday evening at the company's office.

—Article VII.—

If any vacancies occur among the Directors or officers of the company or the Executive Committee, such vacancies shall be filled for the remainder of the year by the Board of Directors at any regular meeting at which a quorum shall be present.

—Article VIII.—

The seal of the company shall be in the custody of the Secretary, and shall have engraved upon it the words, "The Consolidated Brick Company," arranged in a circle, with the words, "Incorporated, 1896," across the center of the space inclosed.

—Article IX.—

The President shall be the chief executive officer and head of the company, and in the recess of the board shall have general control and management of all its business affairs. He shall preside at all meetings of the Board of Directors. He shall make quarterly reports and submit the same to the Board of Directors, showing the condition of affairs of the company, making such recommendations as he thinks proper, and shall, from time to time, bring before the Directors or Executive Committee such information as may be required touching the business and property of the company. He shall also, with the Treasurer, sign all certificates of stock, checks, drafts and other evidences of indebtedness necessary to be signed. No promissory note shall be made or signed, issued or indorsed by the company, or under written instructions from the Executive Committee, or under power given by a resolution of the Board of Directors, except that the President or Treasurer may indorse for collection or deposit only, expressly stating the purpose of such indorsement, checks, notes or drafts, to the order of the company. He shall give security to the company for the sum of fifteen thousand dollars.

—Article X.—

The Vice President shall perform the duties and have the powers of the President in the absence of the President.

—Article XI.—

The Treasurer shall have charge of the funds of the company. He shall keep proper books and accounts, showing all receipts and expenditures or disbursements of the company, with vouchers in support thereof, which books, accounts and vouchers shall be open at all times to inspection of any of the Board of Directors. He shall also, from time to time, as required, make reports and statements to the Directors and Executive Committee as to the financial condition of the company, and submit detailed statements of his receipts and disbursements, and perform such other duties as shall be assigned to him by the Board of Directors or the Executive Committee. He shall give security to the company for the sum of fifteen thousand dollars.

All funds of the company shall be deposited by the President and Treasurer daily in the corporate name of the company, in such bank or banks of deposit as shall be designated by the Board of Directors or Executive Committee. Such funds shall be disbursed by the President or Treasurer only as provided by Article IX. He shall, with the President, sign all certificates of shares of stock. As Secretary, he shall keep a record of all proceedings of the Board of Directors and Executive Committee and of all meetings of the stockholders. He shall use the seal of the company only as directed by the Board of Directors or Executive Committee, and shall perform such other duties as the President, Board of Directors or Executive Committee shall from time to time direct.

—Article XII.—

Shares of stock of the company shall be transferred only on the books of the company by holder thereof, in person or by his or her attorney authorized thereto in writing, upon the surrender of the certificate therefor. In case of loss or destruction of a certificate of stock, another may be issued in its place upon proof of such loss and the giving of a satisfactory bond of indemnity.

—Article XIII.—

The fiscal year of the company shall begin on the 1st day of January and terminate on the last day of December in each year.

—Article XIV.—

These By-laws may be altered, modified, amended or repealed at a special meeting of the Board of Directors by a majority of said board.

Sound in every plank and bolt. Article IX covers all security. If a manufacturer must have help he must have stock on the market, and they will advance about 60 per cent. on the cargo, but it must be in their possession.

—Cargo.—

The company has about one-half of last year's output, or, to be precise, 530,000,000, to start with. None of the stockholders are called upon to place old brick on their hand—only the product of 1896. The company has secured office rooms in West Fifty-second street, and expect to open about May 1.

It will be a fight to a finish, agent versus manufacturer—and the winner would not be hard to name.

—Market.—

The market is about like the old darkey's prayer for pepper—too much brick. Think of it! Fifty-one barges, besides sailing vessels, on the market. Last week a drop of 25 cents per thousand was the result. The following comparison with corresponding date of 1895 is far from satisfactory:

April 27, 1895.		April 25, 1896.
$1.50@2.00	Pale	$1.50 @2.00
4.50@5.00	New Jersey ordinary	4.50 @4.75
5.25@5.50	New Jersey good	5.00
5.00@5.12½	Common hard ordinary	4.50
5.25@5.37½	Common good	4.75
5.50@5.62½	Common fine	5.00
5.75@6.00	Common special	5.12½@5.25

A profit in the difference, with all indications of a slump.

A. N. OLDTIMER.

THE CHICAGO BUILDING TRADES CLUB.

The above is the title of a new semi-social and business organization that has been formed by the leading builders and building material manufacturers and dealers in the Windy City. Its home has been established at 118 and 120 Monroe street, and if elegance of appointment and pleasant surroundings count for anything, the club will be a joy forever. Prominent among the members are W. H. Alsip, D. V. Purington, W. D. Gates and A. J. Weckler, so our readers may readily understand that the visiting brick men, and particularly members of the N. B. M. A., will receive a cordial welcome whenever they present themselves. The social rooms are delightfully cozy, and the dining room affords all desirable luxuries in either eatables or drinkables. Mr. Jos. Downey, Chicago's most popular builder, is President, while Chas. Scribner, an ex-President of the National Association of Builders, and a most kindly gentleman, is Secretary, and will devote the major part of his time to the club's interests.

It was our good fortune to be present at the formal opening of the club, April 23, when the first annual dinner was given. The following was the

—Bill of Fare:—

Blue Points.
Olives. Radishes.
Consomme of Chicken with quenells.
Sauterne. Stuffed Lobster. Cucumbers.
Tournedoes of Tenderloin a la Bordelaise.
Potato Croquettes. French String Beans.
Benedictine Punch.
Plover on Crusts, with Bacon.
Hominy Balls. Tomato Salad.
Fancy Ice Cream. Cake.
Camembert. Crackers. Roquefort.
Coffee.

After discussing the substantials, etc., cigars were passed, and the guests and members, numbering one hundred and fifty or more, enjoyed a number of brilliant

—After-Dinner Speeches.—

"Our Club"	President Joseph Downey
"Chicago"	Hon. George B. Swift
"Our Nation's Builders"	Hon. C. C. Kohlsatt
"The Architects Position in Conducting Builders' Competitions and the Letting of Contracts"	Mr. George Beaumont
"The Building Trades Club of New York"	Mr. S. M. Wright
"Babel"	Rev. M. J. Dorney
"What Are We Here For?"	Mr. George C. Prussing
"The National Association and the Result of Its Work"	Mr. Wm. H. Sayward

A most enjoyable feature of the evening was the presentation to the club by Mr. D. V. Purington of a large and handsomely-framed picture of Wm. H. Sayward, of Boston, the popular Secretary of the National Association of Builders, of whom Mr. Purington said many good things, all of which, however, Mr. Sayward well deserves, for he has done a vast amount of good for the builders of America, and it is fitting that his likeness should find a place in every builders' club or exchange throughout the land. The evening's entertainment continued until after midnight, the formal ceremonies closing with the toast, "Long Life and Prosperity to the Chicago Building Trades Club." We hope to be lucky enough to attend the second annual dinner a year hence.

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THE MANUFACTURING INTERESTS.

This is a manufacturing country. While agriculture represents a great portion of our product, it is best for us that our exports should be, as far as possible, of manufactured products. Of grain, it is best that it be manufactured into flour, meal or grits; of leather, into shoes; of metal, that it have its manufactured forms.

* * *

The National Association of Manufacturers has done quite a little along the line of forming a new department in our government, to be known as the Department of Commerce and Manufactures. The United States government probably does less as a government for the extension of trade than any other civilized government. The principal aim of the British government seems to be to promote the trade and general commercial interests of its people. There is no getting around this. Great Britain is the great commercial country. Small in home territory, but great in general possessions, manufactures and commerce.

* * *

A Department of Commerce and Manufactures, properly organized by our government, could do a great deal to extend our trade, both at home and abroad. We know of a young man who, during a year's sojourn in Paris, was instrumental in developing a flour trade for American products of over 100,000 barrels of flour per month in that city. This was done by going to the brokers at the right time, showing them the merits of American flour and placing them in communication with American mills. A department at Washington, with officers at all of the principal cities where we now have consuls, could do the same thing in all other lines. Our manufacturers of boilers, engines, clayworking machinery and many other products could find an outlet for their manufactured goods. A government department of this kind could investigate the peculiar demands of trade in all sections of the world. It could call the attention of buyers in all markets to the character, advantages, prices, etc., of our various products, and, in that way, bring the buyer and the manufacturer together.

* * *

So little has our government done in this line that we do not realize the strength and power which it might exert in this way. It should be a part of the business of the voters of this country to urge upon our government the organization of such a department. It may be said that the American consul is expected to do this same class of work. On the other hand, it is well to bear in mind that he has a great deal of another class of work to do, and his office is of that changing political character which should have no relation to commerce and manufactures. The American consul is nearly always a politician. An officer of the proposed Department of Commerce should be selected for his peculiar fitness for this kind of work, and he and his assistants should be retained in office so long as they have the strength and energy to carry it on.

GOOD BRICK PAVEMENTS BEST.

The city of Indianapolis is getting tired of asphalt pavements. Why? Because of the expense of maintaining them. Many miles of this pavement were put down in a rush under a five-year guarantee. The guarantee on some of it is about out. The pavement is not in good condition. The city sees that the expense of its maintenance is going to be great in the years to come. At the same time, some brick pavement has been used in this city. A large portion was put down of bad material, badly placed in position, and, of course, is a discredit to brick pavement as a class. We have some very excellent brick pavement, which should call for more of it being specified and used.

* * *

Asphalt has been largely used, not because it is a first-class pavement or because it is economical to repair, but because it has a powerful organization back of it. The Barber Asphalt Company, which reaches all over this country, is full of brains and money. It is a compact working organization. The manufacturers of brick pavement are disintegrated, so to speak. Their work is merely individual. There is no general, strong, financially heavy and brainy organization to reach out and fight for brick. In the nature of the material and the way in which it is manufactured an organization similar to the asphalt "combine" is not practicable, but if the paving brick manufacturers could unite against their common enemy and direct their efforts toward educating our taxpayers on the paving question, good would result to all concerned, for brick is the best paving material, all things considered. If properly selected and well put down, it will make its way in time.

HOW TO INCREASE THE DEMAND FOR BRICK.

There is one line of business which is pursued very profitably in all of the great cities and many of the small cities and towns of the old world which is scarcely known in America. That is the building of houses for the purpose of selling them immediately or soon after completion. In all of the great continental cities this work is done by builders and not by mere speculators. It has been done to some extent in Philadelphia and in New York, and to a small extent in Chicago, by speculators. It is a perfectly legitimate occupation and a very profitable business for the producers of building material, and, if intelligently carried forward, it is a business which affords not only a legitimate builder's profit, but a good profit on the material used.

In every city many houses are built by people who expect to own them for all time to come, but the opportunity to sell at prices affording large profits has, in many instances, led the owners to sell. Now, in every such case there was a builder's profit of probably 10 or 15 per cent., and the owner's profit unquestionably as much more. In any town or city there is always a market for a fairly well-built house, with the ordinary conveniences which belong to houses built in that vicinity. At this time, when building material is relatively and absolutely low, when there are a smaller number of people than usual building houses for themselves, there is opportunity for judicious experiments in this line.

Let the brick manufacturer turn builder, and have an attractive design made for a neat, showy, convenient house, on a good lot, well located. He will find that before the house is completed he will have inquiries for it, and if it is well finished and neat in appearance and convenient, it may be sold at a good profit.

In all of the cities of Great Britain and the continent this is a regularly established business, and one which yields large profits. There are a great number of people who are unable to understand just what a plan means, and if they could see a house that was fairly satisfactory they would buy it and pay a good price for it rather than be annoyed with building, to say nothing of the uncertainty of cost in the end. In other words, they would rather buy ready-built houses than to build to order. If brickmakers follow this course more brick buildings will be built in proportion than is the case now.

LABOR TROUBLES.

There is not the usual amount of May labor troubles the country over. Each one may assign his own reason therefor. It is true that during recent years labor has not been generally successful in enforcing its demands upon the employers of labor in the building business, and the discouraged efforts of those who have engaged in such undertakings have taught those who were foremost to be a little chary in striking at this time. There is a fair amount of building all over the country and a good prospect for the future, which may be realized from the very fact that agitators have found it wise to keep quiet at this time. It is one instance wherein they have shown good judgment.

WHY TERRA COTTA IS BETTER THAN STONE.

In the April number of the Clay-Worker we made reference, under the caption of the "Survival of the Fittest," to a lament by our contemporary, "Stone," of the fact that the use of terra cotta has increased. Our general statement was that the increased use of terra cotta was in obedience to the law of the survival of the fittest. The May number of "Stone" makes a scattering answer, and closes with a statement exhibiting more ignorance or blindness, or both, than can often be found within a few lines. Here is the glittering exhibition:

> "Terra cotta has no claim of merit as a building material except the present one of cheapness, and this a few years more will show as groundless as the stuff itself. It is the dearest thing that could be used in buildings designed to endure alongside the massive structures of stone and steel. The builders in the older countries of the world have learned this lesson."

Even from a partisan we expect the semblance of reason, and a little knowledge of history as well as facts as they exist at the present. The truth of this business is that "baked clay"—brick and terra cotta—is a better building material than stone, hence its increased use in spite of the combined efforts of the stone men. This is more remarkable when it is considered that the producers of stone have a better organization than the producers of brick or terra cotta. While at this particular time there is a little disruption in their ranks, it is well known that under ordinary circumstances producers of stone are always on hand at prominent lettings or where there is competition among architects for any public building. Who ever knew makers of brick, pressed, ornamental or otherwise, or producers of terra cotta, to be "legging" around a Board of County Commissioners or other public officers who were about to build. Stone dealers are always on hand. Oftentimes with their money to put up before the contract is let. They are on hand to help the architect and to help the contractor, and for this reason, and this reason alone, that material is ofttimes used. But, when it comes down to a simple question of the selection of a material which is not affected by frost, fire or water, the material which can be insured at a less cost than anything else, brick or terra cotta is always selected. The larger number of the great commercial structures of this country are built of some form of burned clay. Burned clay is always used when people stop to think. It is the one fire-proof and frost-proof material of the world. It is cheap as to first cost, and it is everlasting. For these reasons it is preferred to stone by wise builders.

OUR VISITORS.

W. R. Cunningham, the affable Secretary of the Wallace Manufacturing Co., Frankfort, Ind., "come to town," the 7th inst., and helped nominate the next Governor of Indiana. The political fervor made a lasting impression upon his mentality, as the reader will perceive by turning to page 480.

W. J. Woolley, of Anderson, Ind., was with us at the same time and on the same mission. His neighbor made a gallant fight for the honor, but was unsuccessful. Just the same, Woolley will be in it at the finish, and in the meantime will always have leisure to explain the merits of the "Iron King" brick machine to any progressive brickmaker seeking information along that line.

W. N. Durbin, Secretary of the Anderson Foundry and Machine Works, whose pleasant face is pictured on page 447, came, too, and literally took off his coat and labored with the enthusiasm of youth in the interest of the natural-gas belt candidate, and, like the good Republican that he is, yelled himself hoarse for "McKinley, Protection and Prosperity." We can all stand a large dose of the latter, sure.

Col. D. V. Purington treated us to a fleeting glimpse of himself one day recently. He was looking well—that is, as well as could be expected after spending two whole days in Cincinnati with the Blairs—but resolutely refused to tarry with us, notwithstanding the entreaty of a lovely young lady, to whose wishes he usually defers. He wouldn't even stop long enough to explain the brick situation in Chicago, further than to say the strike was over and peace reigned supreme, the demand for brick not being sufficient to cause any turmoil.

We enjoyed very much an interesting chat with N. Lookeren Campagne, of Zalt Bommell, Holland, who called at our sanctum recently. He has been a reader of the Clay-Worker for several years, and is now visiting America for the purpose of inspecting our brickyards and becoming better acquainted with American methods. He and his brother operate a tempered clay plant, using a steam-power machine, drying on an open yard and burning in continuous kilns, which he likes better than either the up or down-draft kilns he has seen in this country. We will give a detailed account of his Holland yard and the manner of making brick there in a subsequent issue.

A NEW BRICK MACHINE FIRM.

Mr. Emil Fernholtz, President of the Fernholtz Brick Press Company, St. Louis, a new firm recently organized for the purpose of manufacturing a dry press invented by Mr. Fernholtz, paid us a brief visit early in the month. He was then on his way home from Cincinnati, where he had purchased a portion of the machinery necessary to equip a new machine shop, in which his improved press will be manufactured. Mr. Fernholtz is well known in the brick machine business, having been connected with it for many years. There is associated with him Mr. T. L. Myers and W. H. Fizer. All are experienced hands at the business, and may be counted on to secure a good share of the trade. They will also introduce an improved kiln, patented by Mr. Myers. Both the kiln and machine are illustrated on pages 482-483.

AMONG THE MACHINE MANUFACTURERS.

So far the year of our Lord 1896 has not been as fruitful as the majority of the brick machine men hoped for, still most of them have had a fair trade, and a few are still quite busy. Among the latter may be mentioned D. J. C. Arnold, of New London, O., whose factory is now running full handed on orders for brickyard supplies. This means considerable, for his plant is equipped with every labor-saving device possible, enabling him to turn out work with a rapidity that seems marvelous compared with the old hand methods, and, too, the product is better in every way, as well as much cheaper. Mr. Arnold recently received a "rush" order for two dozen molds of a special size. There was nothing ready that would fill the bill, so they were made up in a hurry and shipped the day following the receipt of the order. In addition to the brickyard supplies, Mr. Arnold is doing an extensive business in metal wagon wheels, the demand for which exceeds his capacity, and will probably continue to do so, for the wheel, which is illustrated in his ad. on page 501, is a good thing and is sure to be pushed along.

E. M. FREESE & CO., Galion, O., have had a fair trade, about the same in volume as '95. They are now turning out a monster stiff-clay brick machine, which has a capacity of 60,000 brick a day. It looks big enough and strong enough to last forever, and ought to be very popular with the brickmakers who want unbreakable machinery.

THE WELLINGTON (O.) MACHINE COMPANY has had a good spring trade, and is still quite busy. The "Monarch" has been most in demand where its last season's work was observed, which is gratifying to them. They have also sold a few "Quaker" outfits and the usual number of trucks, barrows, molds, etc., and consequently are not finding fault with the present administration, though McDermot admits that he expects to do better when Grover has given way to "McKinley and Protection."

THE FATE-GUNSAULUS COMPANY, Plymouth, O., has not been burdened with orders for new machinery, but has been kept fairly busy with repair orders. They note a tendency on the part of brick and tilemakers to patch up present equipments in preference to buying new outfits, but think this is but a passing spasm of economy that will disappear with the advent of the good times we are all looking for. Their best trade has been in drain tile machinery.

THE WALWORTH RUN FOUNDRY COMPANY, Cleveland, O., exceptions to the general rule, are very busy. They do an immense business in a general line of foundry work. Their Eastern trade has grown so extensive that they have built a new foundry and machine shop at New Brunswick, N. J., which, with their old foundry at Cleveland, they are running full handed. Their celebrated brick cars (see ad. on page 494) are made at the latter plant. Their facilities for manufacture are such that they think they can make the best cars on the market, and at figures that are hard to beat, quality of product considered.

THE HORTON MANUFACTURING COMPANY, Painesville, O., has had a satisfactory trade and takes a hopeful view of the industrial situation. This is due in a large measure to the fact that their "Standard" brick machine has proven satisfactory wherever introduced, and Mr. Horton is far-sighted enough to know that that means a constantly growing business. The field is a vast one, and the day is far distant when there will not be a great many soft-clay brick machines, and the concomitant mold sanders and other supplies, used in the United States, to say nothing about our South American neighbors.

J. W. PENFIELD & SON, Willoughby, O., are working a goodly number of hands at their shops—not so many as they could if orders were more plentiful, but they are far from idle. They do not anticipate a rush of trade that will compel them to run night and day very soon, but expect to be kept going at a moderate pace. Their capacity is great, and, as they make almost everything in the line of clayworking machinery, their trade is naturally large, even in the dull seasons.

THE BONNOT COMPANY, Canton, O., are running their extensive shops full time, having been fortunate enough to have booked several good orders. The demand for their clay press and other pottery machinery has exceeded their expectations. From present indications they will run steadily through summer. Canton is the home of Governor McKinley, and it is but natural that his neighbors, who seem to love him dearly, should connect his name with the longed-for era of better times, and shout with more than passing enthusiasm the slogan of "Protection and Prosperity."

TURNER, VAUGHN & TAYLOR, Cuyahoga Falls, O., are pursuing the even tenor of their way and furnishing needy

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GOT WHAT HE WANTED.

Editor Clay-Worker:

If this reaches you in time please take my ad. out of Clay-Worker. If I was needing a wife, and could not get one in my own neighborhood, I should discard all matrimonial papers and advertise in the Clay-Worker, feeling confident that I should soon have propositions enough. Through my ad. of last month I not only had correspondence enough, but secured a position at New Castle, Pa., and I think the Clay-Worker is the best advertising medium for clayworkers in the United States. Many thanks until you hear from me again. R. H.

Books for Brickmakers.

"BRICKMAKER'S MANUAL."—Morrison and Reep.......... $3.00
"BRICKMAKING and BURNING."—J. W. Crary, Sr.......... 2.50
"TABLE OF ANALYSES OF CLAYS." Alfred Crossley.......... 1.00
"VITRIFIED PAVING BRICK."—H. A. Wheeler, E. M.......... 1.00

Mailed, postage free, on receipt of price. All of them to one address for $6.00. Address

T. A. RANDALL & CO., Indianapolis, Ind.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, ST. LOUIS, MO.

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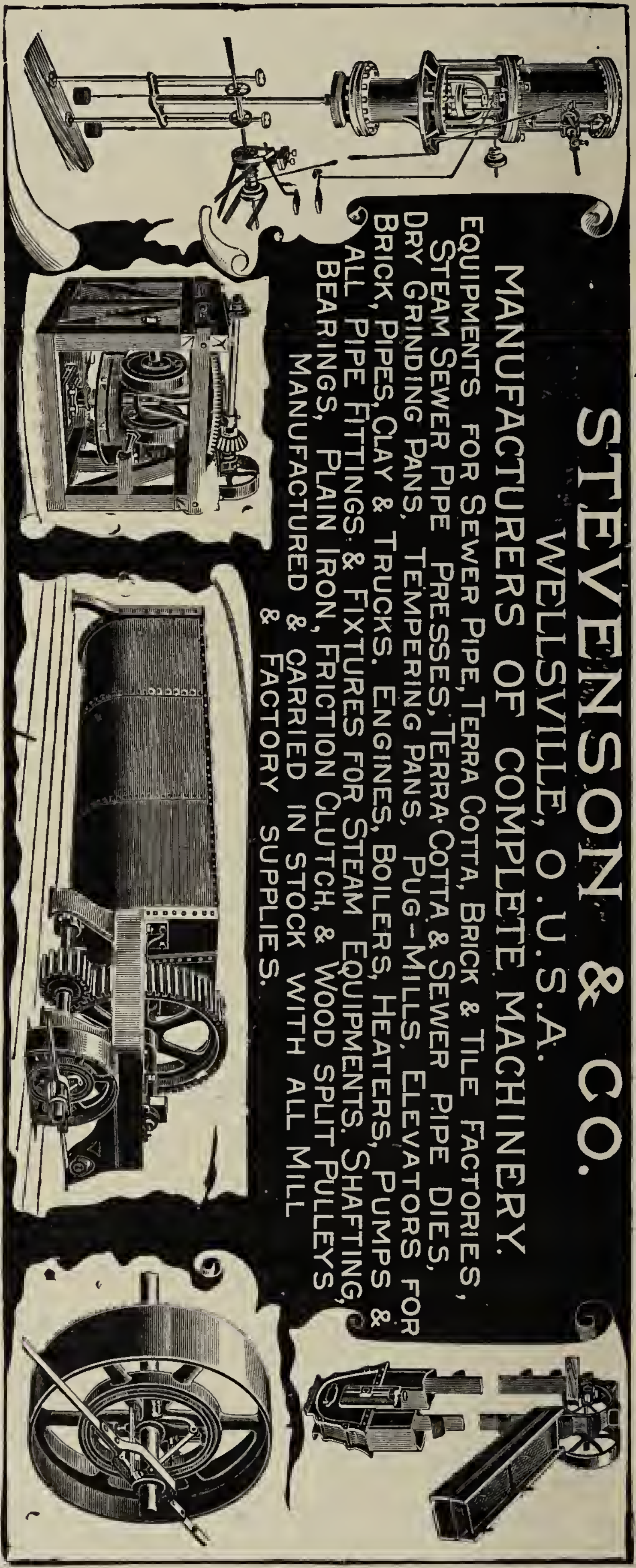
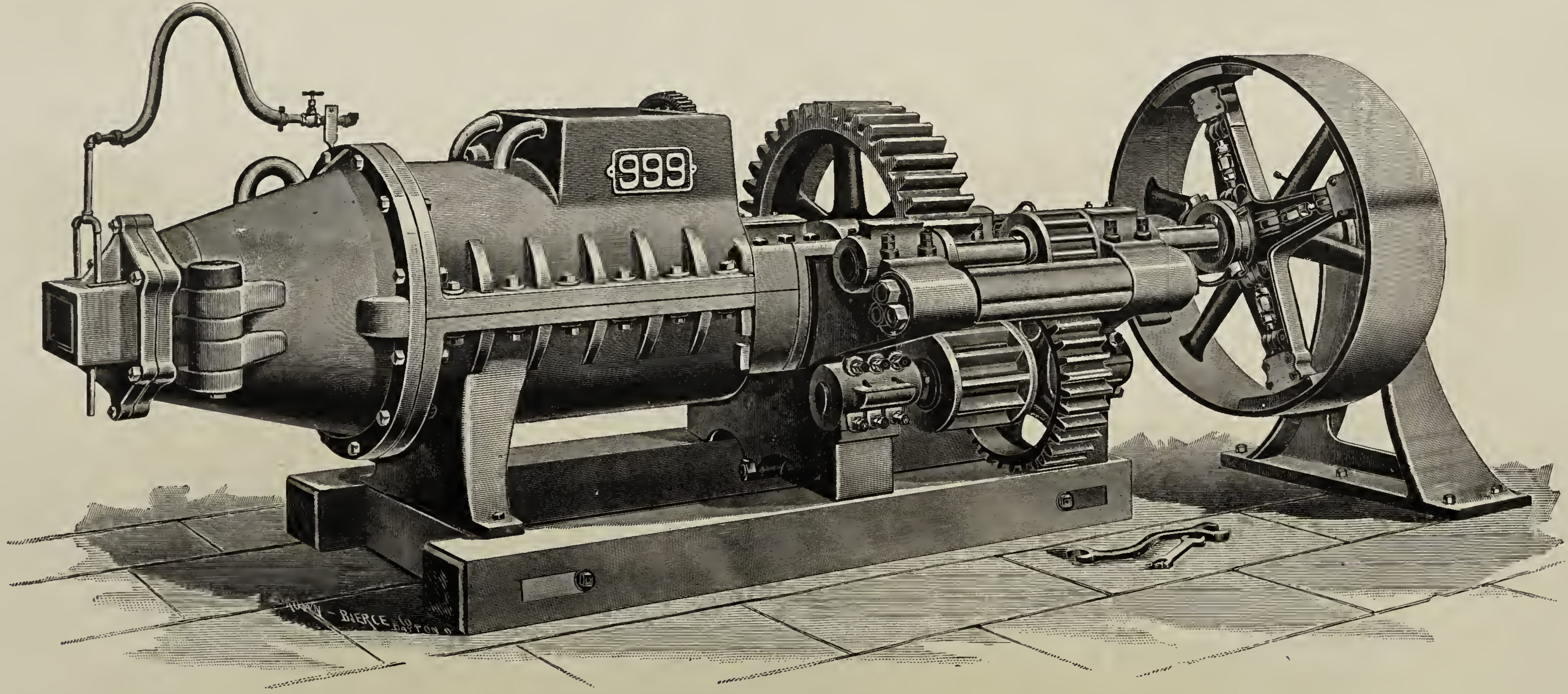


STEVENSON & CO.
WELLSVILLE, O. U. S. A.
MANUFACTURERS OF COMPLETE MACHINERY.
EQUIPMENTS FOR SEWER PIPE, TERRA COTTA, BRICK & TILE FACTORIES,
STEAM SEWER PIPE PRESSES, TERRA COTTA & SEWER PIPE DIES,
DRY GRINDING PANS, TEMPERING PANS, PUG-MILLS, ELEVATORS FOR
BRICK, PIPES, CLAY & TRUCKS. ENGINES, BOILERS, HEATERS, PUMPS &
ALL PIPE FITTINGS & FIXTURES FOR STEAM EQUIPMENTS. SHAFTING,
BEARINGS, PLAIN IRON, FRICTION CLUTCH, & WOOD SPLIT PULLEYS
MANUFACTURED & CARRIED IN STOCK WITH ALL MILL
& FACTORY SUPPLIES.

Speculation May be a Better Sounding Name than **Gambling,**

But it Costs Just as much; Don't Speculate in Inferior Brick Machinery.



Buy the **999** and you will get one that is **a Dead Sure thing every time.**

C. W. RAYMOND & CO., OF

DAYTON, OHIO, make it.

They also make some other things. Send for their Catalogue.

AMONG THE MACHINE MANUFACTURERS — Continued.

clayworkers, who insist upon it, with sewer-pipe presses, dry pans, etc. Genial C. W. Vaughn, who is now the sole proprietor and business head of this old and well-known firm, bears his added honors and responsibilities with great humility, and wishes it understood that he will lend an attentive ear to any craftsman wanting clay machinery of any sort—if the latter has the cash or its equivalent.

W. D. RICHARDSON & CO., Cleveland, O., have found that it is advisable for them to build their own represses, clay feeders, screens, etc., and accordingly have purchased a very desirable lot in the manufacturing district of Cleveland, and will at once build a machine shop suited to their needs. This evidence of their success is gratifying, but not at all surprising, for with Mr. Richardson's acknowledged ability and wide acquaintance no other result was to be expected.

THE F. D. CUMMER & SON COMPANY, Cleveland, are among the busiest people we have visited since boom times. Brick and clay drying is only a small part of their business, but they are well satisfied with what they have done in this line this season. They have installed brick dryers on several yards, and are getting gratifying reports from every one. The dryer built for Otto Geissen, at Canton, is running to Mr. G.'s entire satisfaction. He told the writer recently that he was drying 40,000 large paving brick a day with three tons of slack, which, under the old system, required ten tons of coal. A great saving, truly. Mr. F. D. Cummer, the senior member of the firm, is now in Europe, where they have introduced their system of drying with marked success.

THE CENTRAL MACHINE WORKS, Cleveland, are doing but little, comparatively. Their trade has been largely in the South for several years, and as the brickmakers of that section are now going slow, they naturally have to follow suit. They make an improved form of the old "Sword" brick machine, which for many years has been very popular in the South, and the "Central" brick press.

KELLS & SONS, Adrian, Mich., as is their habit, are "saying nothing and sawing wood." They have never been given to much talk, but have always, since the Clay-Worker was born, at least, done a steady, profitable business, and this year will prove no exception. In this connection we may also add that they have been continuous advertisers in the Clay-Worker all these years.

THE ADRIAN (Mich.) BRICK AND TILE MACHINE COMPANY is one of the oldest of clay machinery firms. Their machinery is well known throughout the country. Their trade this spring has been light, compared with former years. They are taking things easy, as they can well afford to do, and coolly await the inevitable better times.

THE MICHIGAN BRICK AND TILE MACHINE COMPANY, Morenci, Mich., run their shop this spring till they had a large supply of stiff-clay machinery ready for shipment, and then turned their attention to agricultural pursuits, incidentally making a few brick and tile the while. They have a good brickyard and tile factory and a fine clay bank within a stone's throw of their machine shops. They admit that they could have sold a number of brick and tile outfits had they been willing to accept the buyers' terms, but preferred to keep their machinery. They will be ready for the fall rush when it sets in.

THE SIMPSON BRICK PRESS COMPANY, Chicago, have equipped several Eastern plants with their presses this season, and are feeling very comfortable. It would not surprise the writer to hear of their starting a machine shop in which to make their dry-press machinery, and possibly a line of tempered clay machinery as well.

THE WOLFF DRYER COMPANY, Chicago, say they are doing but little. "But little" with them means a fair volume of business, for, like true Chicagoans, they are accustomed to handling large jobs and many of them.

C. T. DRAKE, proprietor of Drake's Standard Machine Works, Chicago, was the busiest man we saw in that everlasting busy place. He had nearly one hundred would-be Shriners to conduct over the hot sand of the desert, and wouldn't talk about brick machinery even for a minute. "Chet" is the most potent Potentate of all, and, when dressed in Oriental robes, is a picture worth going many miles to see.

THE CHISHOLM, BOYD & WHITE COMPANY, Chicago, are saying so little that we suspect them of conducting a still hunt. We know that Mr. Chisholm and Mr. White have both been on the road most of the time lately, which surely means business, for we cannot conceive of a possible purchaser eluding either of these worthies for any considerable length of time.

C. AND A. POTTS & CO., Indianapolis, have had a very satisfactory trade in clay disintegrators, and have also booked a few orders for complete brick plants. Among the latter is an equipment to go to France. This, we suppose, will make it necessary for Albert to learn to speak French and make a trip to gay "Paree," unless he can press Lindley Vinton into service once more. By the way, we understand that "Lin" is back in New York city again, after a long sojourn in South America. There is not one among the old-time machine men but would be delighted to welcome him back with them.

THE STANDARD DRY KILN COMPANY, Indianapolis, are well satisfied with their spring trade and think the outlook for business is good. They have built several brick dryers this spring, among them one at Roachdale, Ind., where a new brickyard is being started by Miller & Rinehart; one for the Burnham Bros., at Milwaukee; another for A. W. Taylor, Summerville, S. C., and one for E. N. Weigel, Little Rock, Ark. They are now figuring with parties from Holland, subscribers to the Clay-Worker, who want to Americanize their works, and will do so, at least to the extent of a Standard dryer.

The Dixie Tile and Pottery Company, Oxford, Ala., write that theirs is a newly-organized firm and that they are in the market for a complete equipment for their yard.

A new paving brick company, to be known as the Allentown Paving Brick Company, in which A. S. Keck, Wm. T. Mosser, Wm. Roth, H. K. Hartzell, E. H. Reninger and Morris L. Kauffman are interested, has been incorporated at Allentown, Pa., with a capital stock of $100,000. A tract of land comprising eighteen acres has been purchased, and a plant will be erected at once.

The Steelton Brick Works, at Steelton, Pa., destroyed by fire some weeks ago, has placed its order with Chambers Bros. Company, at Philadelphia, for new machinery, and an entire outfit of Chambers machinery will be installed as soon as possible. This company has consolidated the Zimmerman Brickyards, at Harrisburg, Pa., which were equipped with Chambers machinery last season.

As a result of the big conflagration at Cripple Creek, Col., the brick interests in and about that town are in a very flourishing condition. John Eisenhart, of that place, has doubled the capacity of his brick plant, and is seriously thinking of repeating the dose, while two new brickyards are to be started at Gillett, a small town near there, and W. K. Johnson, of Florence, Col., says an energetic man can make money by starting a yard in that town.

The death of Mr. Wm. E. Varner, which occurred at his home in Portsmouth, O., on the 4th inst., was a shock to his large circle of friends. Mr. Varner was forty-one years old, and had been engaged in the manufacture of brick almost all his life, first in connection with his father, and at the latter's death, in 1876, with his brother, succeeded to the father's business. They moved the business to Texas for a time, but in 1890 returned to Portsmouth, where Mr. Varner has since resided, and the firm has been known as Sanford, Varner & Co.

Mons. Charles Sauvelet, of the firm of Carlon & Sauvelet, Paris, France, one of the largest brick manufacturing firms in France, lately visited the United States to investigate the machinery, etc., used in the manufacture of brick here. He visited a number of the largest yards in the East, among which was the Mechanicsville Brick Company, at Mechanicsville, N. Y., which is one of the best equipped brick plants in this country. This plant was erected by C. and A. Potts & Co., of Indianapolis, Ind. After Mons. Sauvelet had inspected the various plants he decided upon a duplicate of the Mechanicsville plant, for which he placed his order with C. and A. Potts & Co., as well as for pug mills and disintegrators to be used in preparing clays in a large pottery owned by him. Mons. Sauvelet stated that the machinery used in this country is far ahead of that used in France, and expressed himself well pleased with his visit as being a profitable one to him.

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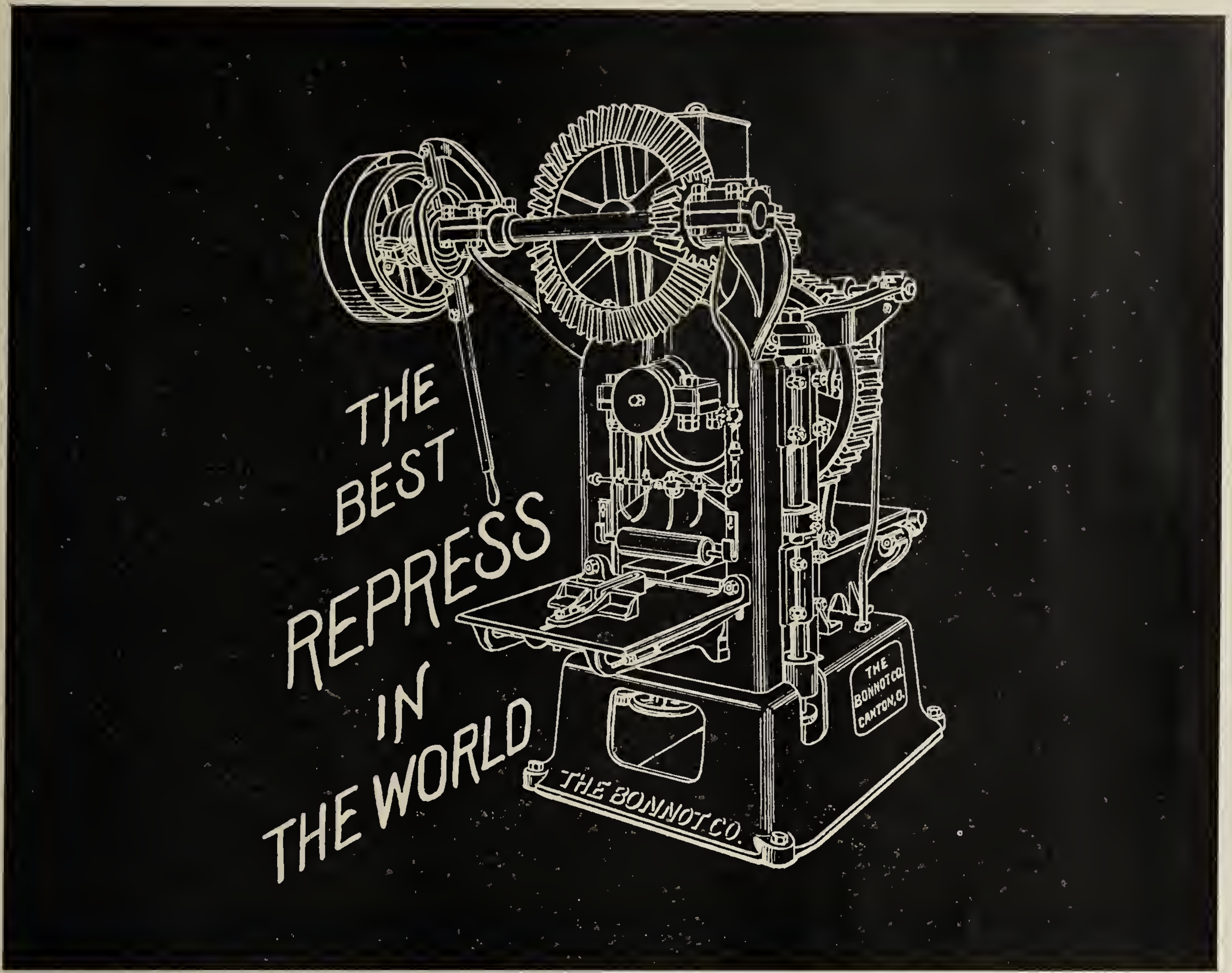
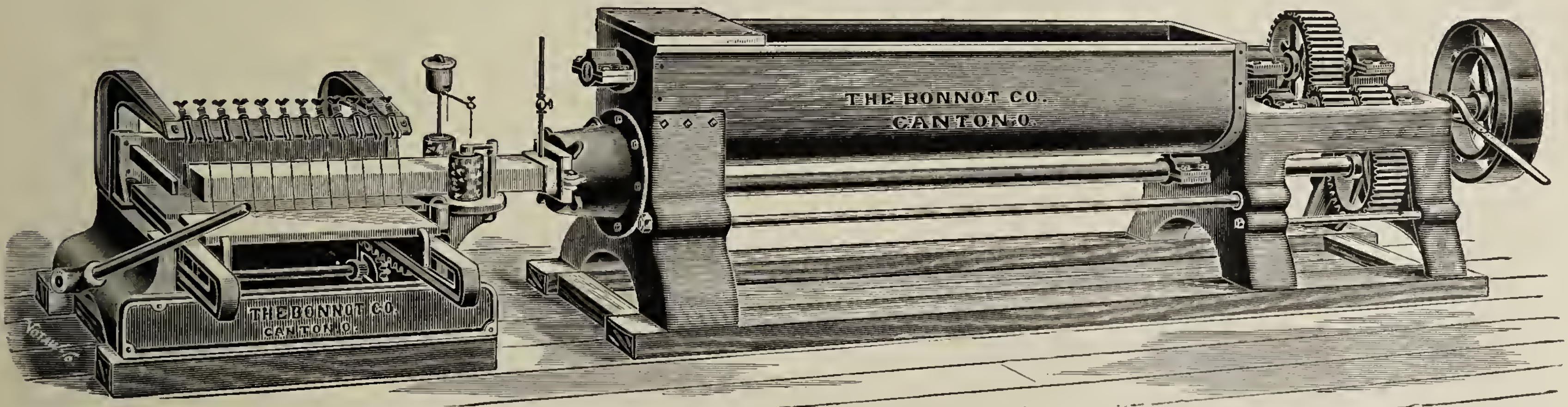

THE BEST REPRESS IN THE WORLD
THE BONNOT CO. CANTON, O.
THE BONNOT CO.

Two Machines in One! (No Pug Mill Floor.)

Compactness! Simplicity!

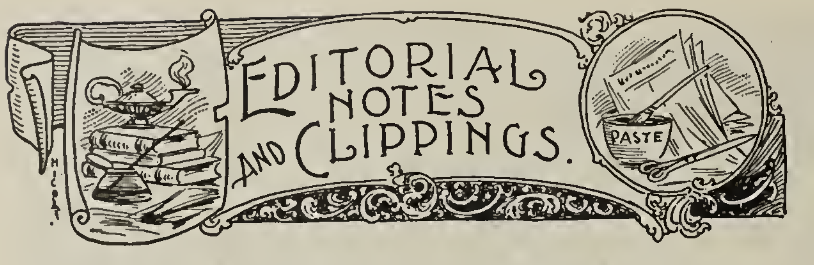
This Machine will save Ten Horse Power making 30,000 Brick per day.
Power Costs and Economy is the Watchword!


THE BONNOT CO. CANTON, O.
THE BONNOT CO. CANTON, O.

Less help required for one than two Machines.
. . . . This Machine is Worth More. It Sells for Less

Built in Sizes, 15,000 to 40,000 Capacity.
. . . GUARANTEED . . .
Ask for Clay Machinery Catalogue.

Write **The Bonnot Co.,**
CANTON, OHIO.



EDITORIAL NOTES AND CLIPPINGS.

G. McMullen will start a brick plant at Eubank, Ky.

W. S. Harvin has established a new brickyard at Columbia, S. C.

Jos. Hill, of Dixon, Ill., will establish a brick plant at Correctionville, Ill.

Jacob Simison will manufacture drain tile at Packerton, Ind., this summer.

Hillsboro, N. D., is to have a new brickyard. Greve & Acker are interested.

A. J. Dexter, Lakeside, Wash., wants to purchase a small auger brick machine.

A. L. Godbout will start a new yard at Bemidge, Minn., the latter part of the month.

The Grove City (Pa.) Brick and Tile Company will remove their plant to Butler, Pa.

G. W. Shaffer, Spencerville, O., is in the market for a small second-hand brick machine.

Ludwig & Weller are erecting a plant for the manufacture of brick at Leavenworth, Kan.

John Cherry, formerly of Amesburg, Mass., will start a new brick plant at Merrimac, Mass.

C. A. Caldwell has purchased the plant of the Newbern Pressed Brick Company, at Alton, Ill.

Smithland, Ia., is to have a new brickyard. A. C. Jones will have the management of the same.

The La Grande (Ore.) Brick and Tile Company suffered quite severely from fire at their plant, April 19.

The R. C. Pingree Lumber Company has purchased the plant of the Rumford Falls (Me.) Brick Company.

C. M. Tower is operating the brick plant of Mr. House, at Beech Hill, near Hanover, Mass., for the coming season.

Lyman C. Umstead has leased the brickyard of L. H. Focht, at Birdsboro, Pa., and will operate the same this season.

A new brick plant, in which Geo. M. Clinger, of Maysville, Ky., is interested, will be established at Knoxville, Tenn.

In order to supply the increasing demand for his brick, Matthew Schwegler will enlarge his plant at Lebanon, Pa.

Seiger Bros., Drehersville, Pa., are making preparations to manufacture their brick by machinery this season instead of by hand.

Uniontown, Ind., is to have a new brickyard. The Mayor of the city, J. J. Dannacher, and C. D. Thomason comprise the new firm.

W. Barnes, M. W. Benham and Colin Cameron are at the head of a new company that will manufacture brick at Phoenix, Ariz.

If you are in need of a good man as foreman, superintendent, burner, setter, sorter, etc., etc., try an "ad." in our "Wanted" columns.

The new Morrison-Trammell Brick Company, at Rome, Ga., commenced to make brick on the 25th of April with a Chambers machine.

Chas. F. Hulme, a well-known brick manufacturer of Westhampton, near Mount Holly, Pa., died at his home in that city on the 5th inst.

A $12,000 fire occurred at the plant of the Central New York Pottery Works, Utica, N. Y. The burned portion will be rebuilt immediately.

The Aurora (Ill.) Brick and Tile Yard has, during the past month, erected two of Pike's Down-draft Kilns, that have a capacity of 70,000 each.

H. J. Chambers and C. H. Coy, of Denver, Col., are erecting a dry-press plant near Cripple Creek. They expect to have a daily capacity of 20,000 brick.

Benjamin Craycroft, of Vandalia, Ill., writes that he is in the market for an auger conveyor to convey soft mud from soak pit to soft-mud brick machine.

The Bogart & Morrell Brick Company, of Passaic, N. J., so long talked of, is now assured. Ground has been broken, and the building of the plant will be pushed as rapidly as possible. The firm is now in the market for necessary machinery and appliances. Mayor Bogart is President of the company, J. H. Wright Vice President, Wm. Macolm Secretary and Treasurer.

Wm. and W. P. Alsip, of Grand Fork, S. D., are contemplating establishing a yard at Aberdeen, claiming that the clay in that vicinity is not surpassed by any locality in the Northwest.

Constant Isabel died at his home in Columbus, O., on the 5th inst., in his fifty-seventh year. Mr. Isabel was a well-known brick manufacturer, having lived in Columbus for thirty-five years.

The brick manufacturing firm of Kohlhepp, Snedeker & Kuhlthau, Sayreville, N. J., has dissolved partnership. J. H. Kuhlthau and Chas. Snedeker will continue the business, Mr. Kohlhepp retiring.

Wm. Lucas, brick manufacturer at Nason's Corner, Deering, Me., is making extensive improvements in his plant, with a view of increasing his capacity. He will put in a complete outfit for manufacturing by steam.

A new company, to be known as the Mining and Manufacturing Company, of Edinburg, Va., will soon be incorporated, it is said, to develop the brick and clay interest of Virginia. C. V. Lichty, of Lancaster, Pa., is interested.

Wm. M. Fox, Manager of the Reading (Pa.) Terra Cotta Works, passed away April 27, in his fifty-second year. He had been associated with his brothers, Eli W. and Benjamin, in the Reading Terra Cotta Works for twenty-eight years.

Jno. J. Prew has purchased the brickyard of Enright Bros., at Willimansett, Mass., and will start the same up immediately. Mr. Prew already has quite a number of contracts on hand, and expects to run the yard full handed all summer.

Several thousand dollars damage was caused by fire at A. G. Ferguson's brick plant, at Marion, Ind., the 10th inst. The fire started in the dryer, and this part of the plant was completely destroyed. The origin of the fire is unknown.

A terrible accident occurred at Mike Meyer's brickyard, Chicago, which resulted in the death of James McGrie, an employe. His clothes became entangled in the cogwheels of a brick machine, and several bones were broken and his body badly lacerated.

Jas. K. and H. K. Getz, John Barbey and W. W. Seitzinger have organized the Reading (Pa.) Shale Paving Brick Company. They expect to have the plant in shape to manufacture brick by the first of next month, and to have a capacity of 40,000 brick daily.

A. L. Clymer, of Sellersville, Pa., is putting in a steam press, which he purchased from the Horton Manufacturing Company, in order to enable him to keep up with the demand. As soon as the machine is in working order he expects to run his yard night and day.

C. & A. Potts & Co., Indianapolis, Ind., report having received an order for two brick machines, three disintegrators, pug mills, etc., etc., from Carlon & Sauvelet, of Paris, France. They say the demand for their disintegrators and mold sanders has been good this summer.

W. R. Osborne, Perth Amboy, N. J., advises us that the demand for wells and outfits for same in his section is better this season than for some time past. Mr. A. H. Lupton, of New Castle, Del., recently placed an order with Mr. Osborne for a three-thousand-gallon tank.

John Oliver Leary, the pioneer brick manufacturer of Springfield, Mass., died of heart disease in that city, April 20, at the advanced age of eighty-four. Fifty years of his life were spent in the brick business. His son Fred, who had charge of the plant during his father's illness, will, in all probability, continue the business.

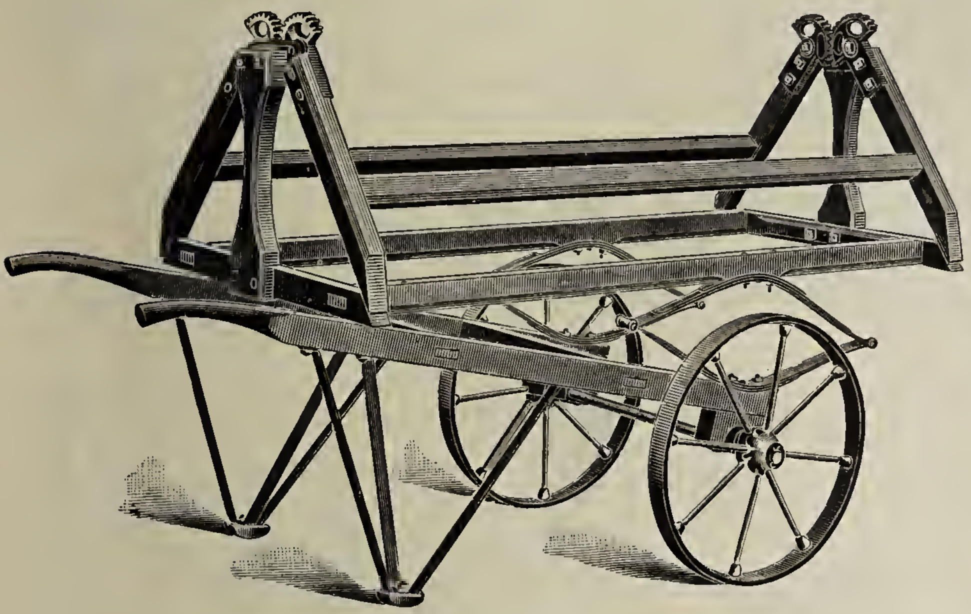
Mr. Henry Allen, of the firm of Flagler & Allen, brick manufacturers, of Arlington, N. Y., met with quite a serious accident last month. While carting stones and dirt, preparatory to making a well in the brickyard, a horse stumbled and fell on Mr. Allen, breaking his collar bone and bruising him quite seriously otherwise.

Murrell Dobbins, Philadelphia's leading brickmaker, in renewing his subscription to the Clay-Worker, says the brick business in that vicinity is improving; that prices are better than last year, and that the prospects for future work are quite bright. He is running all of his yards now, and expects to be able to do so throughout the summer.

The brick manufacturing firm of John H. Printz & Co., Reading, Pa., has been dissolved, John H. Printz, the senior member, retiring. Two of the yards have been turned over to his son, J. Thomas Printz, and a third yard to his son-in-law, Geo. B. Clousser. Both of these gentlemen are practical brick manufacturers, having been associated with Mr. Printz for a number of years.

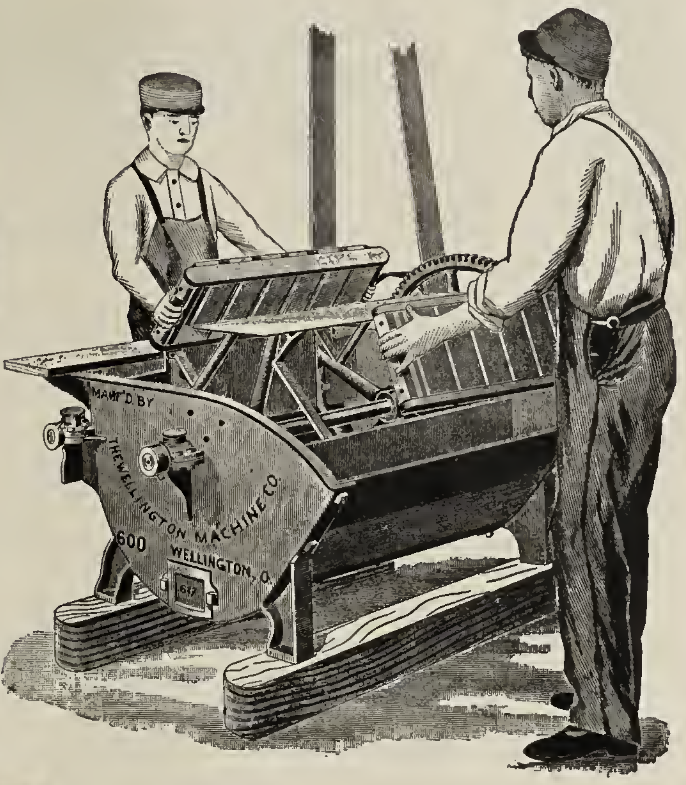
LIES Are Not Liked by Anybody.

(But our Supp=LIES are Liked
by All who Try Them.)



Double Deck Pallet Trucks.

(One or Two Wheels.)


MANF'D BY
THE WELLINGTON MACHINE CO.
WELLINGTON, O.
600

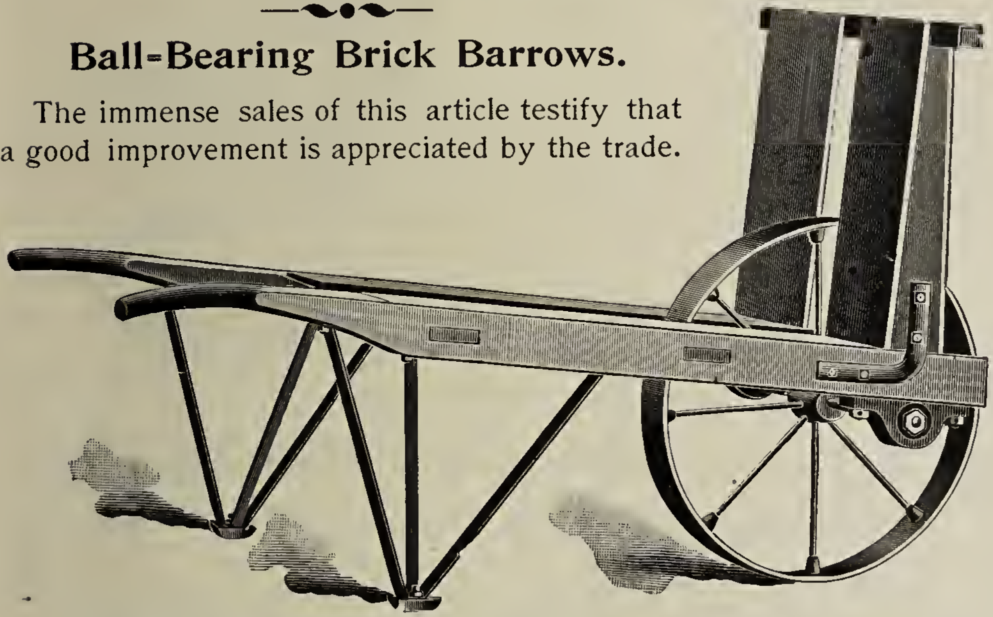
Mould Sander.

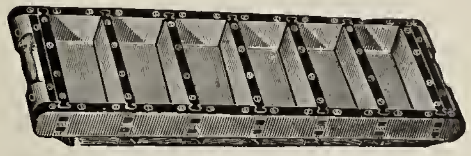
By far the best and at the same time the lowest priced on the market.

◆

Ball=Bearing Brick Barrows.

The immense sales of this article testify that a good improvement is appreciated by the trade.





Moulds: all kinds and sizes.

◆

Dump Tables, Sand Barrows, Dump Carts, Elevators, Kiln Castings, etc., etc.

◆

GOODS PERFECT. PRICES LOW.

◆

For Sale.

Odd sizes of molds. Have not been used:

5 Molds, 8¾ x 4¼ x 2⅜.
12 Molds, 9¼ x 4½ x 2¾.
20 Molds, 8 13-16 x 4 3-16 x 2 7-16.
19 Molds, 9¼ x 4½ x 2½.

Second-hand, but used a few days only:

19 Molds, 9½ x 4⅝ x 2 9-16.
10 Molds, 9½ x 4⅝ x 2¾.
20 Molds, 9¼ x 4½ x 2¾.

All six-brick molds, with 9-16 partitions.

The Wellington Machine Co.,

Wellington,
Ohio.

(See Page 510.)

Sixteen

. . . to One.

We will wager "16 to 1" that the brick manufacturers of this country are in favor of **Protection** and **Prosperity.** Our reason for so believing is, because "Organization, Combination," etc., is being agitated all over the country among the brickmakers as a mean of protection, and our opinion is, with an affective organization against ruinous competition and low prices, prosperity is sure to follow.

Some favor "16 to 1," others favor "a gold standard." We favor that which is good the world over, for the reason that our Pug Mills makes the different values of the clay on a parity.

The **Wonder Brick Machines** make brick that are not **debased** with air puffs and laminations and are uniform, while **Cunningham's End and Side-Cut Automatic Brick Cutters** cut brick so accurately that they are "interchangeable" and "inconvertible."

Those desiring to discuss these important issues, will please write

The Wallace Mfg. Co.,

See Back Inside Cover Page.

FRANKFORT, IND.

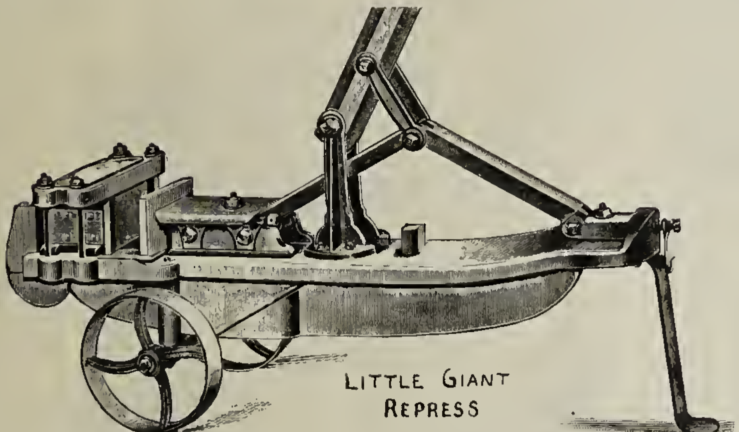
Office Specialty Mfg. Co.

9, 11 and 13 Monroe St.,
CHICAGO, ILL.

MANUFACTURERS AND DEALERS IN

LABOR SAVING OFFICE DEVICES
and METALLIC VAULT FURNITURE.

. . Send for Catalogues. . .



LITTLE GIANT REPRESS

ELI Auger Machine, Capacity 45,000 to 70,000.

ELI Jr. Auger Machine, Capacity 30,000 to 40,000.

LITTLE ELI Auger Machine, Capacity 15,000 to 20,000.

No. 1 A, Auger Machine, Capacity 25,000 to 35,000.

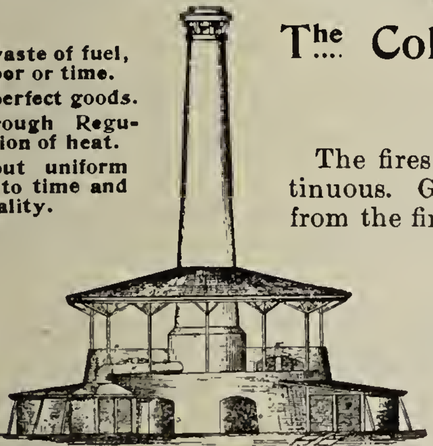
No. 2 B, Auger Machine, Capacity 12,000 to 20,000.

THE No. 1 A and No. 2 B Machines furnished with Square Hopper in place of Upright Pug Mill if desired.

DISINTEGRATORS, HORIZONTAL CONVEYORS,
GRANULATORS—SINGLE AND DOUBLE SHAFT,
UP-RIGHT PUG-MILLS, WINDING DRUMS,
BRICK TILE AND HOLLOW BLOCK TABLES.
TRUCKS, WHEELBARROWS, ETC.

Manufactured and fully warranted by

Michigan Brick and Tile Machine Co.,
MORENCI, MICH.



NEW AND NOVEL,

The Columbian Pottery and Brick Kiln.

No waste of fuel, labor or time.
All perfect goods.
Thorough Regulation of heat.
Output uniform as to time and quality.

The fires remain in one division ONLY and are continuous. Goods move on a ROTATING FLOOR to and from the fires. Radiating heat and spaie heat are used for drying andheating air for combustion.

A perfect and reliable factory Winter and Summer. Kiln and dryer combined. The best kiln for vitrifying Paving brick and glazing

Full information on application.

COLUMBIAN POTTERY & BRICK KILN CO., Dexter B'ld'g., 84 Adams St., CHICAGO, ILL.

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE—Tiffin Soft Mud Machine, Pug Mill, Conveyor; capacity, 30,000; in good order; very cheap. Address,
EDW. C. HUHN,
1215 Filbert St., Room 619,
5 1 L Philadelphia, Pa.

FOR SALE—One eight-foot wood frame Dry Pan; new; modern design; latest improvements; have in stock; will sell cheap. Address, DES MOINES,
5 1 c Care Clay-Worker.

WANTED—A first-class brickyard foreman and burner. A thoroughly reliable and competent man will be given a good job. Address, giving age, references, etc.,
5 1 d NEWS, Care Clay-Worker.

WANTED—Re-engagement as manager or superintendent of fire brick works. Advertiser has had a long practical experience in first-class works. Address, F. B.,
5 1 d Care Clay-Worker.

WANTED—By a practical brickmaker, position as foreman and burner. Can build up or down-draft kilns. Best of references. Address, WHITE,
5 1 c Care Clay-Worker.

FOR SALE—A plunger brick and tile machine, second hand, in good order; wet pan, screen and cut-off table; no stone or lumps in the brick or tile. Address,
JOHN C. SCHROEDER,
4 2 c Onekama, Mich.

FOR SALE—Up to date Brick Plant, dry press and stiff mud machines, steam dry house, ball-bearing cars, up-and-down draft kilns, etc. A chance in a thousand. Address, ORCHARD, Care Clay-Worker.
5 1 d

FOR SALE—Cheap. One single mold and one double mold Whitaker brick machine; guaranteed in perfect running order; also, full set of ornamental brick molds. Address, ST. LOUIS PRESS BRICK CO.,
5 1 d Equitable Building, St. Louis, Mo.

WANTED—Good, experienced brick setter and burner, for face brick, dry-press works; also, a thoroughly experienced man with dry press and other brick machinery. State age and reference, also terms, to
SWITZER FACE BRICK CO.,
5 1 d Blossburg, Mont.

FOR SALE—One second-hand self-contained Dry Pan, 7 feet in diameter; weighs eight tons. The crushing rolls are ten inches wide and forty inches in diameter. The pan is virtually as good as new in every respect and is provided with friction-clutch pulley. It's a bargain. Address, F. O. B.,
5 1 c Care Clay-Worker.

FOR SALE—One A No. 4 Potts Disintegrator, with connected driving pulleys; capacity, 50,000 to 60,000 brick per day; been in use two years; guaranteed in first-class condition. Price, $250, f. o. b. cars, Memphis, Tenn. Address,
J. F. CUBBINS, Executor,
5 1 d Memphis, Tenn.

FOR SALE—1 Ohio "A" Freese Special Brick Machine; capacity, 30,000. 1 Frey-Sheckler "Acme" end-cut Brick Machine; capacity, 25,000. 1 Galesburg end-cut Table. 3 Raymond Represses, capacity, 10,000. 2 sets Clay Flaking Rolls. Foregoing in good order. Inquiries solicited. Address, A. B. C.,
5 1 d Care Clay-Worker.

WANTED—Situation as superintendent, foreman, or charge of setting, burning, repair and erection of kilns, either dry clay, stiff clay or vitrified street paver works. Can superintend erection of works. Practical in every branch. Also a kiln builder. Good references. Address, SUCCESS,
5 1 c Care Clay-Worker.

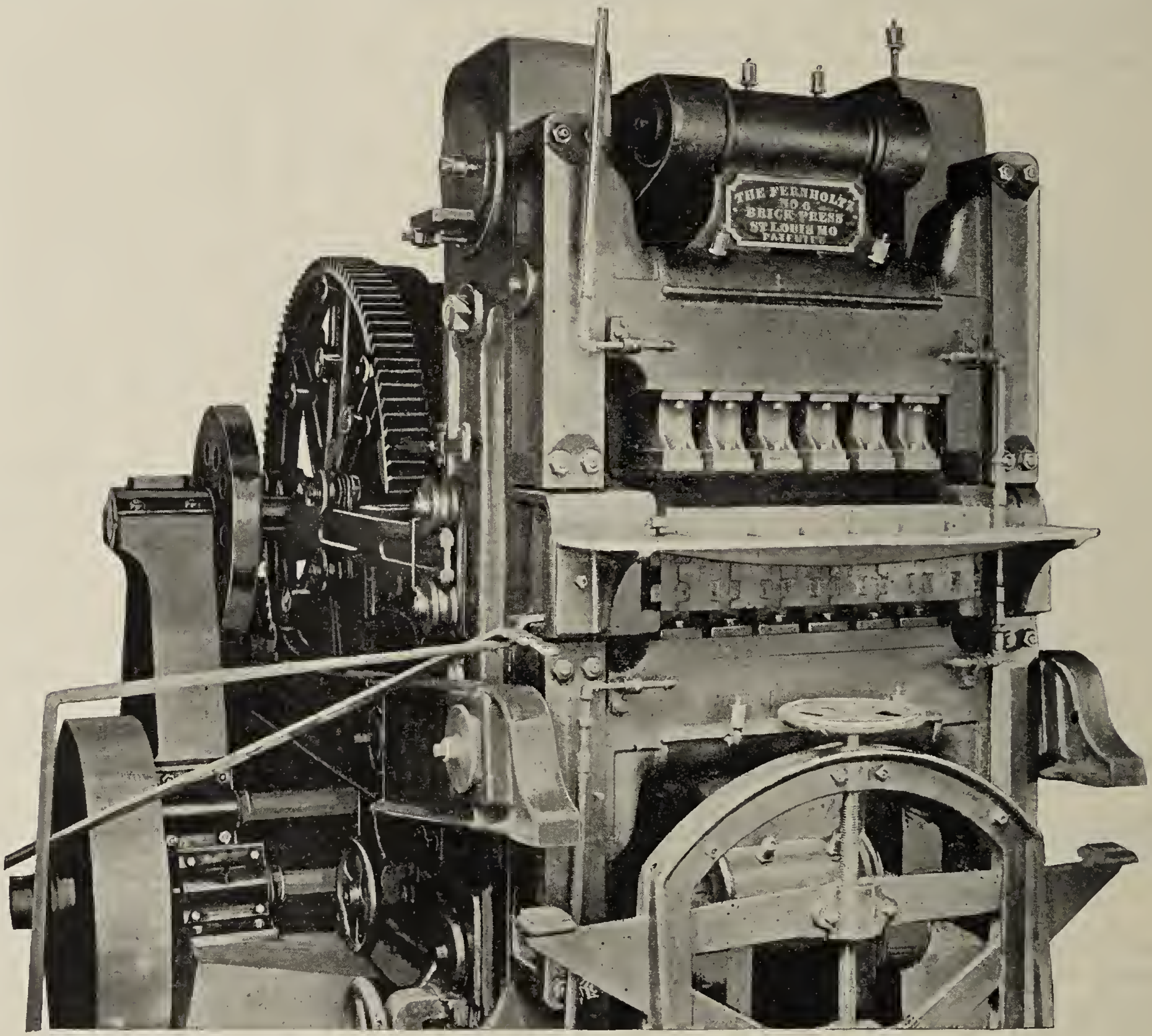
WANTED—Superintendent. Must understand the manufacture of stoneware and brick, and must be able to invest at least $5,000. Reference required. The advertiser is one of the largest stoneware manufacturing concerns in the country. Good salary to right party. Address, J. M. M'NEILL,
5 1 d Canton, O.

(Continued on Page 484.)

The Fernholtz Improved Brick Press and

A Combination that Comprises the Essen-

THIS press is the result of fifteen years of practical experience as a successful press brick and press brick machine maker, backed by inventive and mechanical talents of a high order. It is unequaled for strength and easy running, requiring only 6 to 7 horse power to operate the largest 6 mold press. All the parts subject to strain are made of the best bessemer steel and every part can be seen and got at easily. The thickness of the brick can be changed or regulated without stopping the press, and every press is fitted with the Fernholtz mould which is generally admitted to be the best mold in use. For fine pressed and ornamental brick this machine is unequalled, the pressure on and movement of the clay in the mold being such as to prevent granulation and insures the most perfect product possible.



The Fernholtz Six-Mold Brick Press.

We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

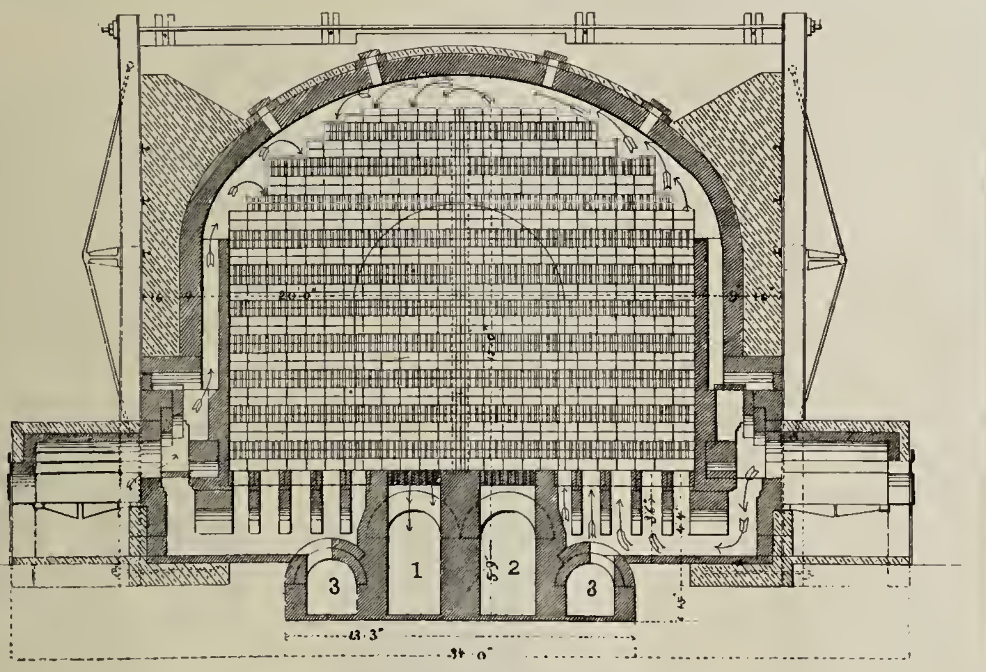
The Fernholtz Brick Press Co.,

1214 and 1216 Poplar Street, **ST. LOUIS, MO.**

Myers Balanced Up and Down-Draft Kiln

tial Elements of Success in Brickmaking.

AFTER pressed brick are made, be they never so fine, they must be well and thoroughly burned or the material, time and labor involved in their production is wasted. How best to burn pressed brick is therefore a vital question. We answer it confidently and offer the trade the **Myers Balanced Up and Down=Draft Kiln** which embodies the surest, best and most economical method of burning yet developed. By a system peculiar to this kiln the draft is under complete control at all times, and a large part of the heat goes through the brick to be burned twice and there is consequently a great saving in fuel and a larger per cent. of first quality brick produced than is possible in other kilns. By our system, the escaping heat from a cooling kiln can be utllized to dry off and partially burn a green kiln. The brick may be dried off or watersmoked with an Up-Draft and finished with a Down-Draft. Thus the top brick are not over-burned in getting the bottom brick hard, as is usually the case with down-draft kilns. And vice versa, the bottom brick need not be overburned or melted to get the top brick hard as with up-draft kilns. In no other kiln can the burner controll the heat at will as in the Myers kiln, in which the fires can be reversed as often as desired during the burning of a kiln. We are prepared to prove in a thoroughly practical and satisfactory way that our method of burning pressed brick is at once **the best and cheapest.**



No. 1 Damper to Stack Open. No. 2 Damper to Stack Closed.
No. 3 Hot Air Flues leading to next Kiln closed whilst burning.

Correspondence solicited. For full particulars address

The Fernholtz Brick Press Co.,

The Equipping of Dry Press=Brick Plants a Specialty. ST. LOUIS, MO.

WANTED—Who has a good second-hand power brick press for sale? Send description, etc., to E. W. FACE & SON,
5 tf d Norfolk, Va.

FOR SALE—One Miller hand press, in good order and cheap. 5,000 good pressed brick can be made daily. Address
W. B. HARRIS & BROS.,
3 tf d Zanesville, O.

FOR SALE—One Edinburg soft mud brick Machine, 2 trucks, 16 molds, all good as new; made about 40 M brick; only $50. Address
3 3 c "HOLD," care Clay-Worker.

FOR SALE—One Henry-Martin Brick Machine, good as new; only used short time; cost $1,000; will sell for $500. Address,
ROME BRICK CO.,
4 4 d Rome, Ga.

WANTED—Situation as foreman, setter and burner on a good, steady brickyard. Thoroughly understands the business. Best of references. FULTON,
4 2 d Care of Clay-Worker.

FOR SALE—One No. 4 Cummer Dryer, been in use about a year; is practically as good as new. Object in selling, wish to put in a larger one. Address, BOX 99,
4 4 d Care Clay-Worker.

WANTED—A good, reliable man desires a situation as superintendent of good stiff-mud or dry-press brick plant. References given and required. Address,
4 2 d JUST, care Clay-Worker.

FOR SALE—One C. C. D. Chambers End-cut Brick Machine, one automatic edger and one disintegrator, all in first-class order, and can be had cheap. SAN ANTONIO,
4 3 c Care Clay-Worker.

FOR SALE—At $450 on board cars, one Chisholm, Boyd & White Co. dry pan, seven feet in diameter, repaired by us and in good order.
CHAMBERS BROTHERS CO.,
3 4 l Philadelphia.

FOR SALE—One second-hand Chambers Brick Machine, 25,000 daily capacity. Repaired by us and in good order.
CHAMBERS BROS. CO.,
53d and Media Sts.,
4 4 d Philadelphia, Pa.

WANTED—To serve somebody who is in need of a vigorous man, capable of assuming full control of soft or stiff-mud brick plant. Drilled in every department. Twelve years' experience. Best of references as to character and ability. Address,
YOUNG GRIMES,
4 3 L Care Clay-Worker.

FOR SALE—Forty wood-bodied brick dryer cars for steam brick dryer. Also a brick and drain tile plant, with modern equipments, in good running order; 150 acres land, sand and timber on premises. Plant sold separate from land for removal, if desired. G. P. ORENDORFF,
8 tf 5p Lacon, Morgan County, Ala.

FOR SALE—Second-hand brick machinery. One Eureka dry press, capacity 25,000, with conveyor, disintegrator, etc. Two Creiger's grand automatic, capacity 35,000 each, with crushers, conveyors, pug mills, etc. One Raymond hand press, with outfit; capacity, 3,500. Sixty thousand good wood pallets, 2 feet 9 inches by 10 inches. Address.
3 3 cm GRAHAM, care Clay-Worker.

FOR SALE—One Penfield all-iron stock brick machine, with horizontal pug mill attached, used one year, but thoroughly overhauled. One Penfield 10 S plunger machine, with one board delivery cutting table arranged to cut Roman and front brick. Two Carnell hand represses, 13¼x4⅜ inches. Two ditto, 8⅞x4¼ inches. Two Kueny hand represses, 8⅞x4¼ inches. Two Tapline & Rice chaser mills, very little used. All above will be put in thorough good order and delivered on car. Write for prices.
R. E. FARNHAM,
3 3 c Metuchen, N. J.

PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

FIRE BRICK, FIRE CLAY and FIRE CLAY TILES.

Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years. Write for prices.

EVENS & HOWARD,
920 Market Street, - - - - ST. LOUIS, MO.

INCORPORATED 1896. CAPITAL $100,000

National Fire Clay ... Mining & Mfg. Co.,

F. X. BARADA, *President*
A. S. TAYLOR, *V. P. and Manager.*
A. S. BARADA, *Secretary.*

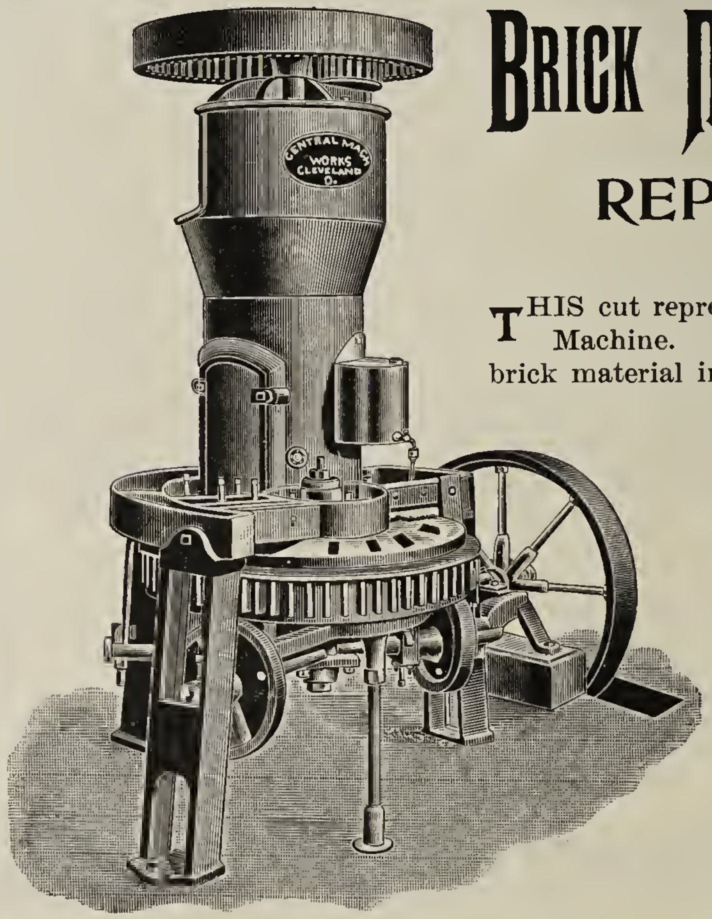
915 Chestnut St., ST. LOUIS, MO.

THE highest quality of Clay for Glass House Pots, Fire Brick, Tank and Furnace Blocks and all articles of Fire Clay used in the construction of Glass and Metallurgical Furnaces.

Read the analysis carefully and note that our clay is the superior of the imported article.

Silica	45.24
Alumina	39.31
Oxide Iron	.37
Lime	.29
Magnesia	.10
Alkalies	.27
Water	14.54
Total	100.12

BRICK MACHINES AND REPRESSES.



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THIS cut represents our Stiff Mud Brick Machine. It will work any kind of brick material including fire clay, shale or common clay right from bank without the use of a pug mill. Each brick is pressed separately and can be haked 7 or 8 high, or repressed right from machine.

Over 500 in operation.

Send for price and circulars

Manufactured by

CENTRAL MACHINE WORKS,
226-236 Abbey St.
Cleveland, Ohio.

NOTICE—We furnish all supplies and repairs for any make of the "Sword" Brick Machine.

DO NOT BUY A

FOUNDED 1879.]

SOFT CLAY BRICK MACHINE

Until You Have Investigated Ours.

Send for Photo.

W. E. TALLCOT & CO., Croton-on-Hudson, N. Y.

Washington University Testing . . Laboratory

Tests of the Strength of Materials

Of all kinds made by experienced and competent experts. . . . . .

ST. LOUIS, MO.

All the United States Timber Tests made at this Laboratory.

Tests of Paving Brick a Specialty.

J. B. JOHNSON, Director.

MAKES THE FINEST BRICK in the WORLD.

THE
Improved Lion Brick Press.

New Catalogue on application.

Complete Brickyard Machinery.

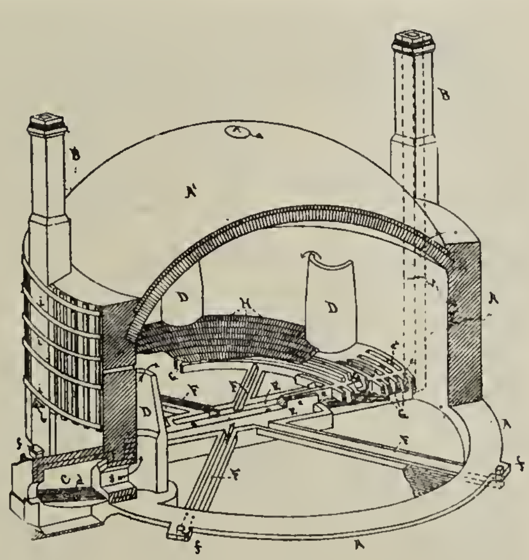
St. Louis Iron & Machine Works,

Main St., and Chauteau Ave., ST. LOUIS, MO.

BURNING MADE EASY

BY USING

Holman's Down Draft Kiln.



Cheaply and easily built, and Fully demonstrated to be one of the most perfect kilns on the market.

. . . . All Parts of the Kiln Fully Under Control.

SEND FOR ILLUSTRATED CIRCULAR.

C. J. HOLMAN, Sargeant's Bluff, Iowa.

FOR SALE—The best equipped roofing tile plant in the United States. It is on a paying basis, and a party understanding the business can make big money out of it. The business is established and can sell its capacity easily every year. The right party can clear his investment the first year. He will have no reputation to make, as the goods have already the best reputation of any made in this country and have been on the market several years. Plant, machinery, kilns, etc., all new, most of them put in this past year, and are of the best and modern. The owner will sell an interest to a good, first-class clay man who understands the business thoroughly if he can't sell out complete. The heason for selling is simply owner is interested in other business and knows nothing about running a clay plant, and is not adapted to the business. After getting into it he finds it will take all his time and more clay knowledge than he possesses to make a success of it such as the business is possible of attaining, and for that reason wishes to sell out cheap, part cash, balance long time, or will sell interest to desirable party. Located in Illinois near Chicago. Address

3 tf d ARTHUR, care Clay-Worker.

BRICK MACHINERY FOR SALE.

We have on hand at our shops, in Corning, N. Y., all the machinery for a complete brick making plant, used only two seasons. Engine and boiler included or will sell separately. Price very low. Address,

PRESTON & HEERMANS, Corning, N. Y.
5 4 dm

BRICK WORKS WITH CLAY DEPOSIT.

Cost, $63,000. Will Sell for $15,000.

On the line of two railroads in Virginia. Plant used a short time; inexhaustible deposit of clay. Will make fire brick, vitrified, pressed, beautiful buff, cream, gray, drab and red colors. Clay rights said to be worth four times the price asked for the property. For sale by HENRY W. ROGERS, 230 N. Charles Street, Baltimore, Md. 5 3 cm

NOTICE.

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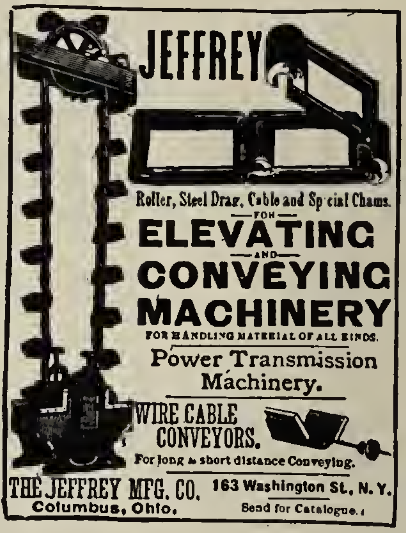

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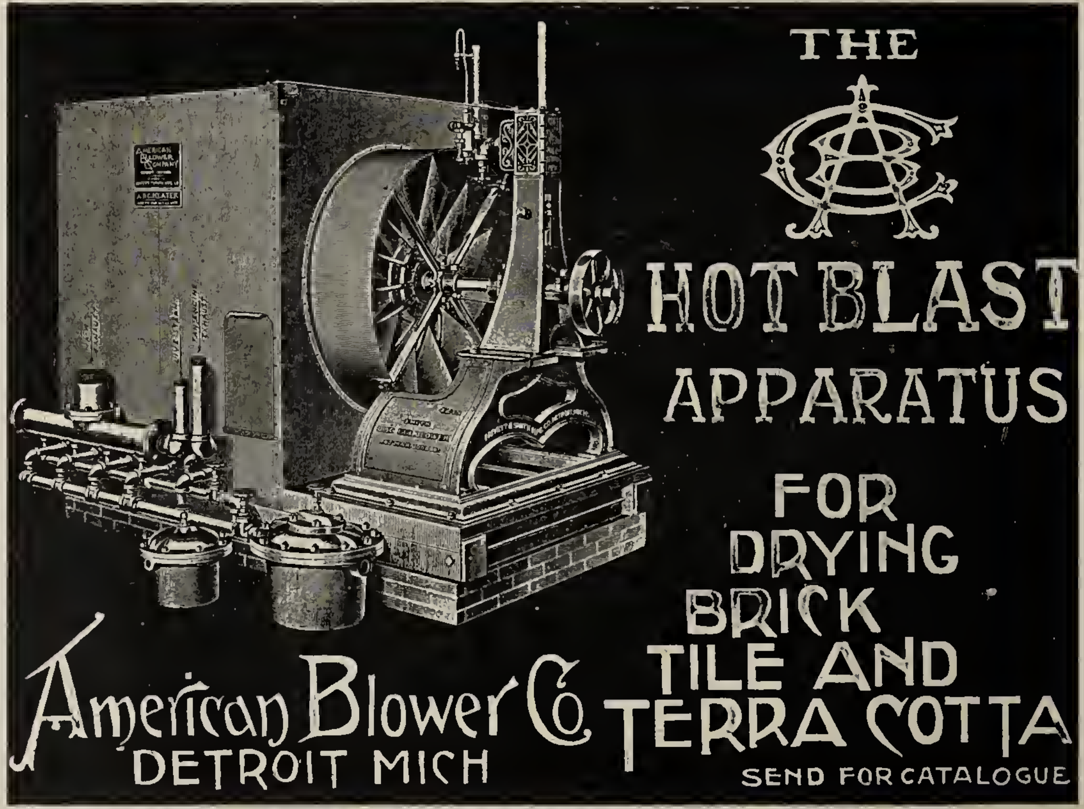

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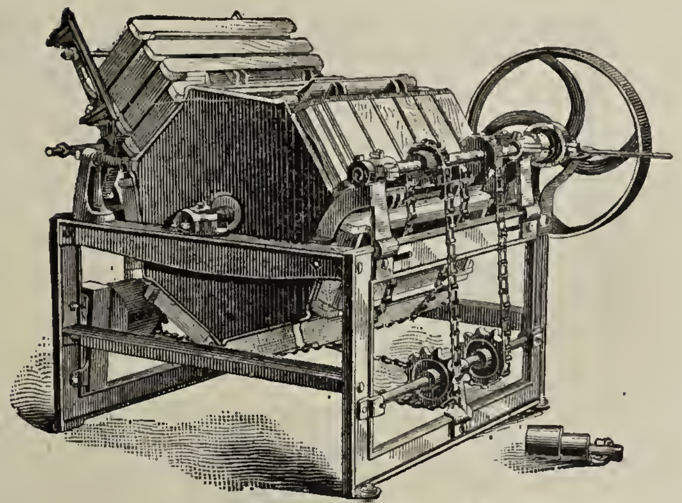

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THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

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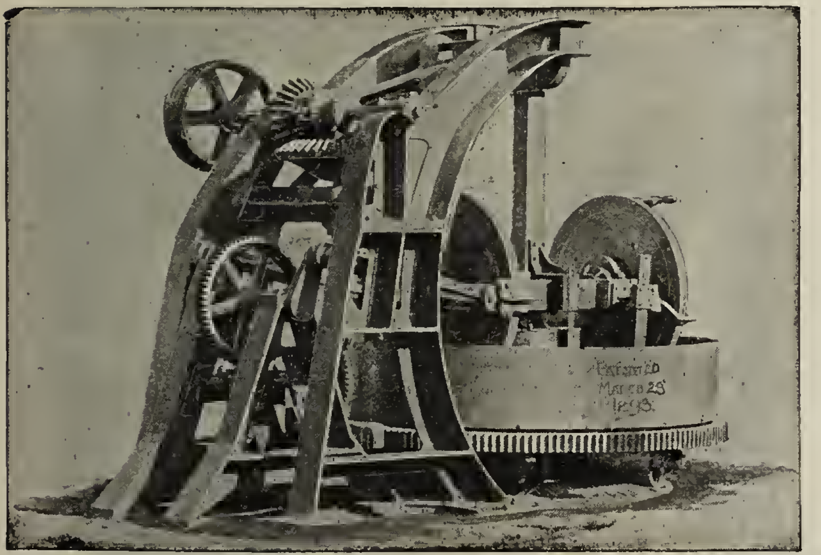

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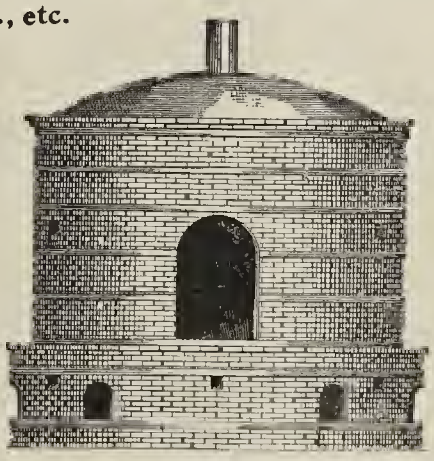

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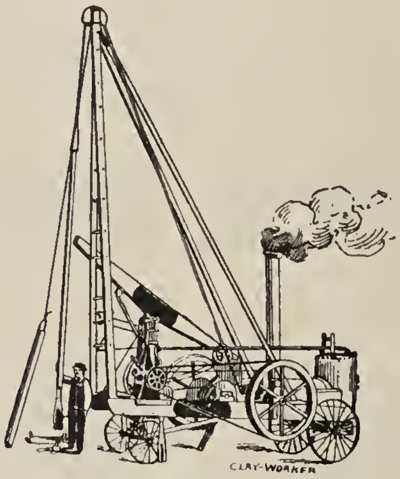

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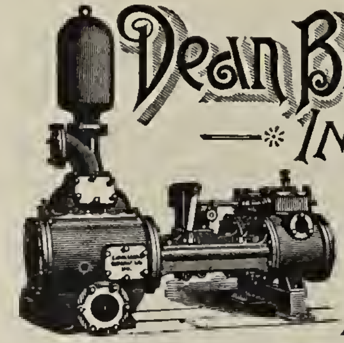

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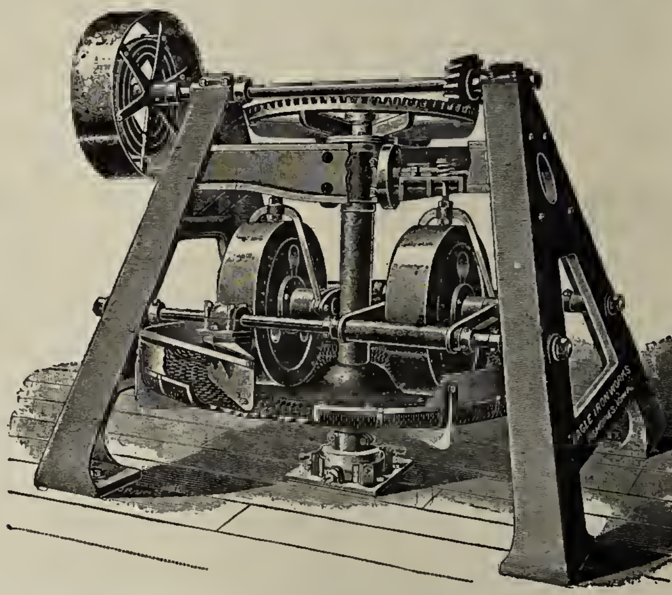

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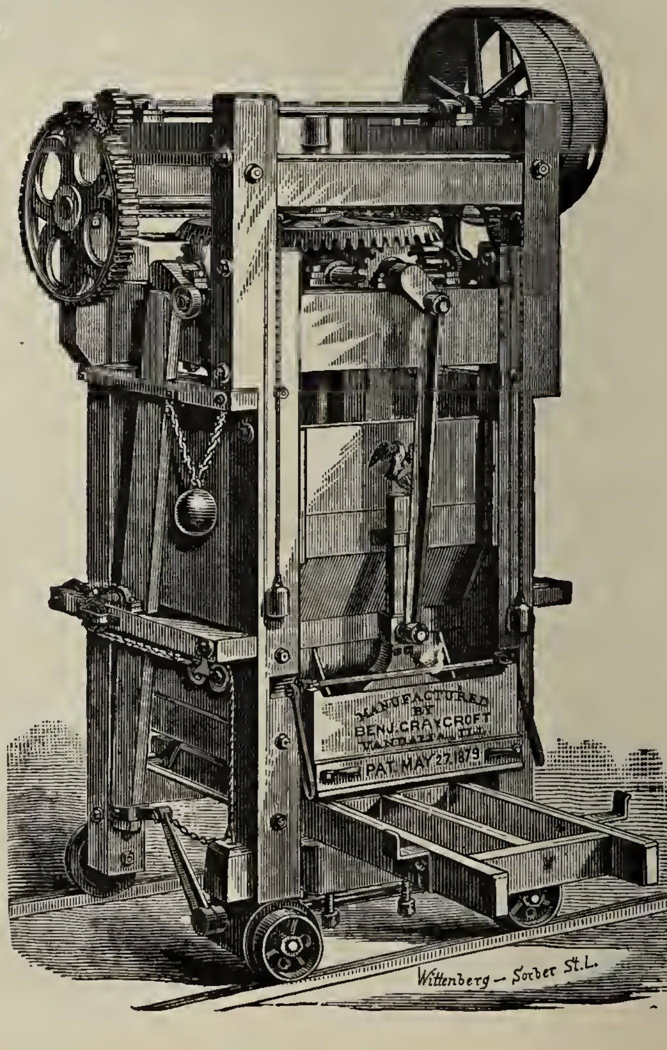
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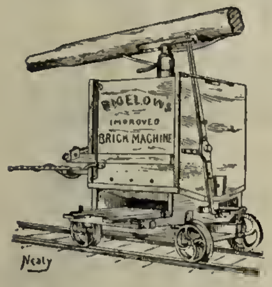

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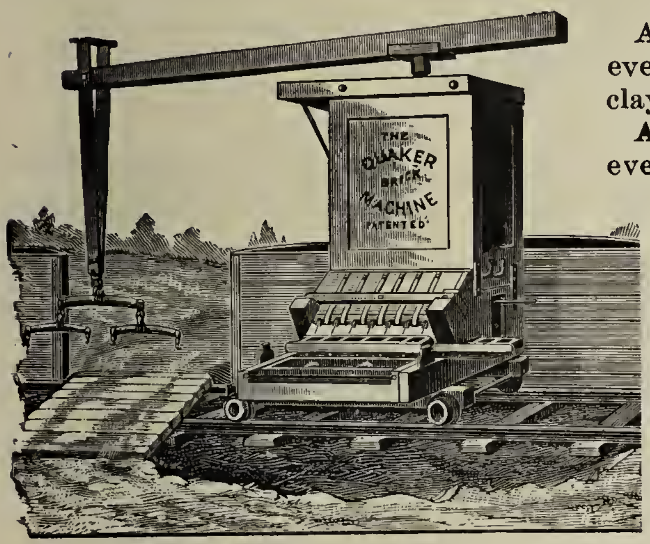

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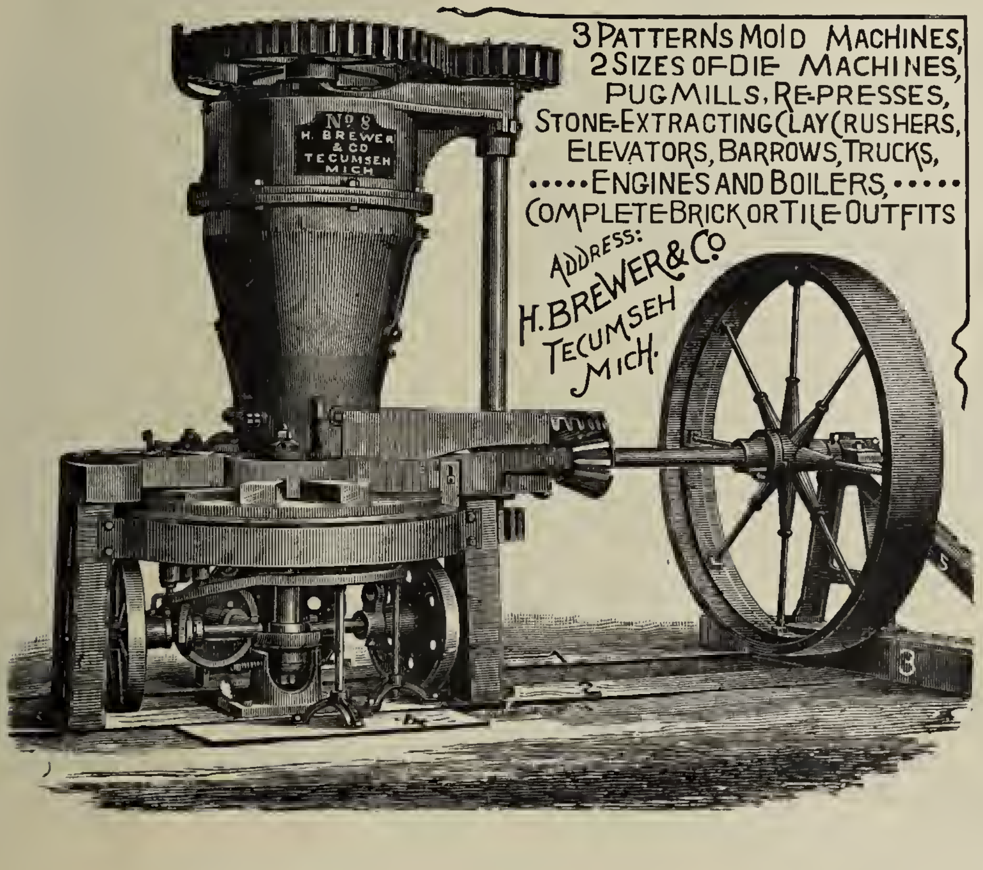

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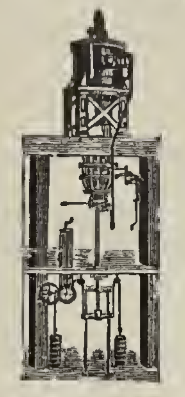

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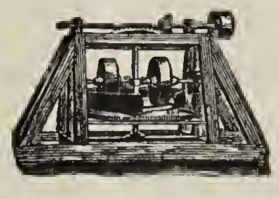

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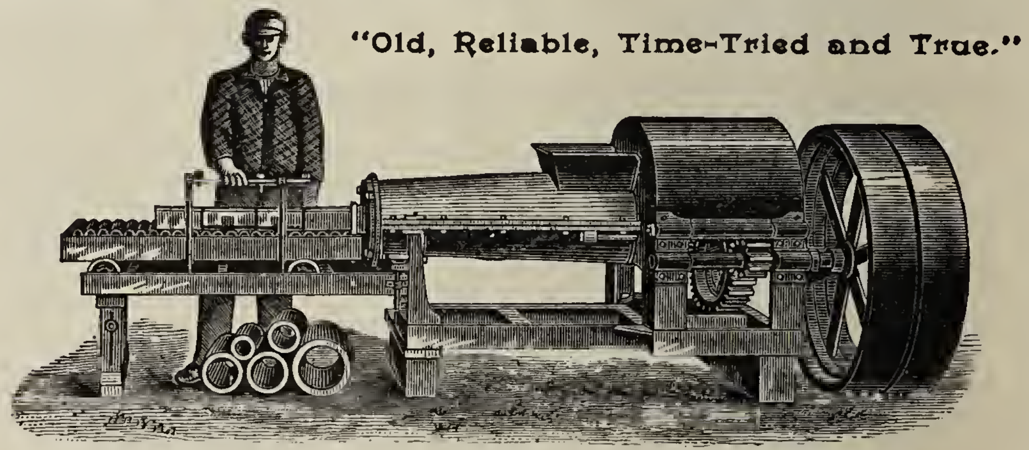

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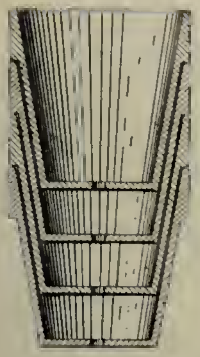

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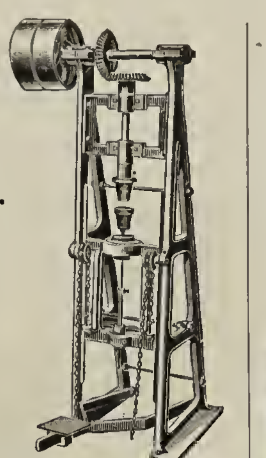

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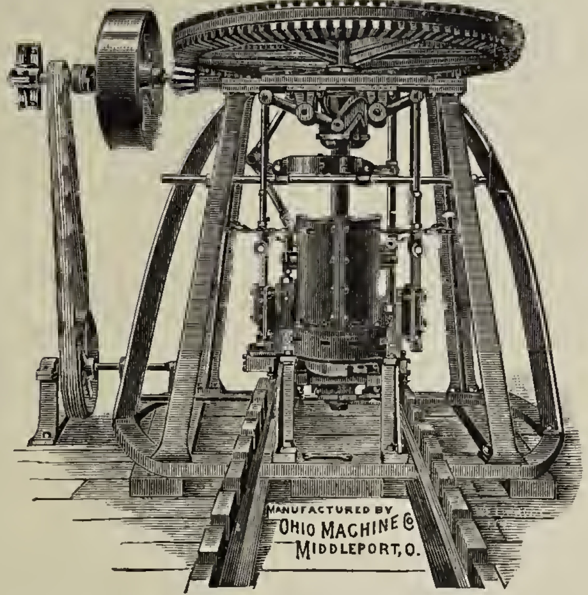

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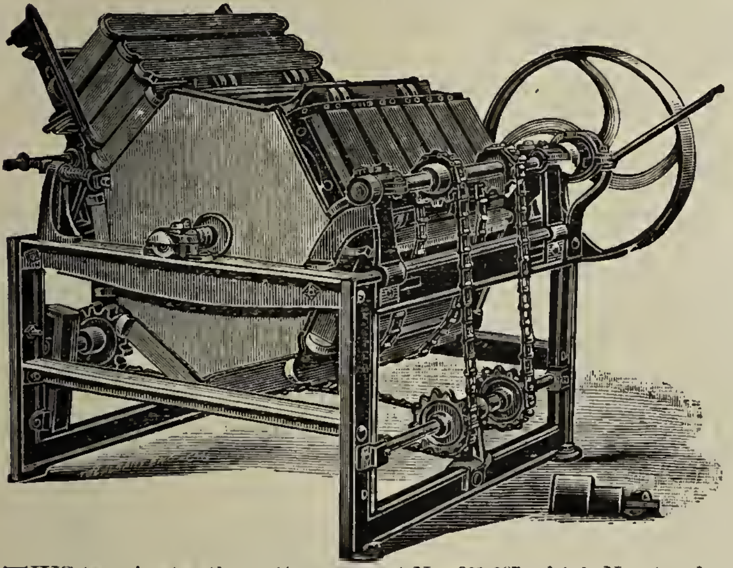
Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.

WHITEHEAD BROS. & CO., General Agents, 517 West 15th St., New York City.

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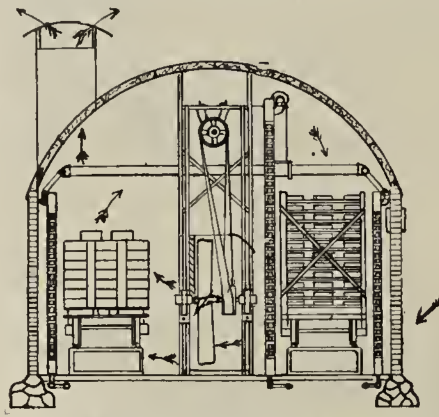
The Detroit and Cleveland Steam Nav. Co.

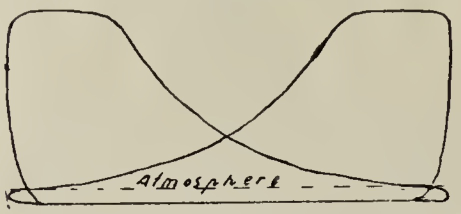
The Safety Dryer,

Made absolutely **Fire Proof**, at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.
U. S. Pat. Aug. 16, 1881. No. 245,742.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



SAMUEL ROSS, President.   JOHN MILLER, Treas. and Mgr
WASHINGTON BRICK AND TERRA COTTA CO.
WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

WASHINGTON, D. C., June 7th, 1895.
S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our —— You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

FORDS, N. J., April 9th, 1894.
MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

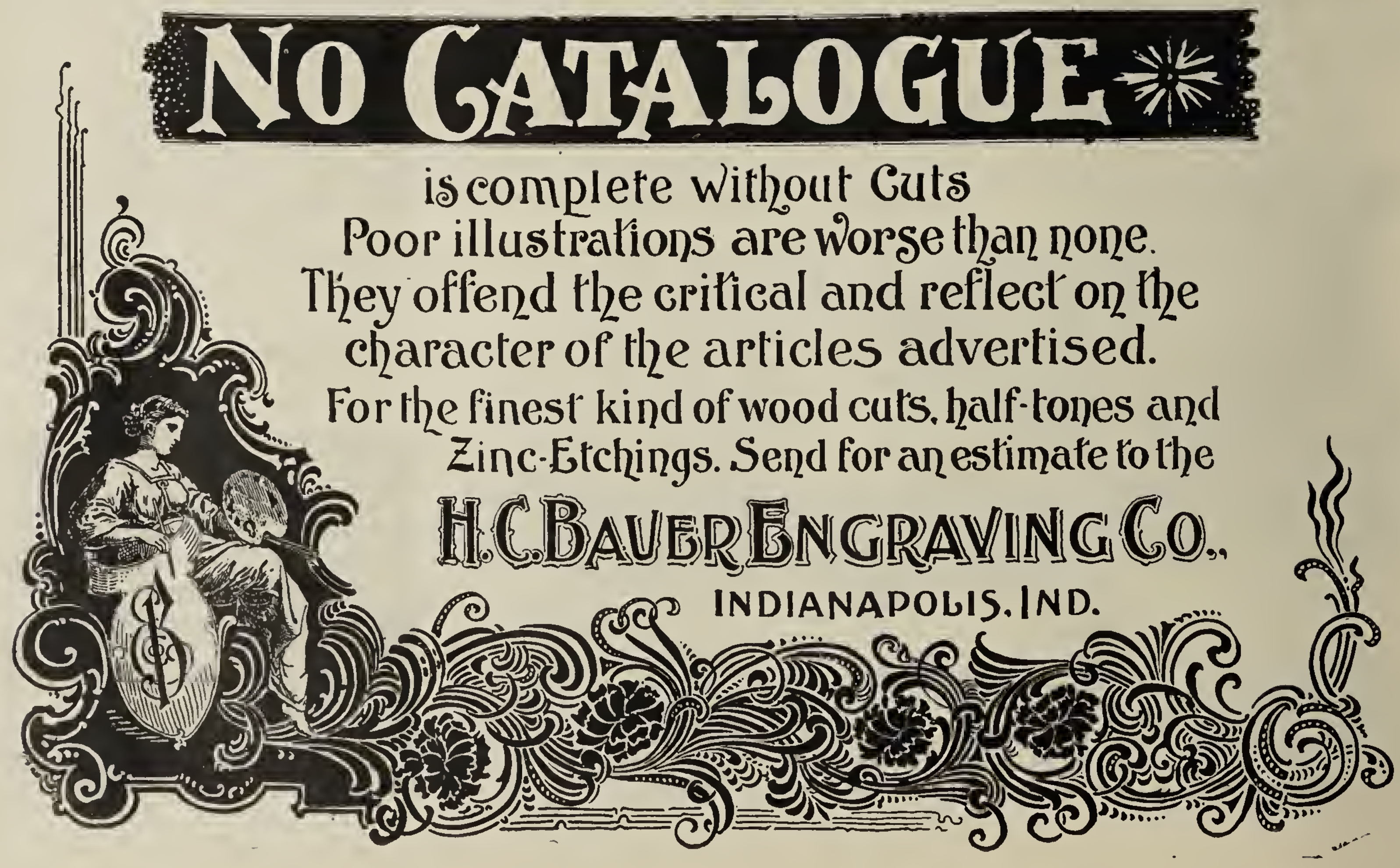
"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.
MR. S. G. PHILLIPS, Woodbridge, N. J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

Yours respectfully,
CHAMBERS BROTHERS CO.,
J. H. Chambers, Gen'l Mgr.

S. G. PHILLIPS,
Agent and Patentee,
161 Grand Street,
Rahway, N. J.



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is complete without Cuts
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character of the articles advertised.
For the finest kind of wood cuts, half-tones and
Zinc-Etchings. Send for an estimate to the
H. C. BAUER ENGRAVING CO.,
INDIANAPOLIS, IND.

Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

F. H. C. MEY,

Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

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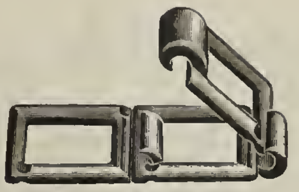
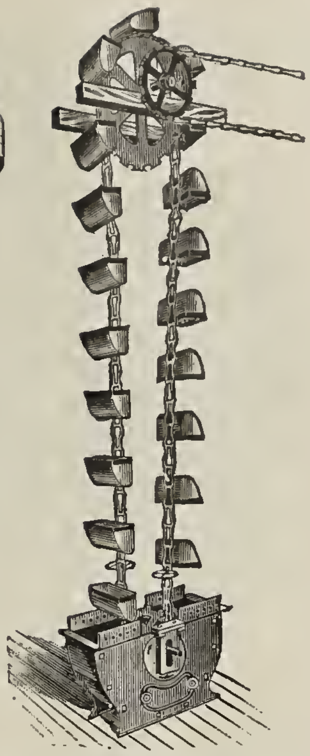
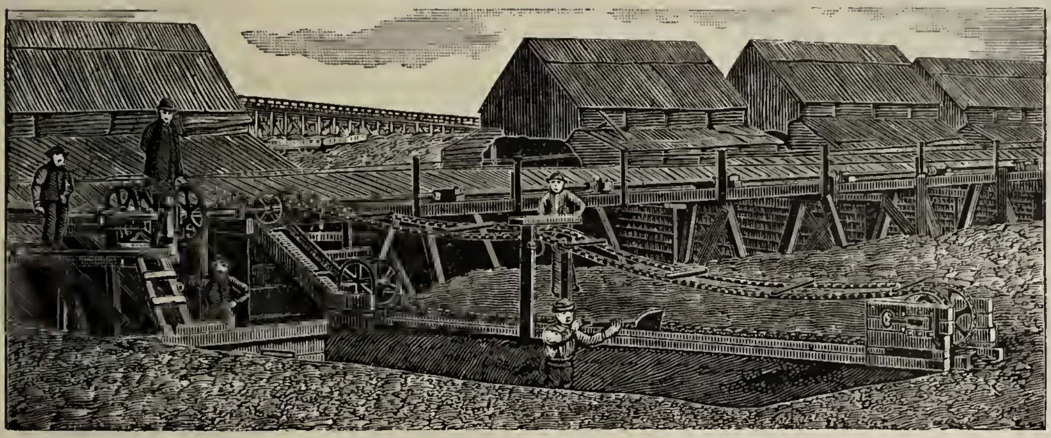




THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.



MEY PATENT CLAY ELEVATOR.

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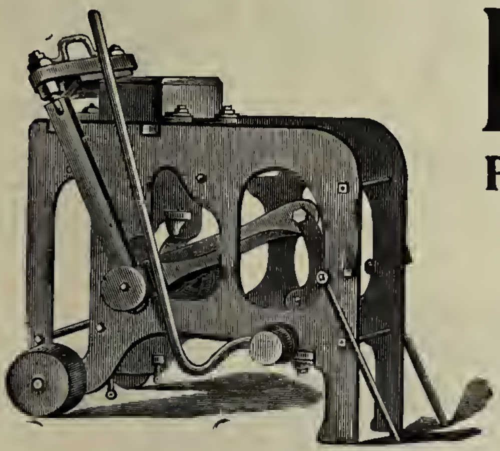
Fire and Red Brick Presses all sizes.

....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

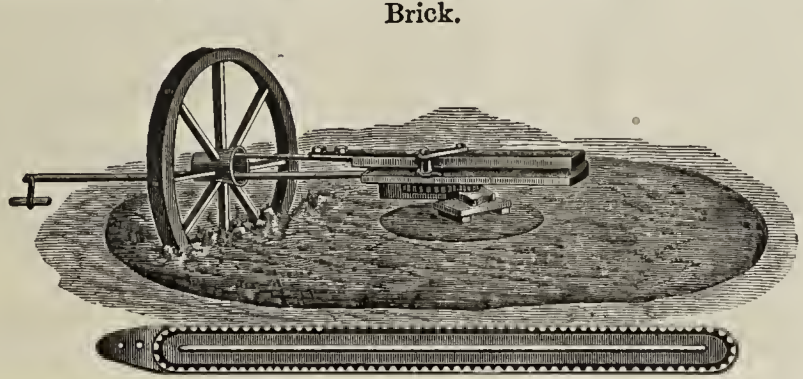


RED BRICK PRESS.

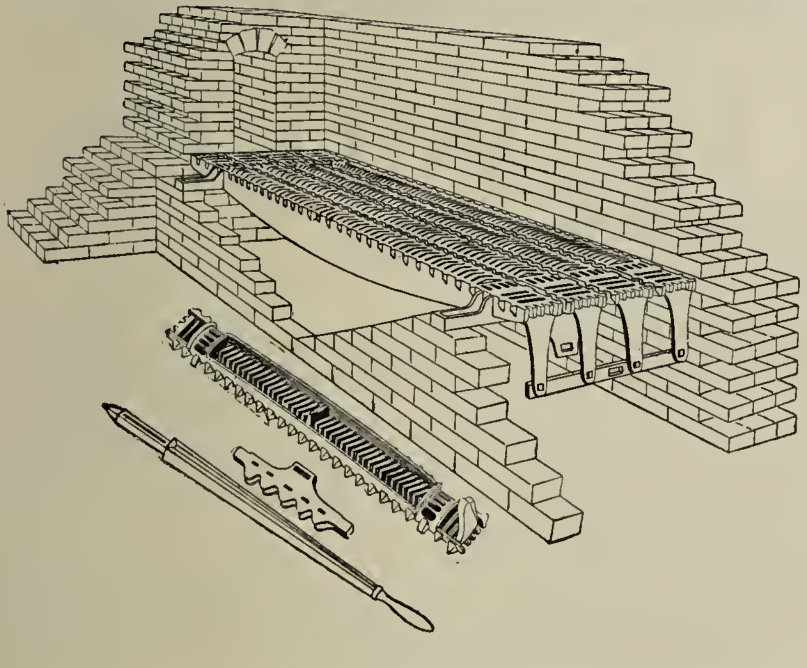
GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

☞ Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.



A Rocking Grate for the Clayworker.

Our Grates give greatest economy of fuel. Cold drafts through furnace are greatly reduced. Why not make cheaper price?

A good thing: Our Art Catalogue.

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Engineers, Founders and Mechanics,
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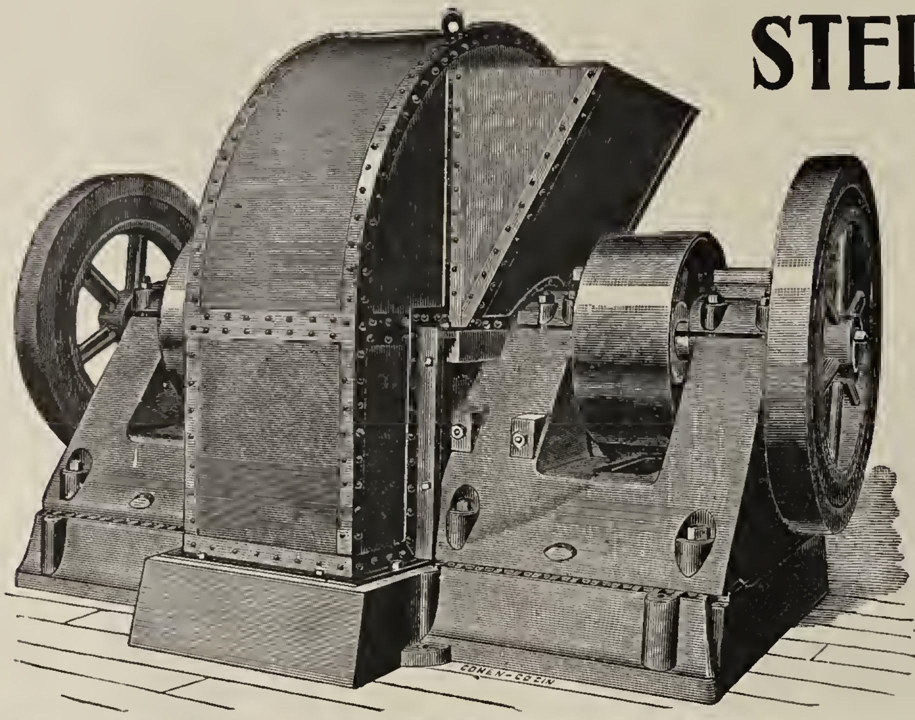

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For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

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THE BEST!

For carrying all kinds of brick. Over 15,000 in use. It will pay you to inform yourself fully.

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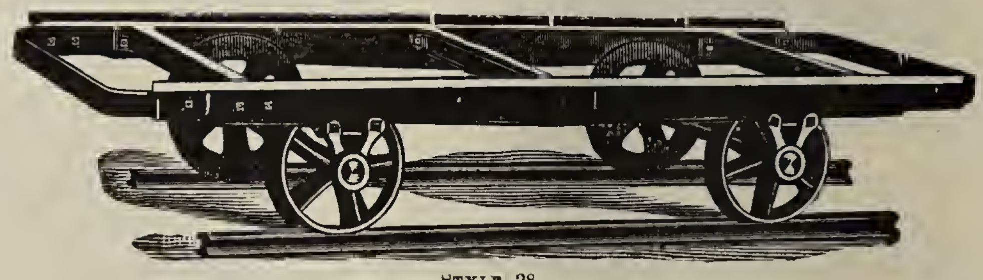


STYLE 28.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

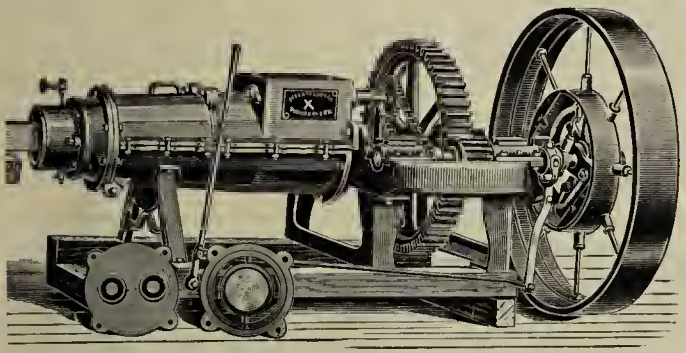
[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

The New South Brick Machinery

Southern Clay Eaters. Veni, Vidi, Vici.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion** or **constipation**. No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.



Our X Brick and Tile Machine.

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GENTLEMEN:—I thought I would let you know that I am well pleased with the New South X Machine. It is the cheapest, runs the lightest and makes the nicest brick of any machine in southwest Iowa. We have a 12 H. P. engine and can make 20,000 bricks in ten hours, and there is not a hand-cutting table in this part of the country that can compete with yours for cutting square on the ends. I consider it the most complete outfit that a man can buy for the money. It surprises old brickmakers. They say your truck is a Yankee trick. We have a club-footed boy, 16 years old, who trucks 15,000 to 18,000 per day with one of them. We wish you success with your enterprise.

Yours, etc.,
S. O. CARTER.

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Strictly modern machinery at the lowest price.
We have just completed a new machine "X-tra."

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J. C. STEELE & SON, Statesville, N. C.

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15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

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12 Second Hand Machines.

Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER MANUFACTURING Co

DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
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DISINTEGRATORS, AUTOMATIC CUTTERS,
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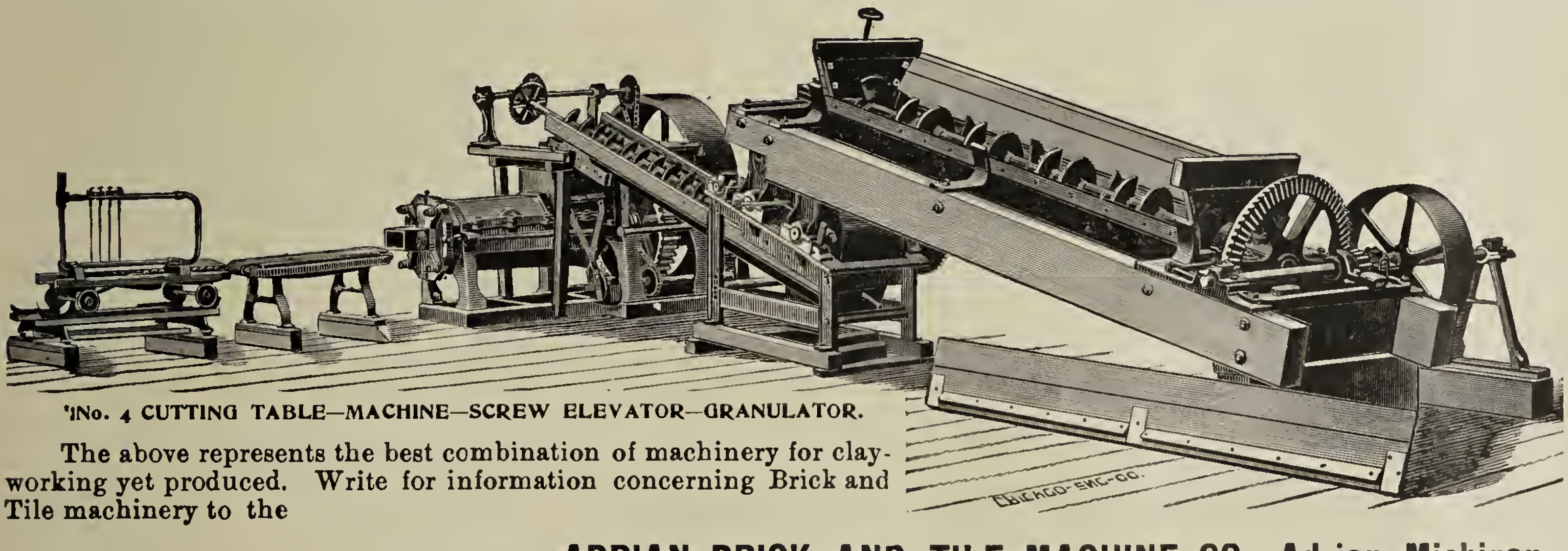
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No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

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CHEMICAL LABORATORY FOR THE CLAY INDUSTRY.

Raw materials and products of the Brick, Stoneware, China, Lime and Cement industries examined and advice given.

Flaws in the methods of manufacture corrected.

Many years experience.

Laboratory for the German Association of Refractory Clay Ware Manufacturers.

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DRAKE'S STANDARD MACHINE WORKS
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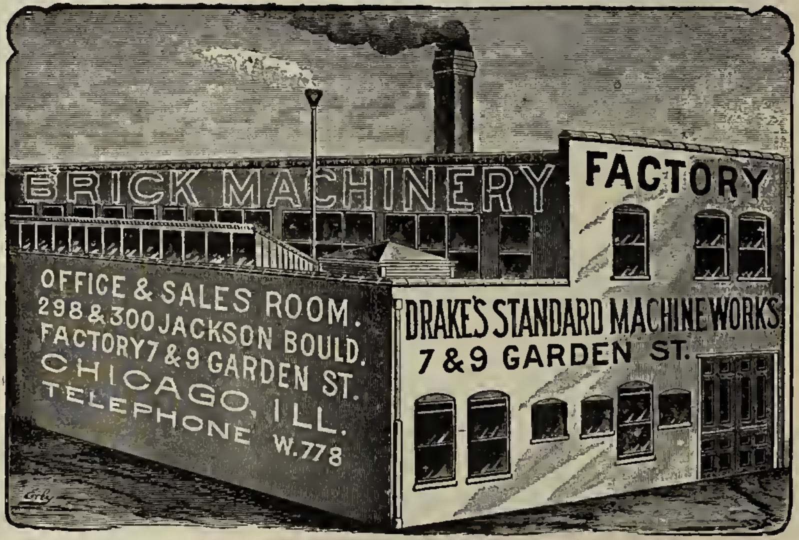

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DRAKE'S STANDARD MACHINE WORKS
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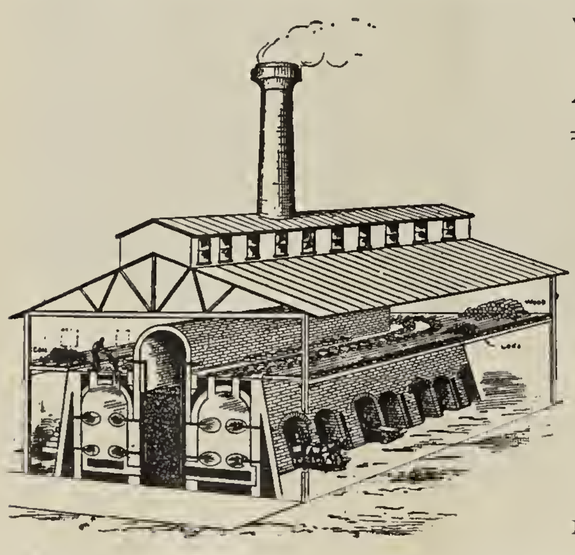
OUR NEW PERCUSSION SCREEN **Is the Latest and Best Device for Screen Clay, Lime, Cement, Etc.**



Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

Vitrified Paving Brick

Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Wheeler. Mailed free on receipt of price, $1.00.

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.....A DRY PAN
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WITHOUT LOOKING INTO THE MERITS OF

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A BRICK MACHINE that has never made a failure.

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All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
...AND...
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For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

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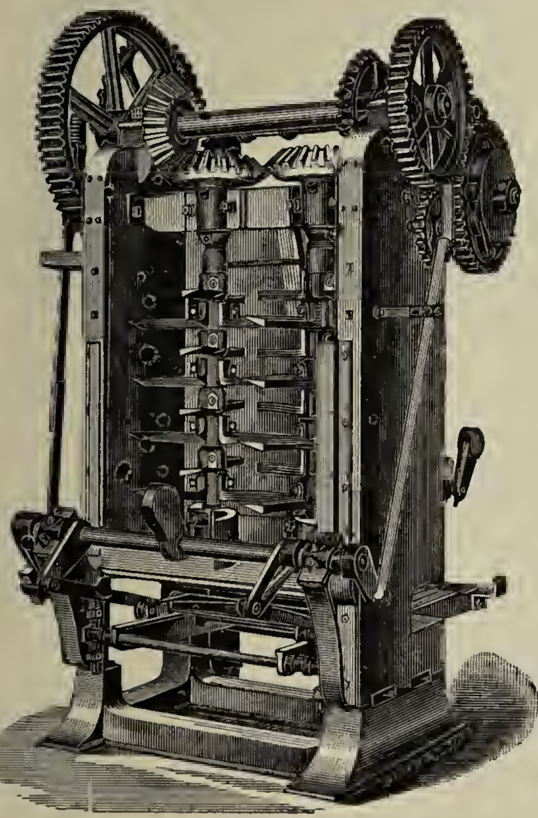
THE DUPLEX

Is the Standard of All Soft Clay Brick Machines.



It is made entirely of iron and steel, thus being very Strong and Durable, Simple in Construction, and makes a much stiffer brick than can be made with any other soft clay machine.

Write for Catalogue . .
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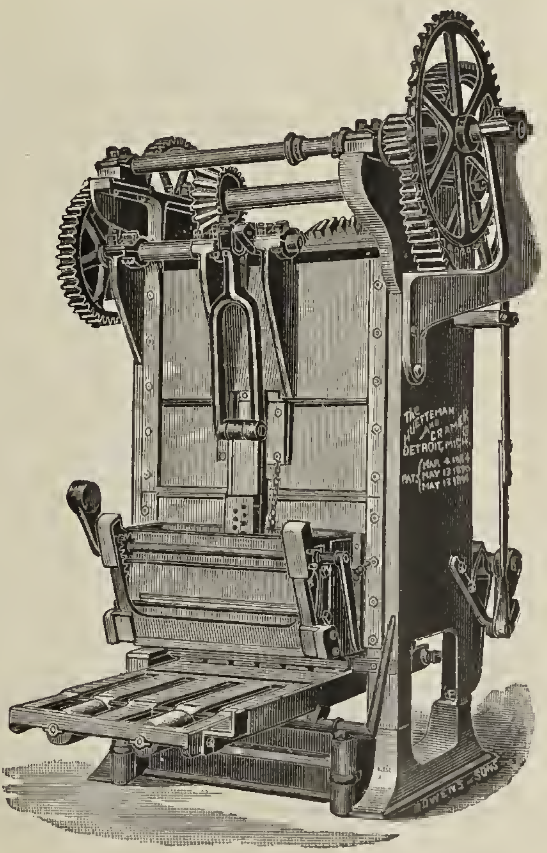
The Huetteman
& Cramer Co.,

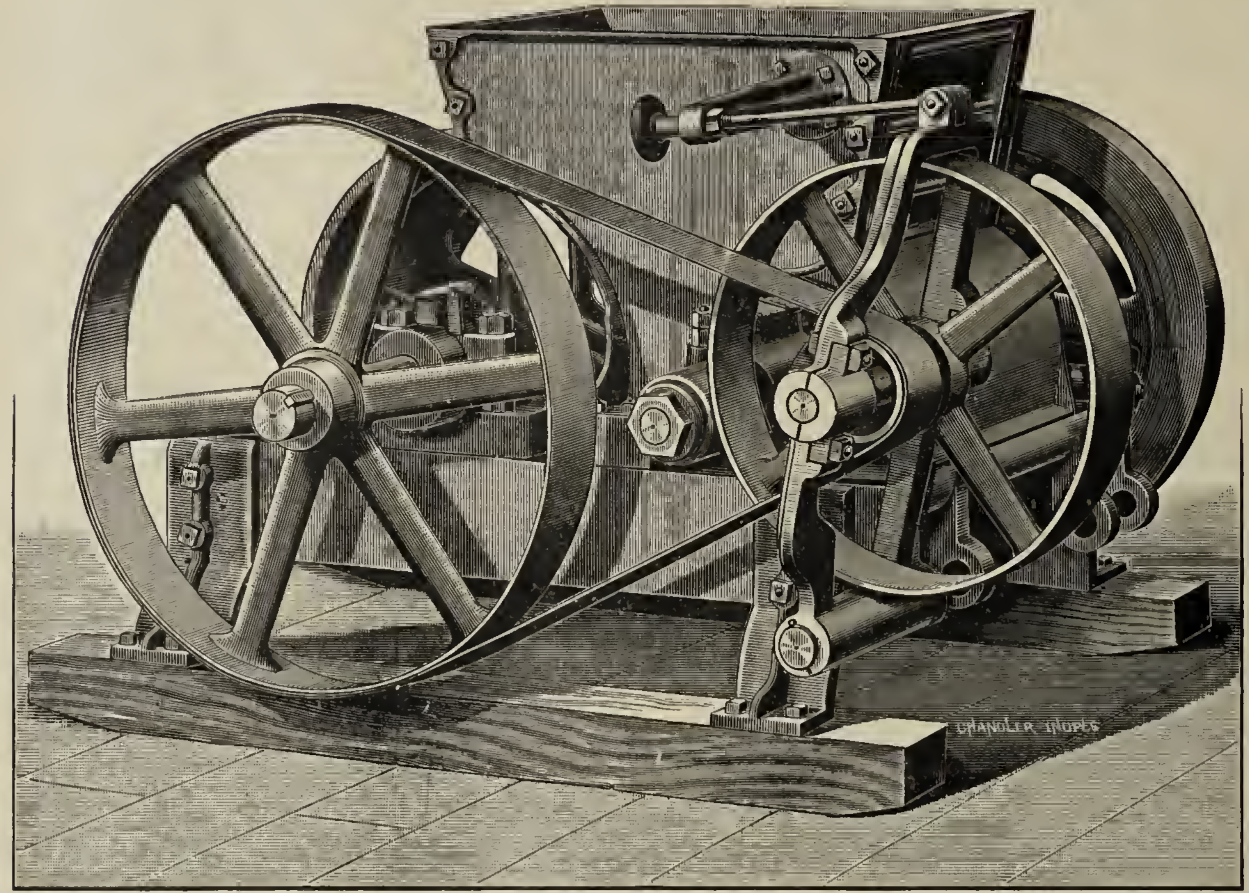
Manufacturers of the Duplex Brick
Machine and general outfit
for brickyards,

12, 14 & 16 Sherman St.,

DETROIT, -- MICH.



The Potts Disintegrators



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WORK WET or DRY CLAYS.

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Separate or grind the stones. Simple in

CONSTRUCTION,
STRONG and
DURABLE.
CHILLED ROLLS.

You take no chance of Patent Litigation by purchasing this machine.
Twelve sizes and styles.
Capacity from 15 M to 150 M brick per day.

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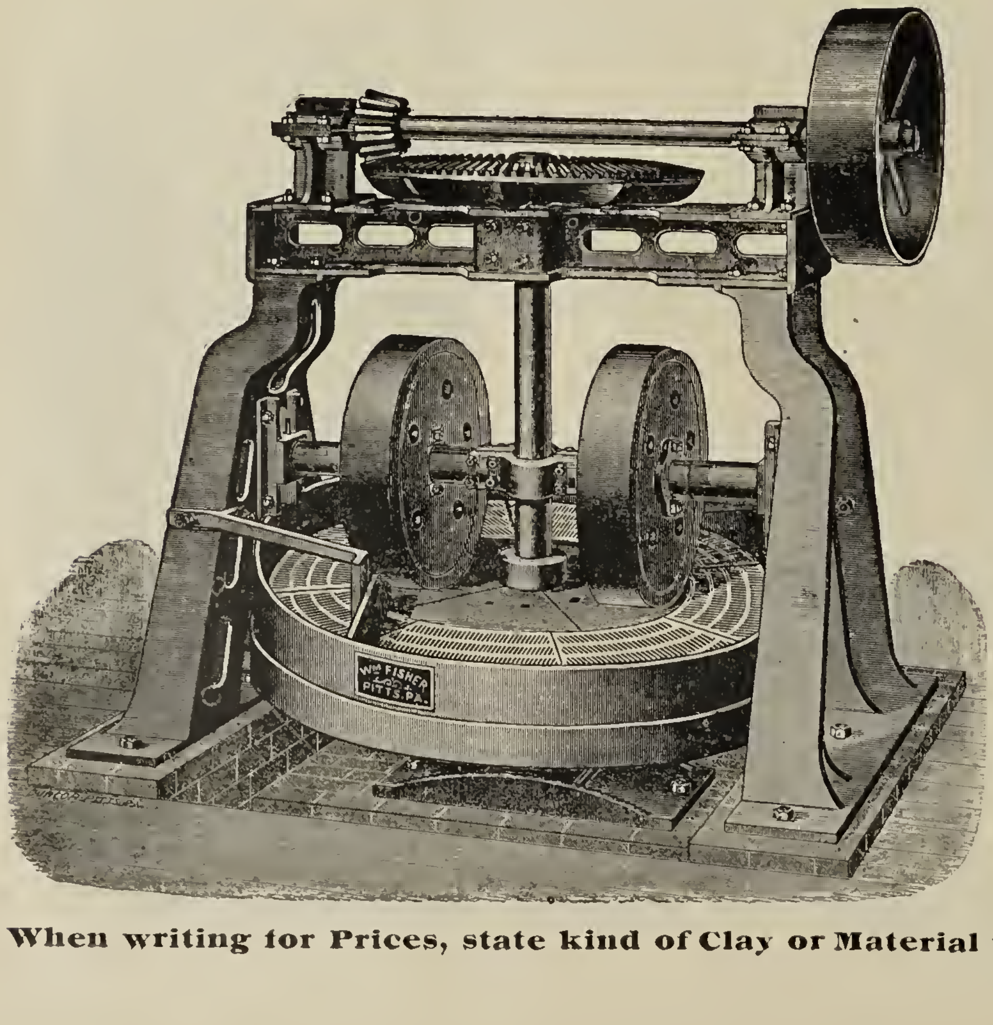
C. & A. POTTS & CO., - Indianapolis, Ind.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.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Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets.
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

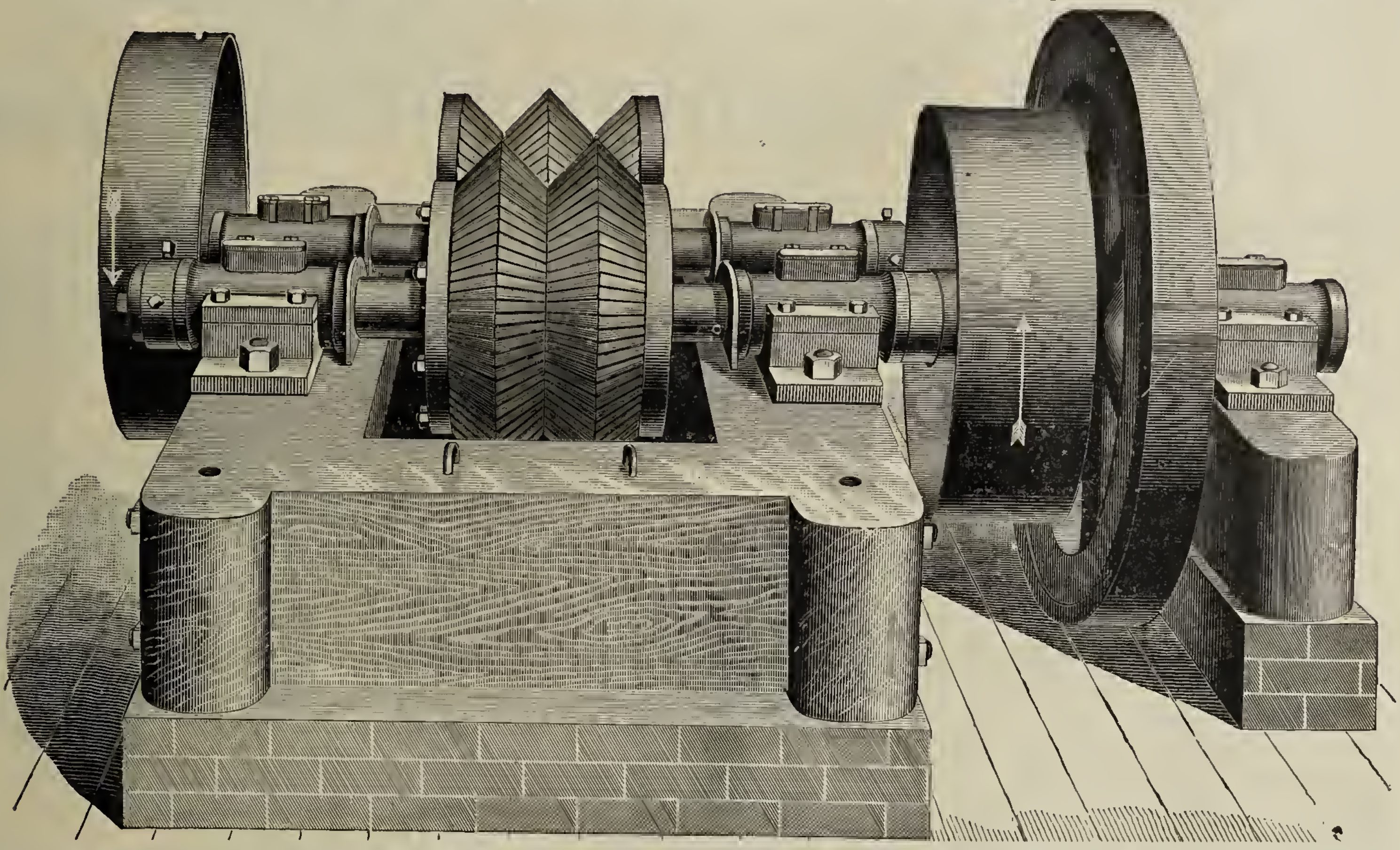
We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

NEWELL IMPROVED CLAY PULVERIZER

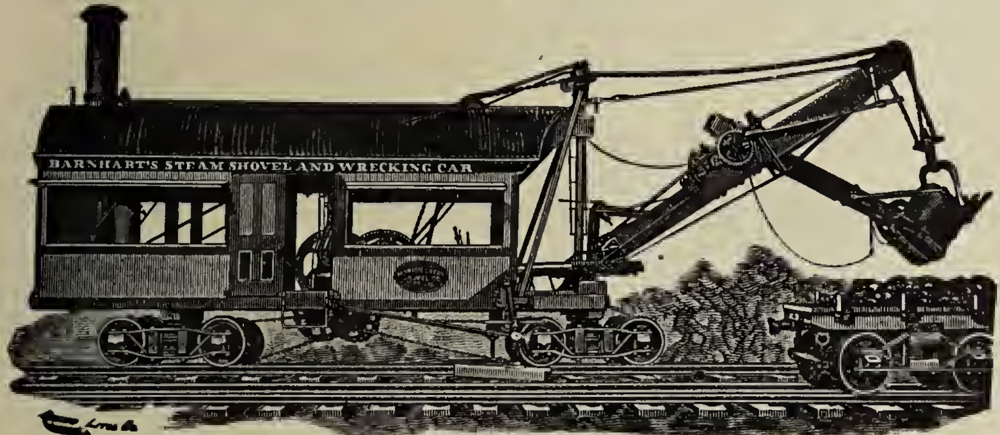
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
26 Cortland and 21 Dey Streets, **New York, U. S. A.**

Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

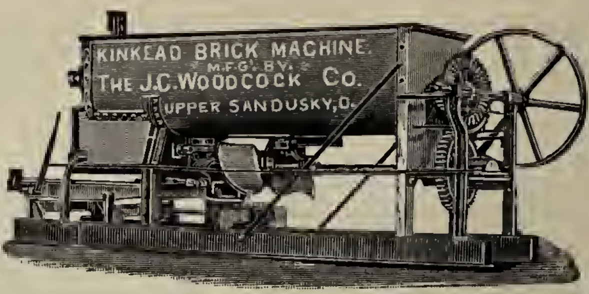
Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

603 West Center Street, - **MARION, OHIO.**

STYLE C—¾ YD.

A Good Brick Machine:

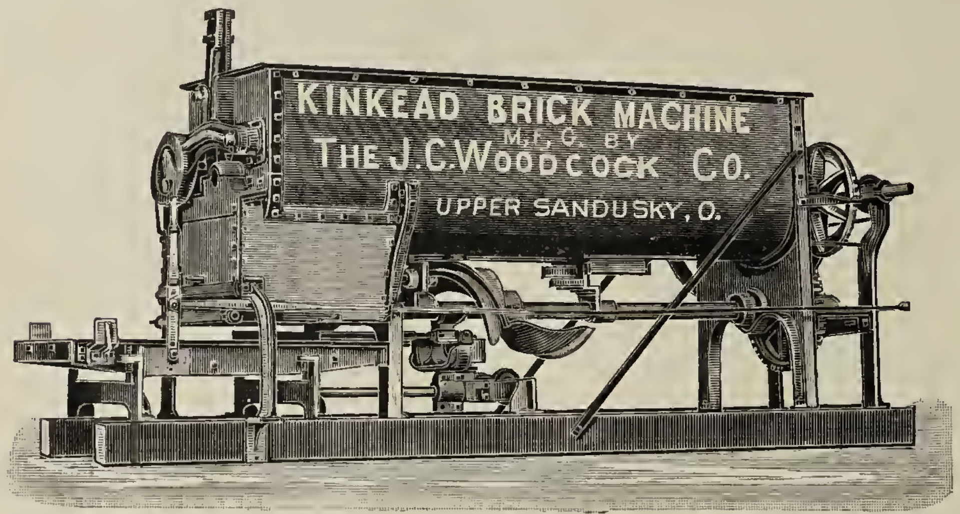

KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Rear View.

One that's Strong enough to withstand the severe strain of working stiff clay.

One that's Durable and will not only make good brick under favorable conditions but will make good brick under the varying conditions incident to brickyard work.

One that's Cheap because it is simple in construction and never breaks down or gets out of repairs but will turn out a desired quantity (30 to 50 M) every day, six days in the week is well nigh "worth its weight in gold." We offer it to you at a much lower price and also a line of excellent.


KINKEAD BRICK MACHINE
M.F.G. BY
THE J.C. WOODCOCK CO.
UPPER SANDUSKY, O.

Front View.

Brickyard Supplies:==

Brick Moulds, Trucks and Barrows, Elevators, Pug Mills, Etc.

All warranted to be first-class and on reasonable terms.

Dont fail to get our prices.

**The J. C.
WOODCOCK CO.,
Upper Sandusky, Ohio.**

"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

ZANESVILLE, OHIO, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. BURTON, Secretary and Treasurer.

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

248 Randolph St., CHICAGO, ILL.

PHILADELPHIA:
1219 Carpenter Street.

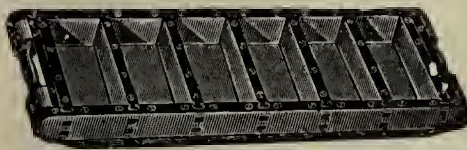
BOSTON:
120 Pearl Street.

ARNOLD'S BRICKYARD SUPPLIES.

••⊰They are the BEST that are Made.⊱••

3 Brick Hand Mold.

6 Brick Hand Mold


6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have the best. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

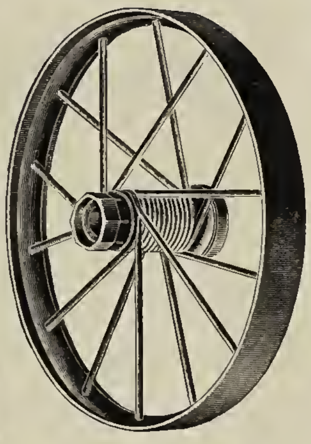
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.



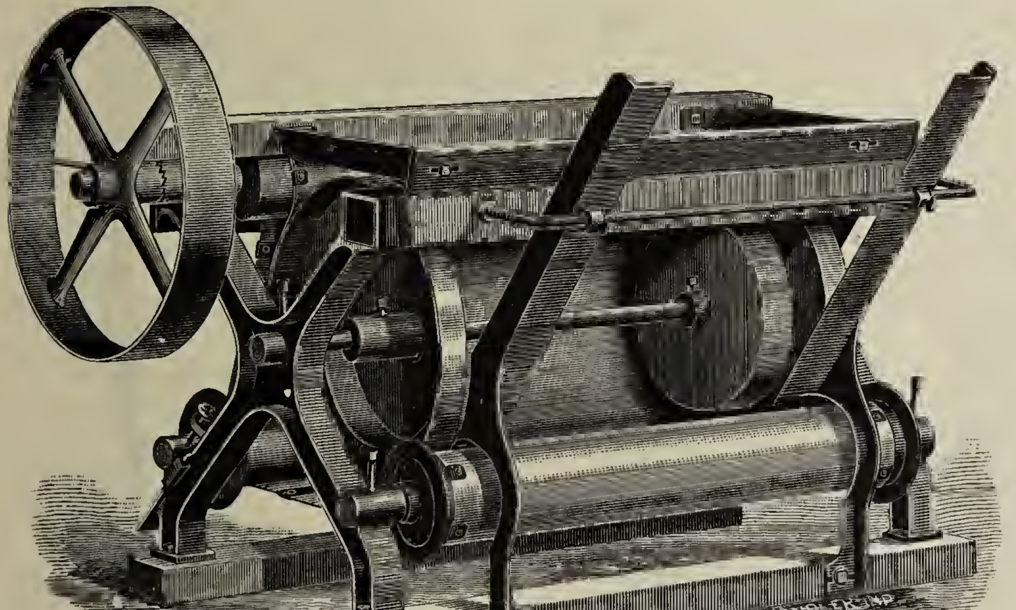
METAL WAGON WHEELS

MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The **strongest** wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced. Circular and prices sent on application. Address

The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

The Potts Mould Sander

No Chains nor Gear to Wear or Break.



No place for moulds to catch and cause delays.

Simple in construction, strong and durable.

Sands mould better than can be done by any other means, easily and quickly changed to suit any size mould.

Write for prices.

G. & A. POTTS & CO.,

420-428 West Washington Street, (See ad. on pages 395 and 409.) *INDIANAPOLIS, IND.*

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

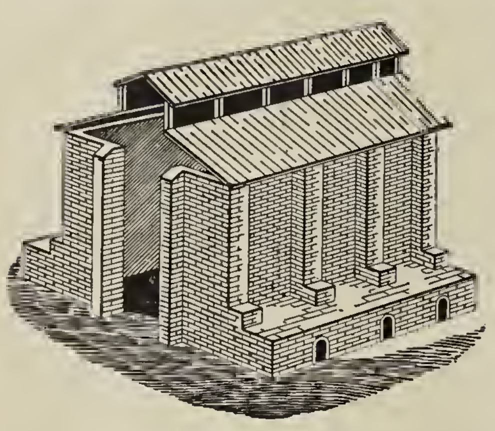
Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., ***Minneapolis, Minn.***

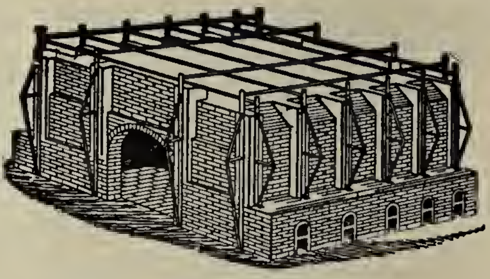
LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Up-Draft Kiln.



Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

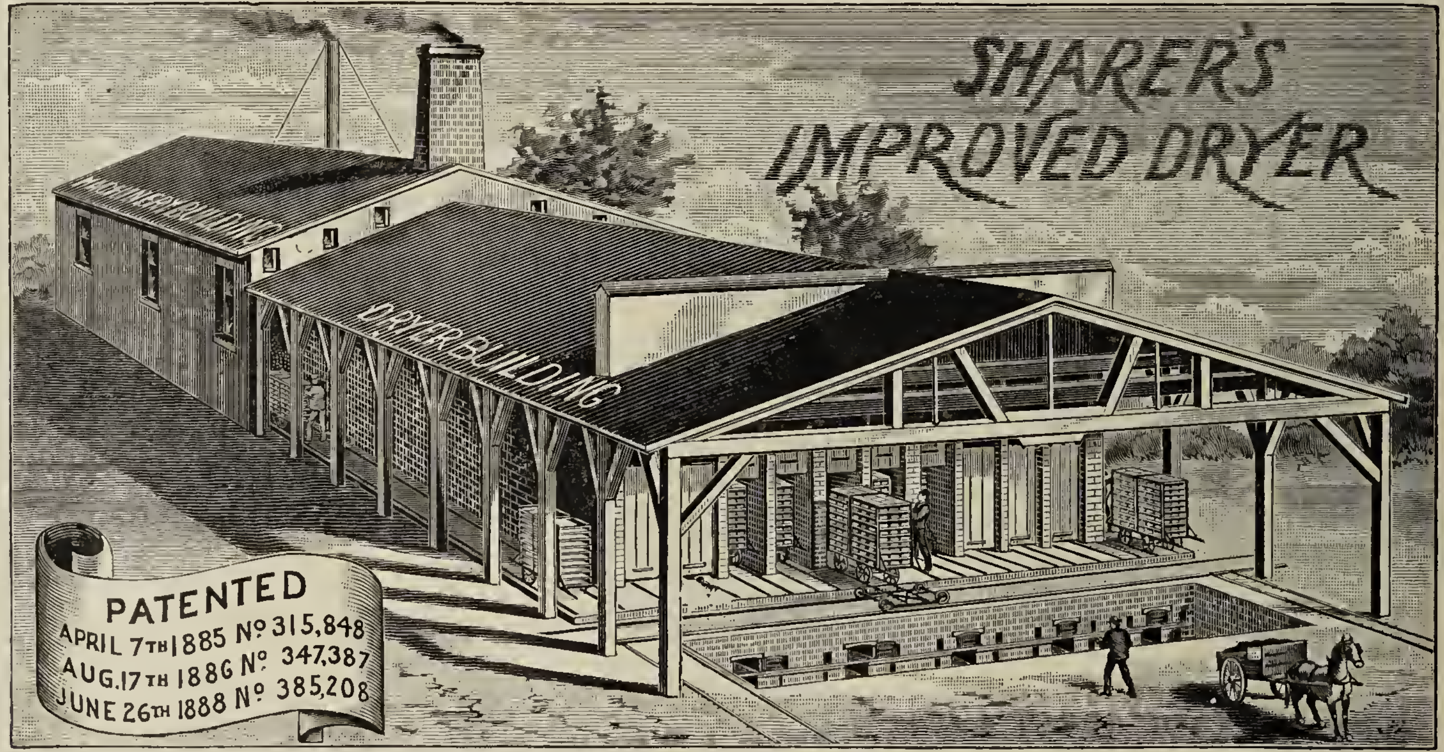
The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., ***Kansas City, Mo.***

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.


SHARER'S IMPROVED DRYER
DRYER BUILDING
PATENTED
APRIL 7TH 1885 Nº 315,848
AUG. 17TH 1886 Nº 347,387
JUNE 26TH 1888 Nº 385,208

COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address

GEO. W. SHARER, 2224 Tioga St., **Philadelphia, Pa.**

ALSIP'S LATEST IMPROVED Down and Up=draft Kiln.

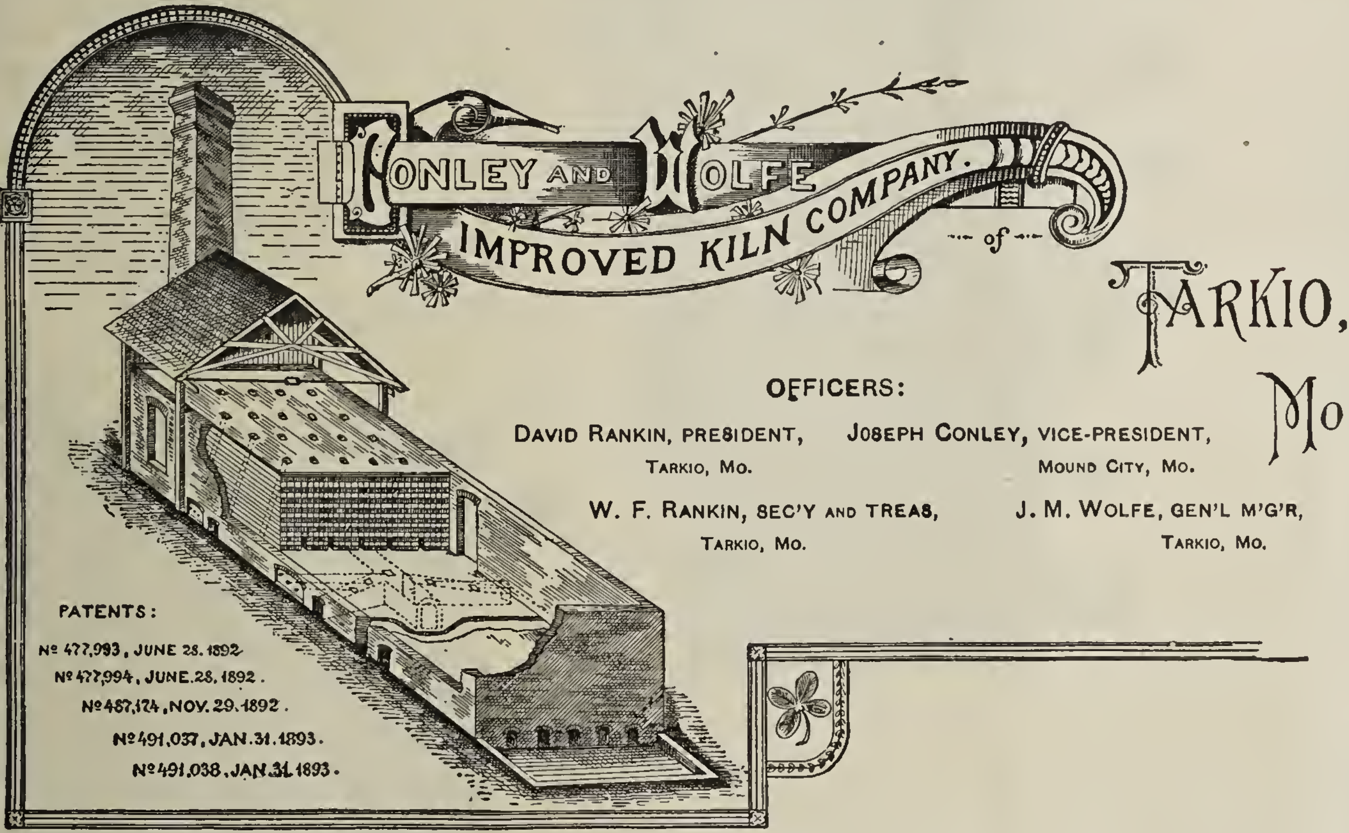
The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**


PATENTS:
№ 477,993, JUNE 28. 1892
№ 477,994, JUNE. 28. 1892.
№ 487,174, NOV. 29. 1892.
№ 491,037, JAN. 31. 1893.
№ 491,038, JAN. 31. 1893.

CONLEY AND WOLFE IMPROVED KILN COMPANY, of TARKIO, MO.

OFFICERS:

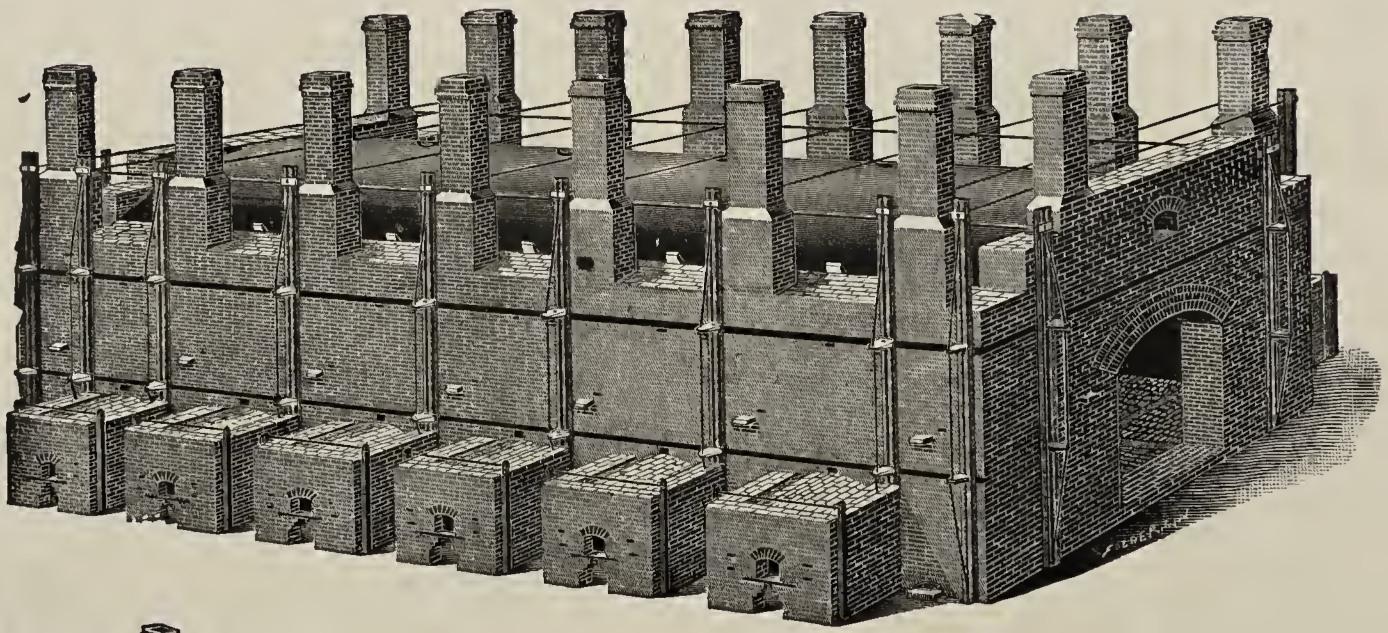
DAVID RANKIN, PRESIDENT, TARKIO, MO.
JOSEPH CONLEY, VICE-PRESIDENT, MOUND CITY, MO.
W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.
J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

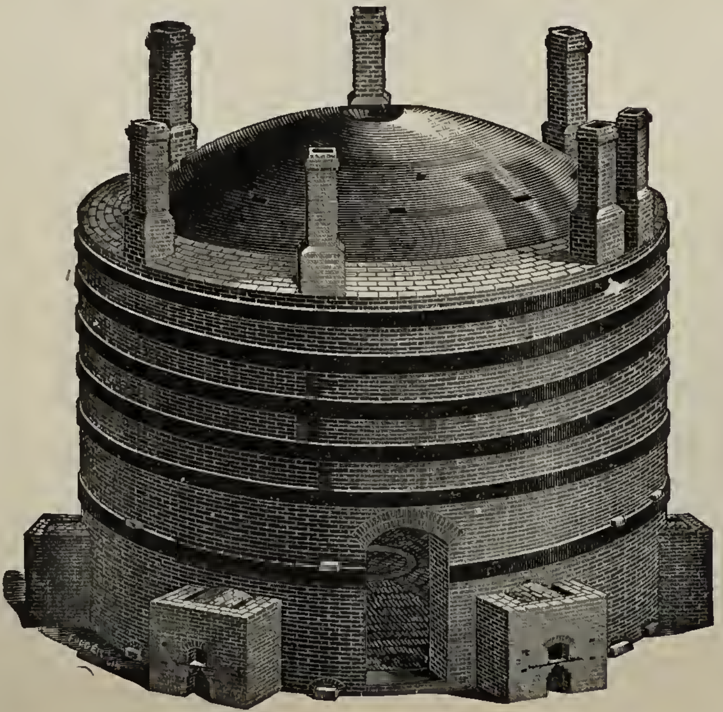
THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION. . .

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy** in **cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, **Cincinnati, Ohio.**

Any Draft So Its Up-Draft.

WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost.

Manufacturers of Building Brick can get nothing better.

For all information desired address

R. B. MORRISON & CO.,
P. O. Box 335,
Rome, Ga., U. S. A.

PROPRIETORS
Morrison's Latest Improved Kilns.

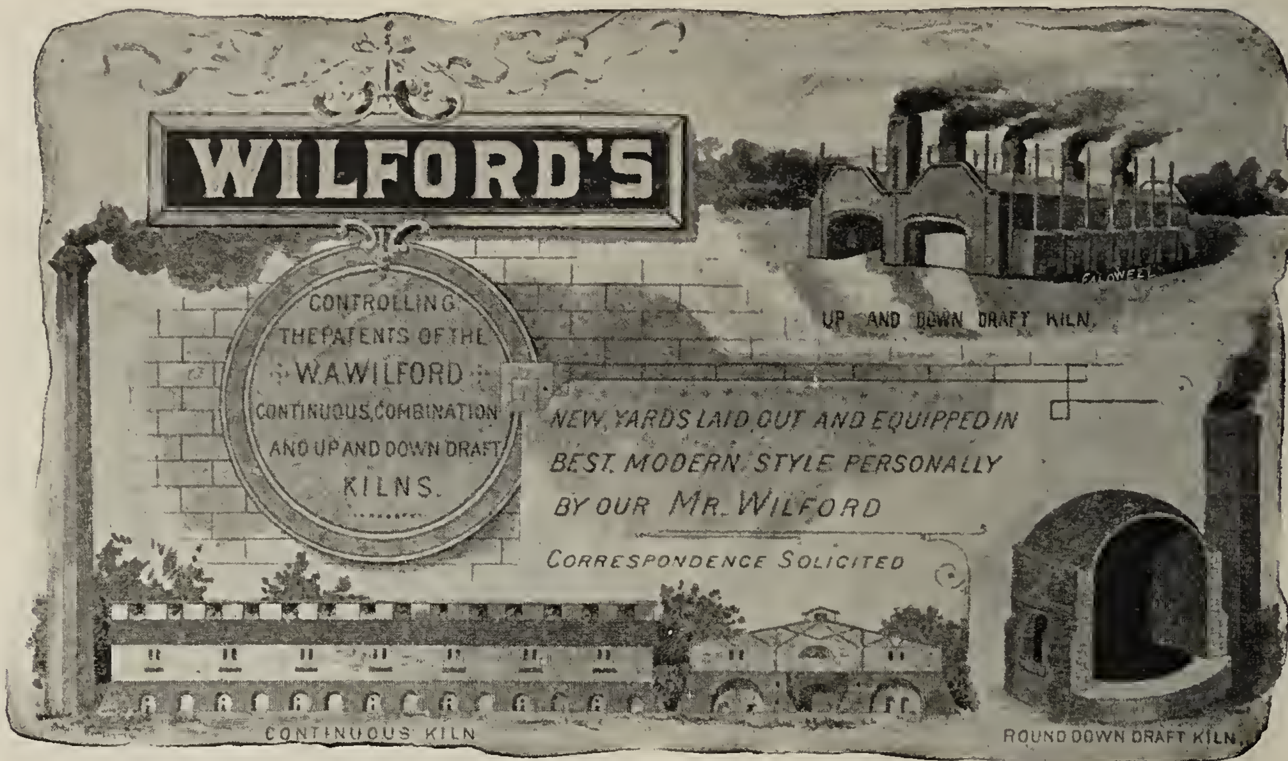
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS,COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

HON. A. DESJARDINS, PRESIDENT. JOS. BARSALON, VICE-PRES. HUBERT DESJARDIN, MAN. DIRECTOR. N. T. GAGNON, SECRETARY.

MONTREAL TERRA COTTA LUMBER CO.
LIMITED.
Maisonneuve, P. Q.
Office, 86 *St. Peter Street, Montreal.*

MONTREAL, July 12th, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—In answer to yours of the 1st inst., we are thoroughly satisfied with the kiln you built for us. We find we have better burnt material than we ever had before. Your system of kilns we consider as near perfect as one can expect. Our ware is all burnt alike from top to bottom. We have burnt it many times round, and the more we use it the better we like it. Shall be glad to answer any enquiry from anyone interested in your kilns, as you deserve success. Your very truly,

N. T GAGNON, *Secretary.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are Yours truly,

TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are, Yours truly,

TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying. Your well wishers,

J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and* 2 *Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly, BRUSH BROS.

Let us give you full Particulars.

The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ELMIRA, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

Price, $85.

Outing
BICYCLES.

Price, $85.

NONE BETTER AT ANY PRICE.

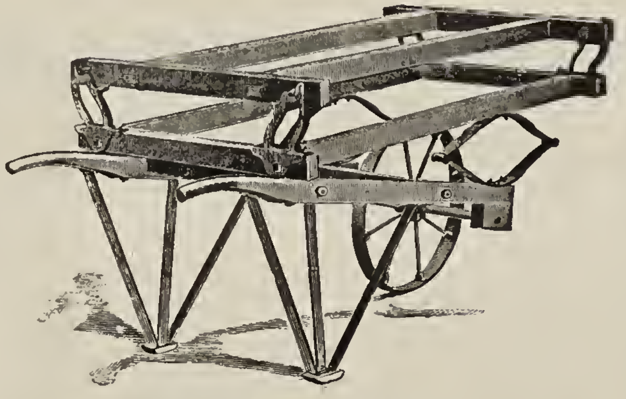
We refer by permission to the entire staff of the "CLAY-WORKER" they all ride Outing Bicycles.

In elegance of finish and fine workmanship Outing Bicycles easily distance all others.

Good Agents Wanted. Send for Catalogue.

HAY & WILLITS M'F'G. CO.

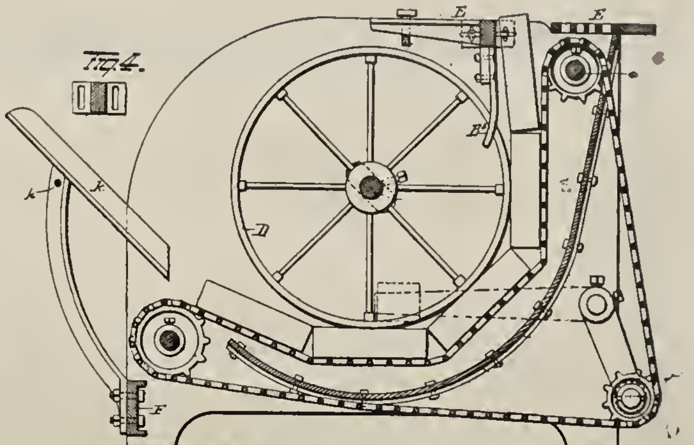
76 North Pennsylvania St., = = = INDIANAPOLIS, IND.



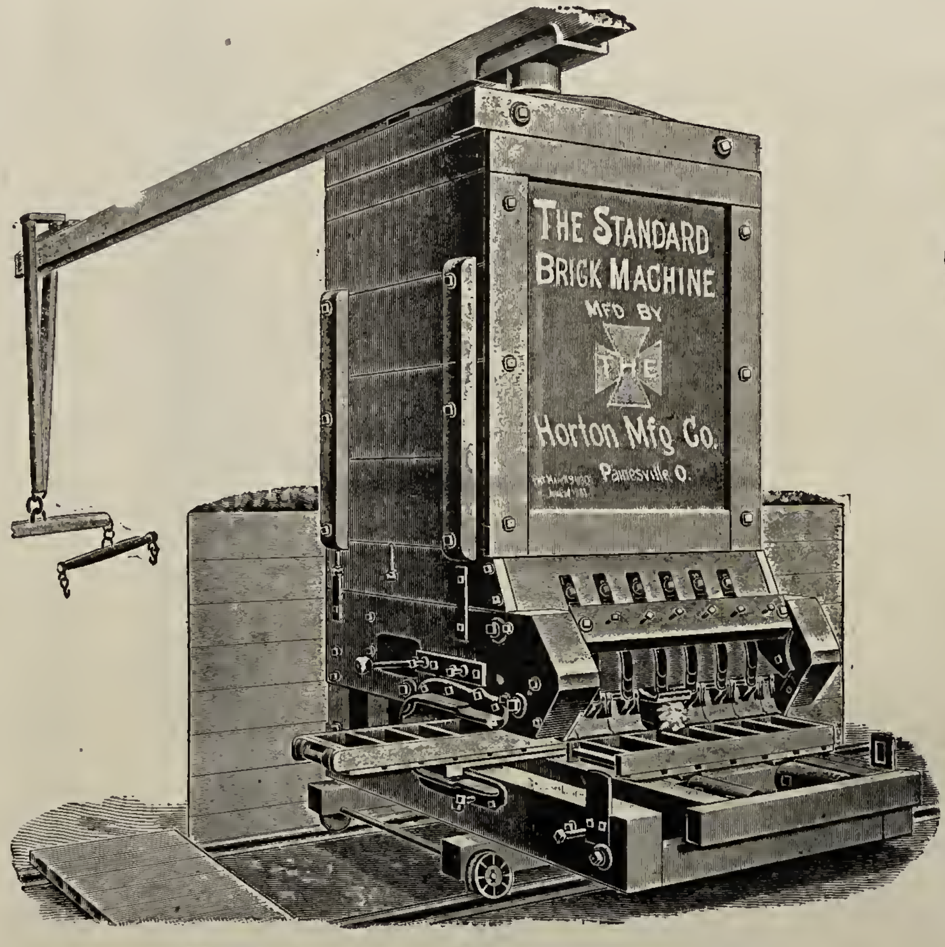
Double Deck Truck.

PRICE and QUALITY

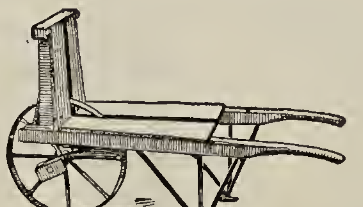
WILL TELL.



Cut Showing Position of Molds in Sander.
No Expensive Belts to Wear Out.



The Standard Brick Machine. (Horse Power.)



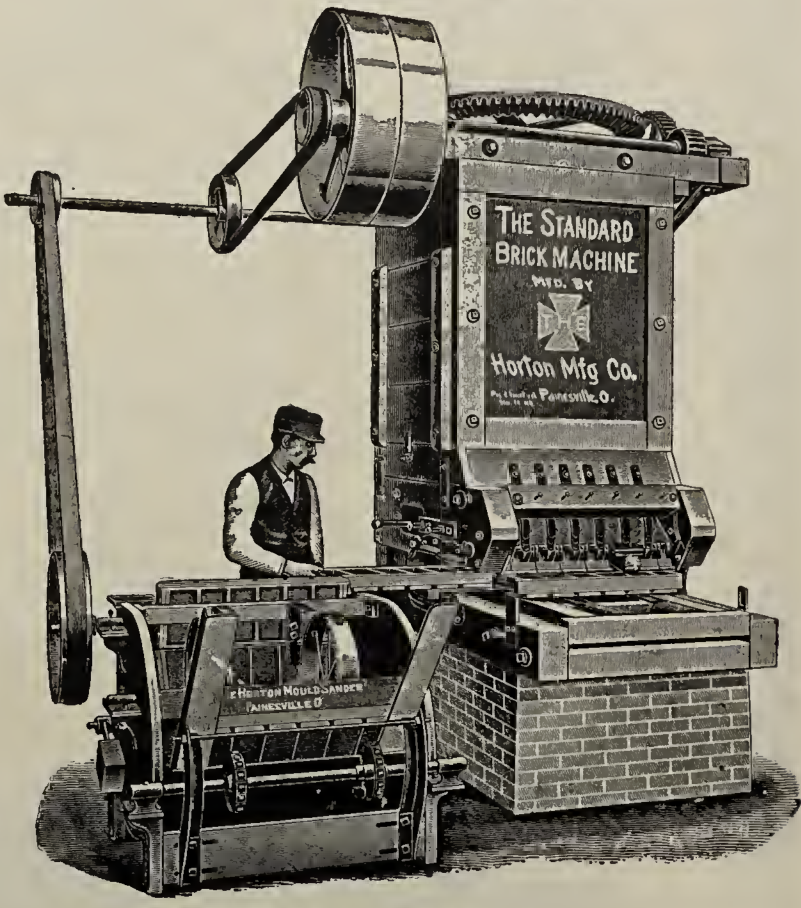
DISINTEGRATORS,
PUG MILLS,
REPRESSES,
CONVEYORS,
ENGINE and
BOILERS.

FOR SALE—CHEAP.

One 10 H. P. second-hand hoisting engine and boiler.

One 30 H. P. second-hand engine and boiler. This is in good shape.

3,000 Hacking pallets (second-hand).



The Standard Brick Machine. (Steam Power.)

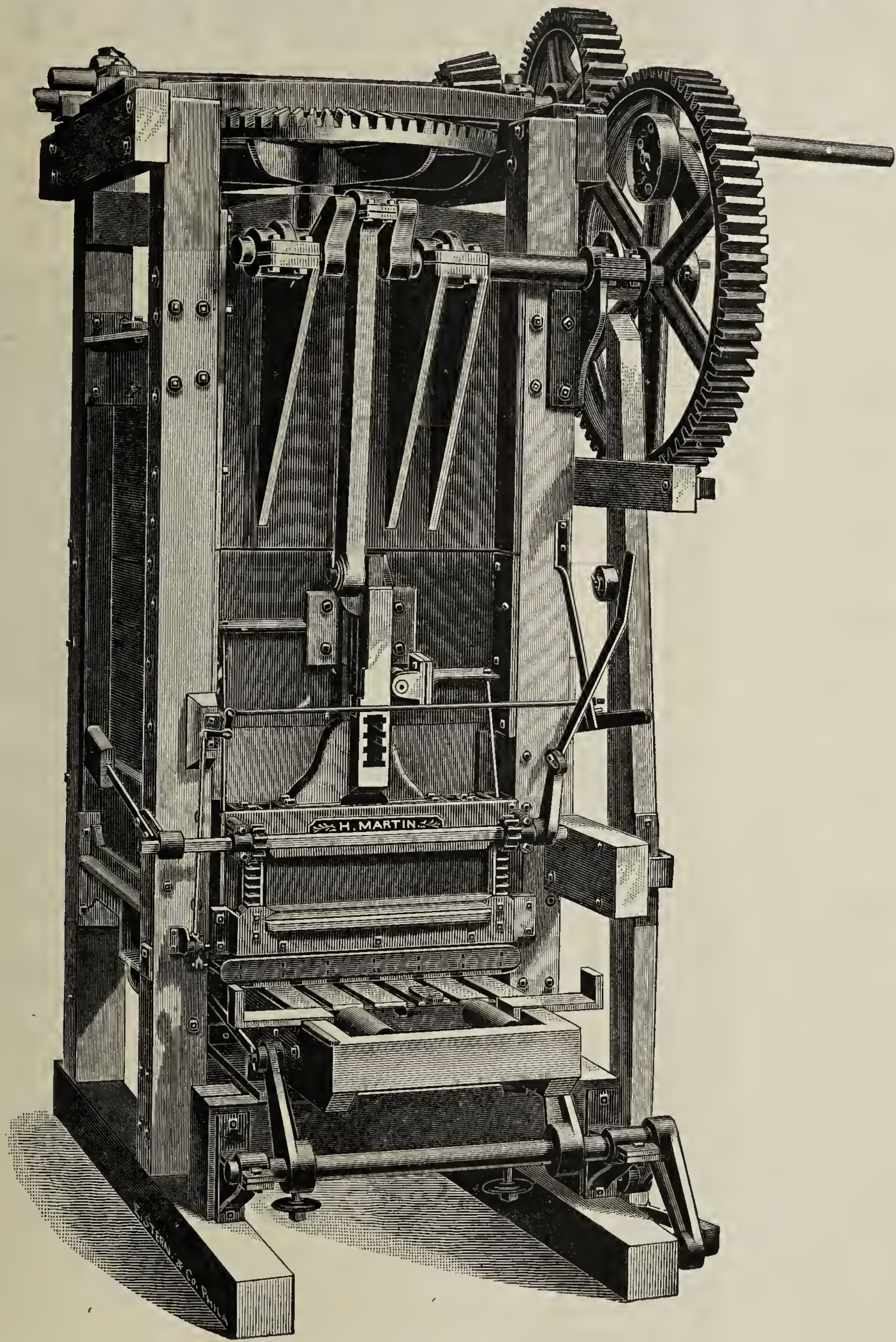
The HORTON MANUFACTURING CO., = Painesville, Ohio.

Inquire at the Largest and
Best Know Brick Plants using **The "Martin"**

And they Will Tell You Why

It Stands at the Head of Soft Mud Brick Machines.

ESTIMATES CHEERFULLY FURNISHED.



WE KEEP EVERYTHING REQUIRED ON A BRICKYARD.

MARTIN'S LETTER "A."

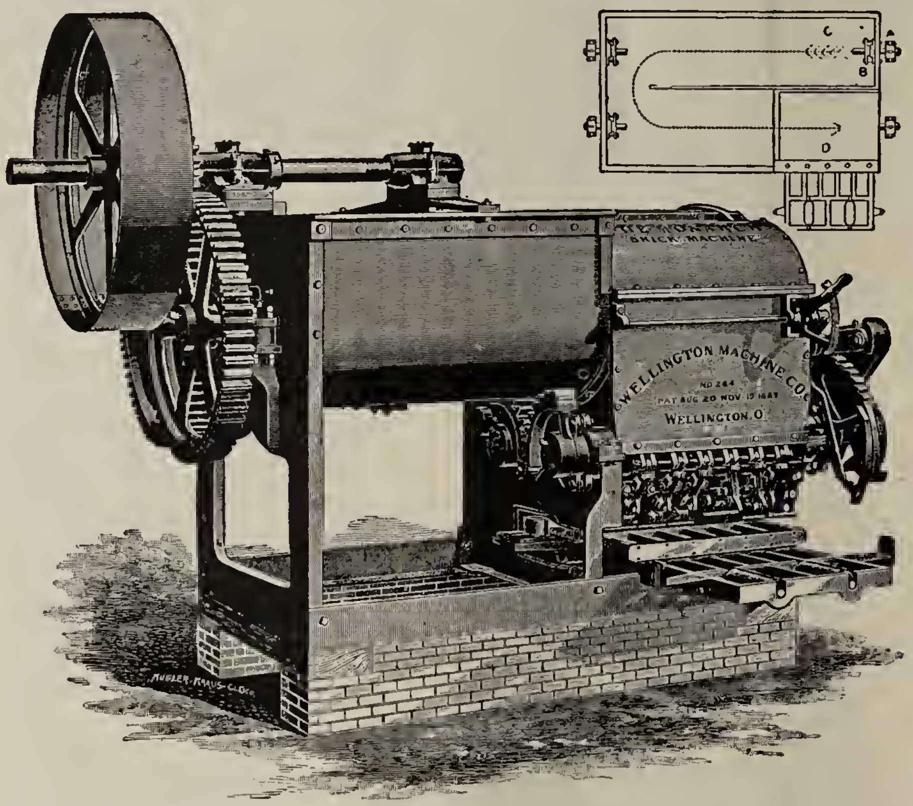
The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

LANCASTER, PENN.

It's Different,

The "Monarch" is

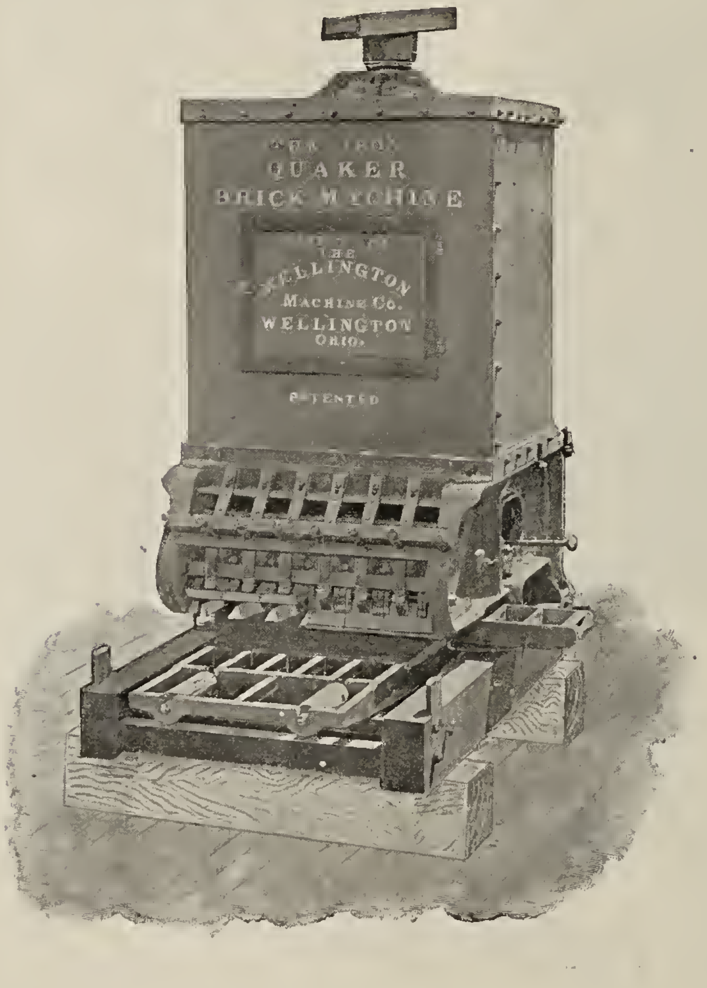

BRICK MACHINE
WELLINGTON MACHINE CO.
NO 264
WELLINGTON, O.

—From any other Brick Machine, and there are reasons for it. Sixty users (see last three months of the CLAY-WORKER) say they **are good Reasons.**

You don't want to buy a machine until you know all there is to be learned on the subject. So if you do not **Realize the Great Difference** between this machine and others, our circular gives full particulars.

* * *

THE DIFFERENCE IS NOT ONLY IN CONSTRUCTION, BUT IN RESULTS ALSO.



* * *

FOR SMALLER YARDS OUR

"Iron Quaker"

Is the Lowest Priced Good Machine.

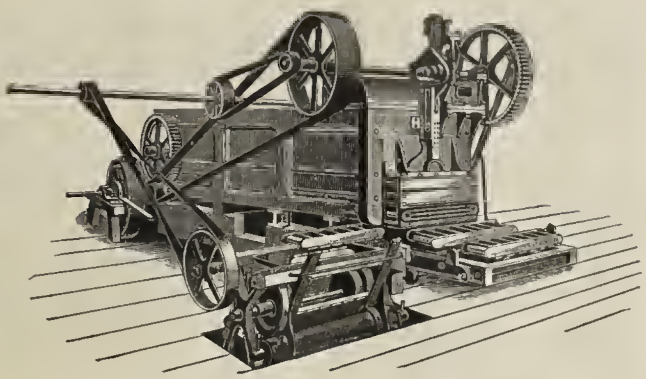
In our circular you will find a partial list (several hundred in it at that) of places where our "**Quaker" Machines** are used.

The "**Iron Quaker**" is still an improvement over the other styles we have made.

**The Wellington
Machine Company,**

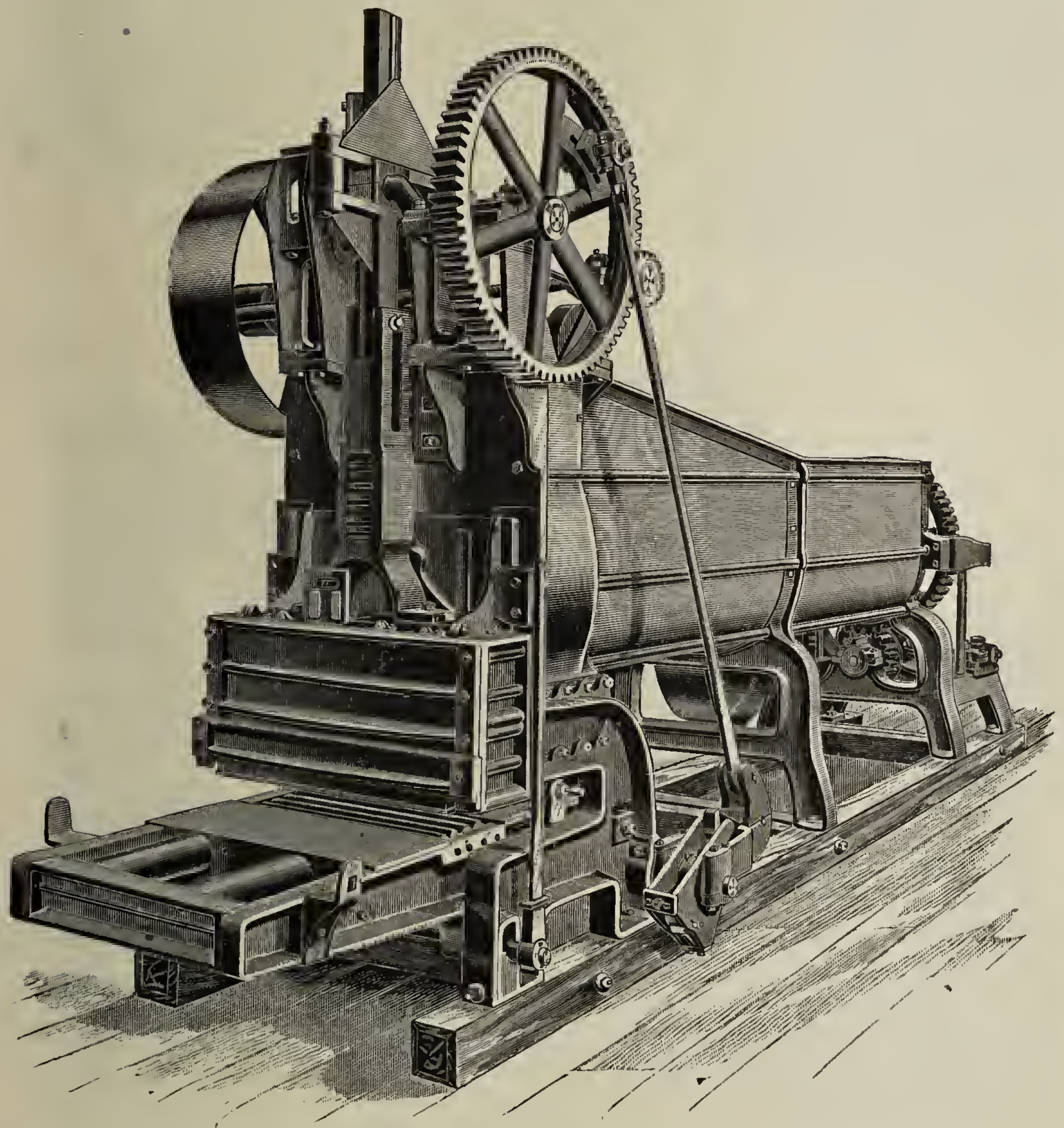
WELLINGTON, OHIO.

THE POTTS



Horizontal Stock Brick Machines

ARE RECORD BREAKERS.



Simple in

CONSTRUCTION,
STRONG and
DURABLE.

For quantity and quality of Brick made they have no equal.

• • •

Made in two styles, either all Iron, or Wood Pug Mills.

They are the cheapest, all things taken in consideration.

We manufacture everything used on the brickyard. **Moulds, Trucks, Barrows, Kiln Castings, Elevators, Pulleys and Shafting.** Write for prices. You will find them low.

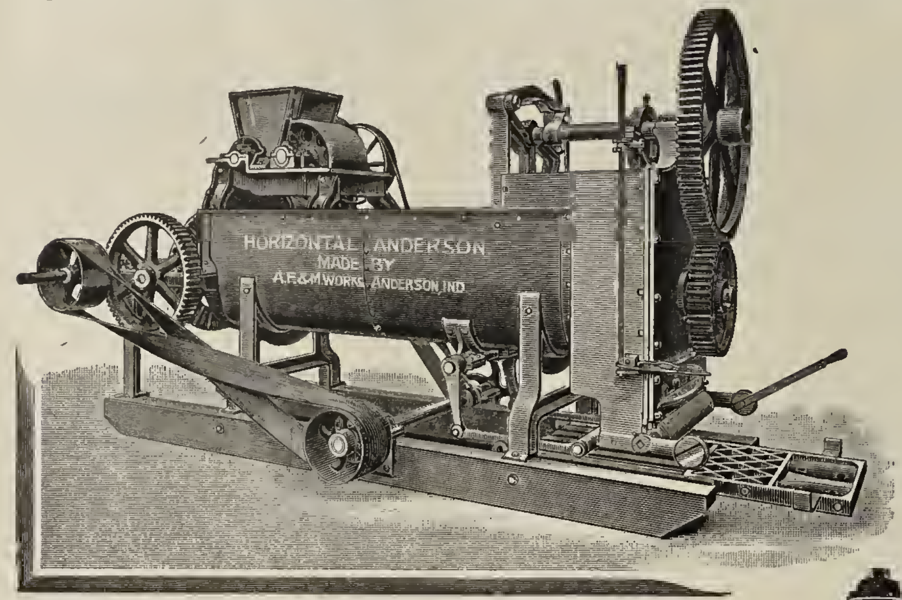
C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND

A New Departure in Brick Machinery

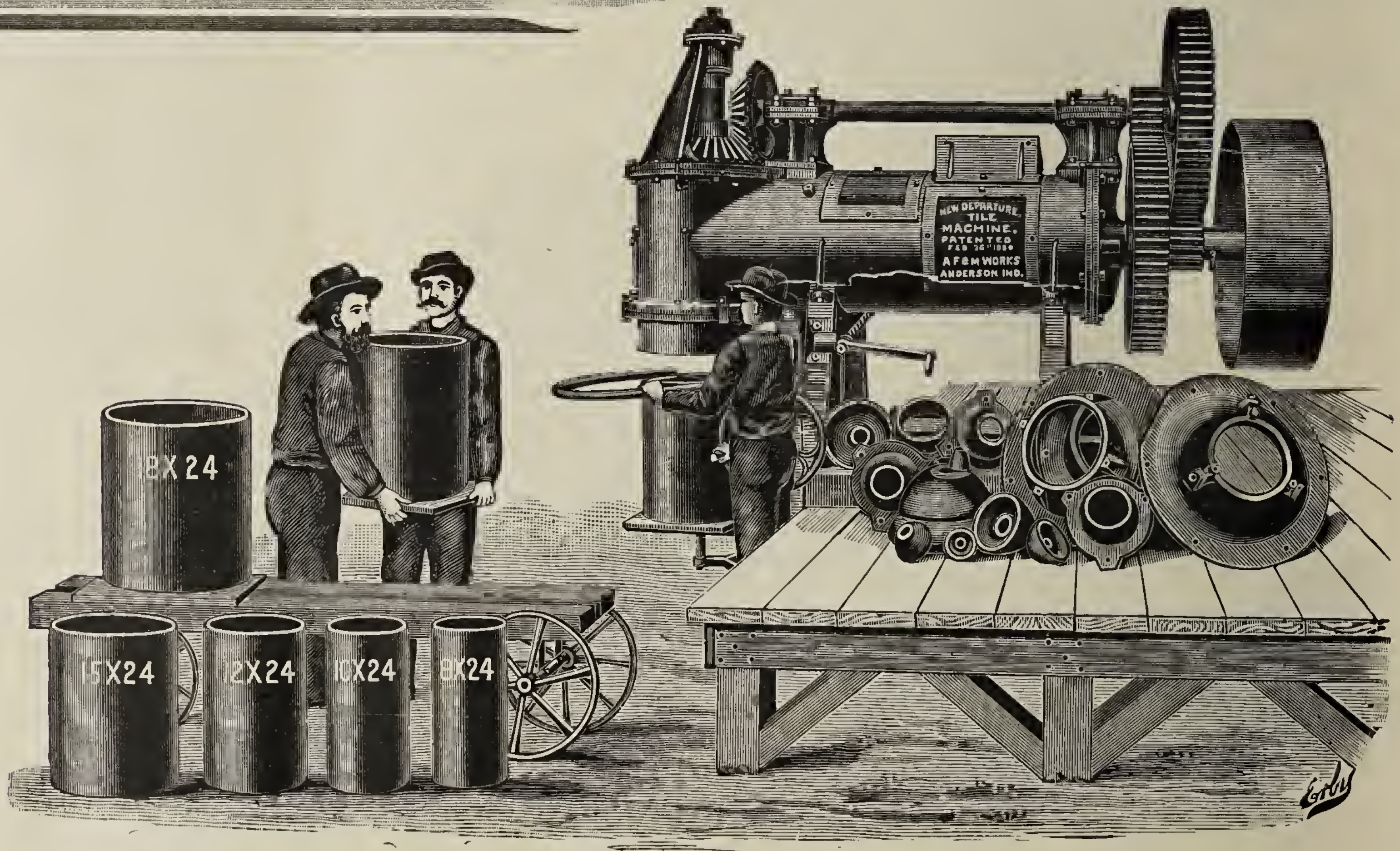
THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.



This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.

◆

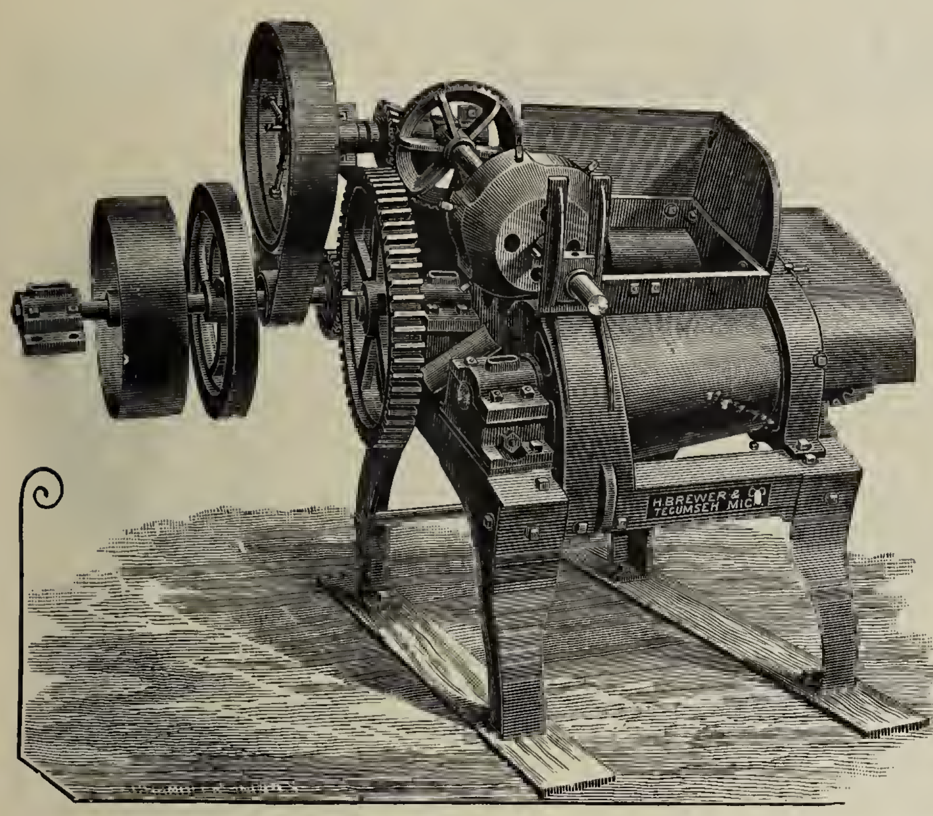


THE GREATEST ON EARTH.

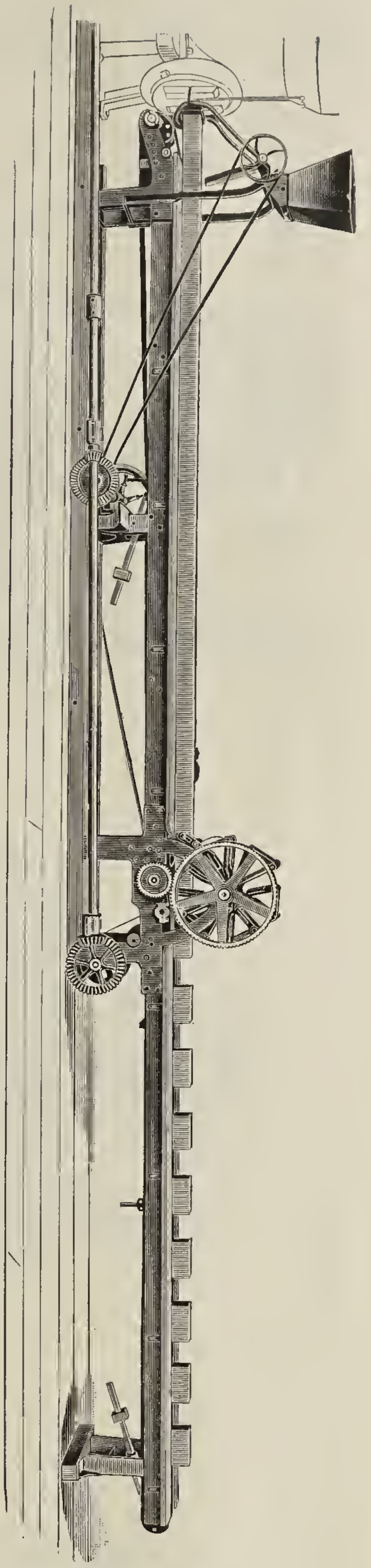
We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.

DOWN DELIVERY FOR LARGE TILE. SIDE DELIVERY FOR SMALL TILE.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.



STONE EXTRACTING CLAY CRUSHER.

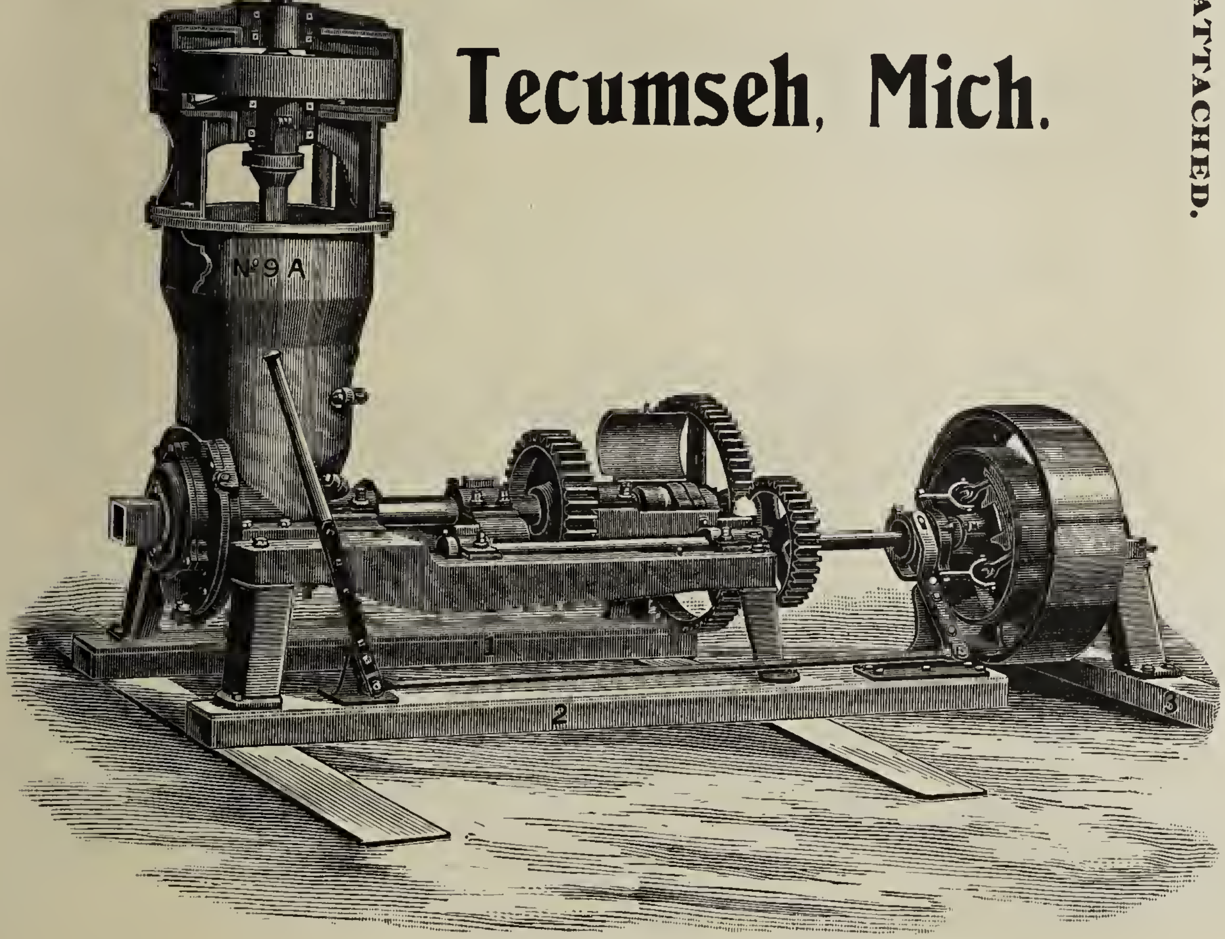


AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

Manufactured by

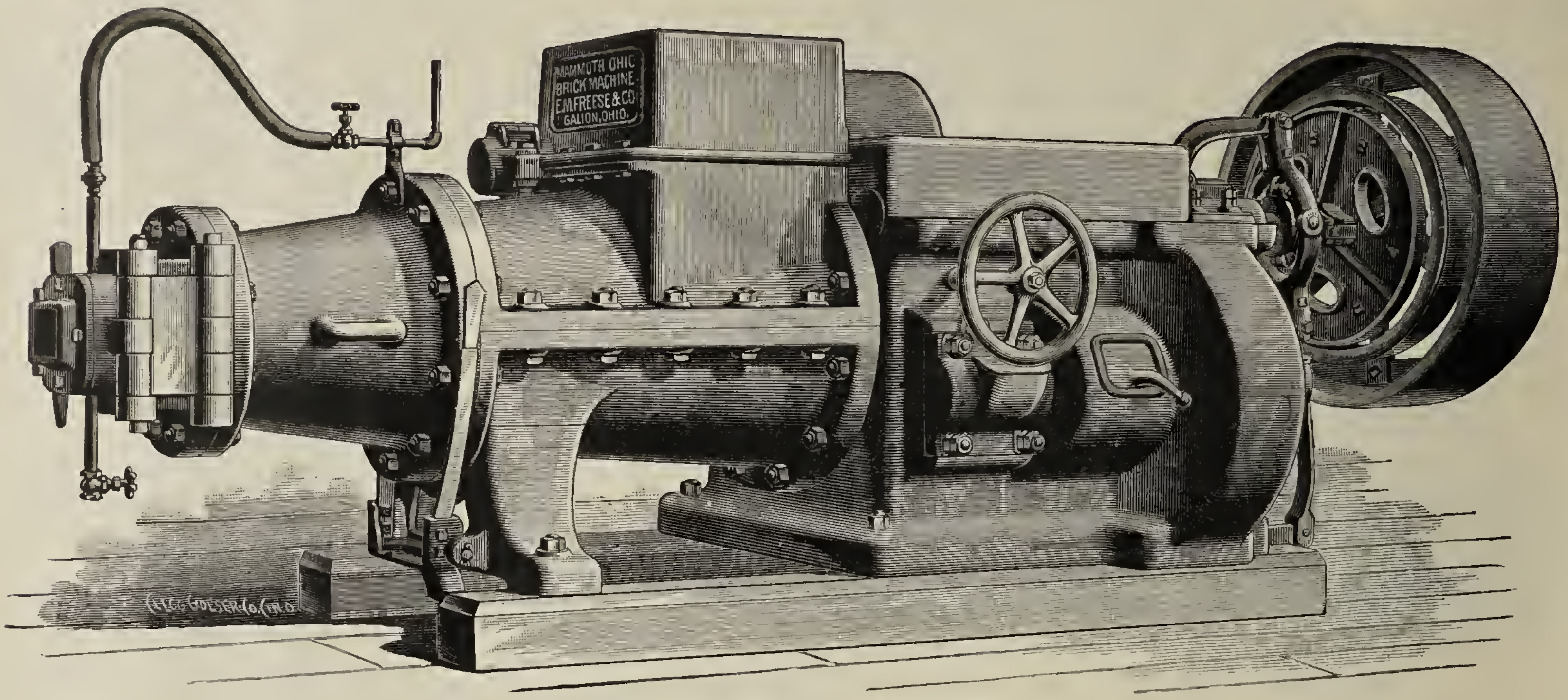
H. Brewer & Co.,

Tecumseh, Mich.

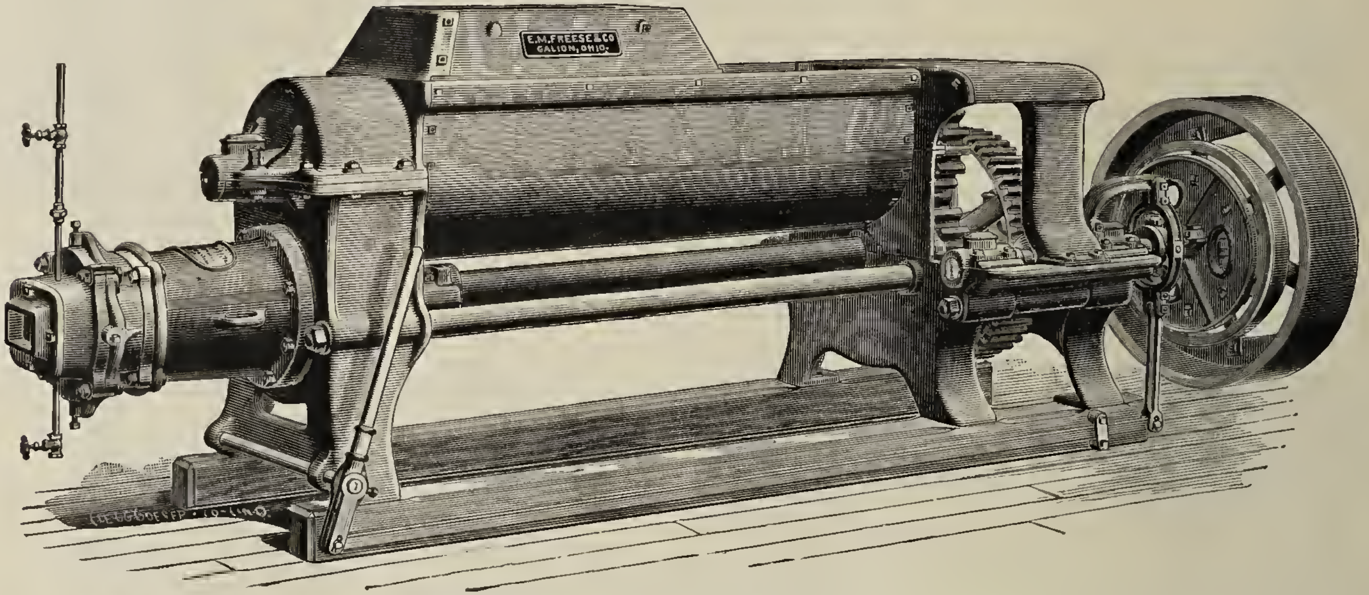


No. 9 "A" BRICK MACHINE.

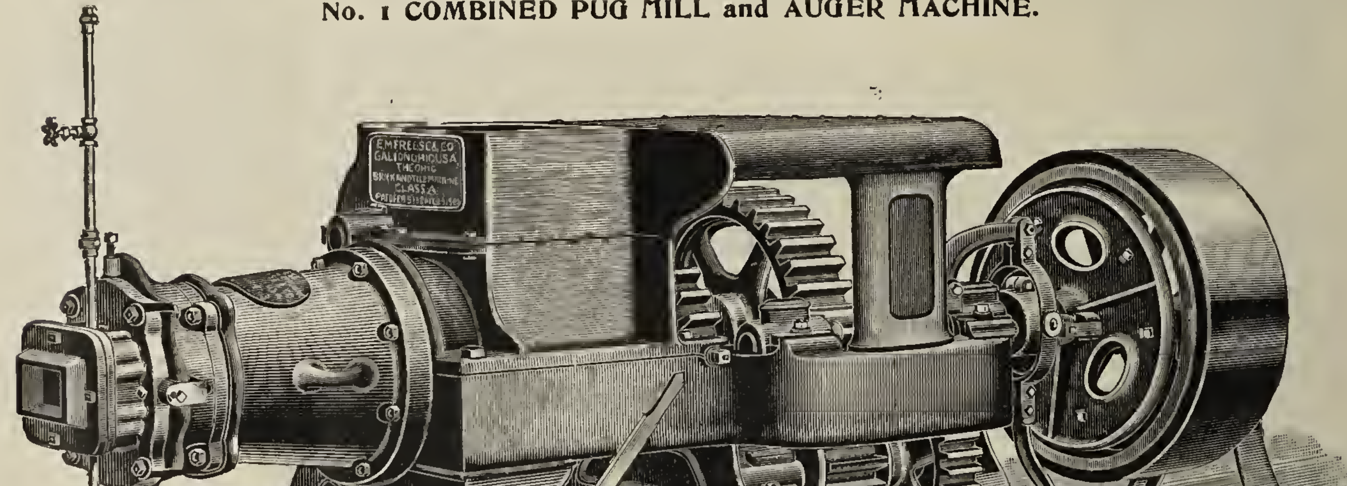
E. M. FREESE & CO., GALION, OHIO.


MAMMOTH OHIO
BRICK MACHINE
E.M.FREESE & CO.
GALION, OHIO.

MAMMOTH BRICK MACHINE.



No. 1 COMBINED PUG MILL and AUGER MACHINE.



IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.

For Profitable Brickmaking,

IT IS just as important to have the plant properly planned as to have a competent architect for a house or a business block.

Convenient, systematic arrangement of the plant or the lack of such an arrangement will do much to determine whether the ware can be made profitably or not, and hence, whether the enterprise will prove a failure or a success.

The general arrangement of the works should be settled by one who is entirely familiar with modern brickyard requirements and with the best method of meeting those requirements, having due regard for convenience and saving of time and labor.

The equipment of machinery, as well as the system of drying and burning, should be determined not by first cost, alone, but by design, construction and performance, and by capability for securing the desired results with greatest economy in cost of operation.

The result will then be a well planned and properly equipped plant, labor-and-fuel-saving, convenient and effective, and fully adequate for the purposes for which it is designed.

In This Connection,

May we not present some of the reasons why we should have your patronage?

We not only manufacture Modern Clayworking Machinery, but are also Practical Clayworkers, Consulting Engineers, and Designers and Equippers of Complete Brickmaking Plants, including drying and burning systems.

Our experience covers a period of nearly forty years; our extensive factories are fully manned and equipped; our line of clayworking machinery is conceded to be the most comprehensive and complete on the market. We can furnish the right kind of machinery for any material suitable for brickmaking purposes.

Having the necessary experience, facilities and varieties of patterns at our disposal, we can make a proper selection for any condition of circumstances, designing and equipping complete plants with the best outfit obtainable, and at a fair and and reasonable price.

Think It Over.

There are advantages in dealing with a large concern, having the necessary experience and facilities to intelligently design and erect complete, convenient, labor-and-fuel-saving plants, selecting the machinery and drying system best suited to the requirements of the clay, as well as the proper kilns in which to economically burn the wares; instead of relying on the judgment of parties entirely unfamiliar with modern brickyard methods, or being guided by the advice of inexperienced agents, or those representing concerns with comparatively little knowledge of the business, or with but a limited line of machinery and appliances from which to make a selection.

WE KNOW HOW.

WE HAVE THE FACILITIES.

WE GUARANTEE RESULTS.

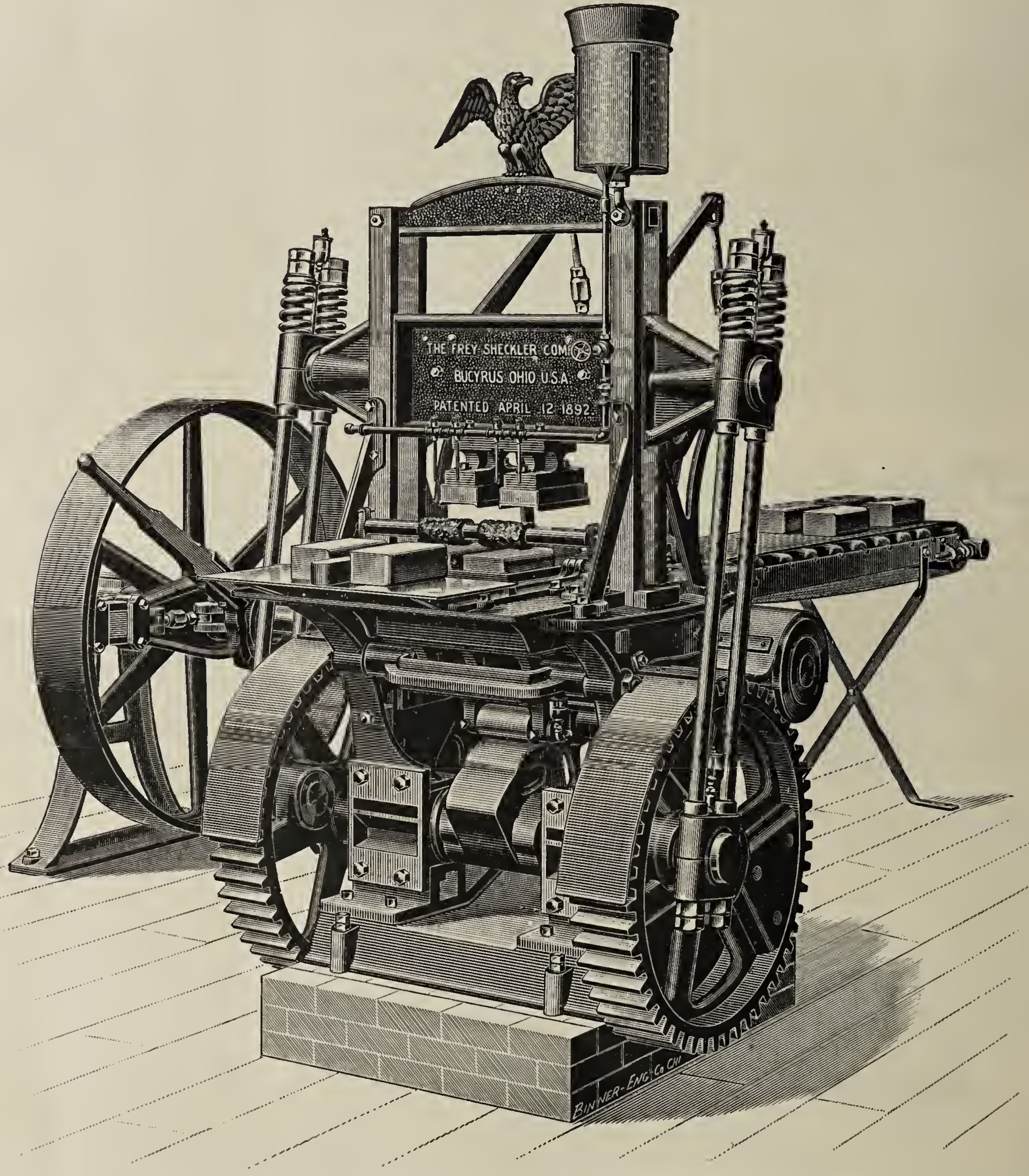
Let us Hear From You.

J. W. PENFIELD & SON,

WILLOUGHBY, OHIO.

Purington HAS TRIED AND APPROVED

The Eagle Repress.



At Galesburg, Ill., The Purington Paving Brick Company worked the **EAGLE REPRESS** side by side with a Repress built by one of our neighbors. After constant trial for more than three months, please listen to what Mr. Purington says concerning it:

> "We are very much pleased with the Press, and have never as yet spent one cent on it since it was put in. Please ship the three Represses ordered from you."

Such encouraging words of approbation from one of the largest, most reputable and capable brick manufacturers in the world is a prize worth working for, and proves the standard quality of our Repress.

It will last four times as long as any other Repress, and will not cost one-tenth as much for repairs.

THE FREY=SHECKLER CO., = Bucyrus, Ohio, U. S. A.

Manufacturers of Clayworking Machinery, and Builders of the Bucyrus Steam Tunnel Dryer.

BRICK MACHINERY FOR 1896.

Write for
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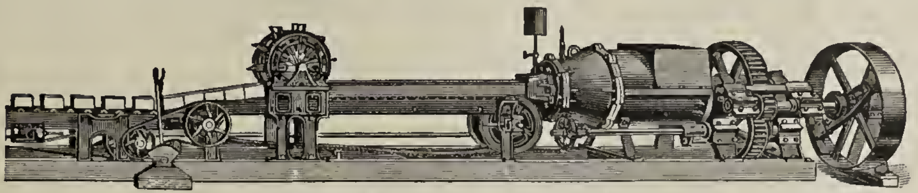
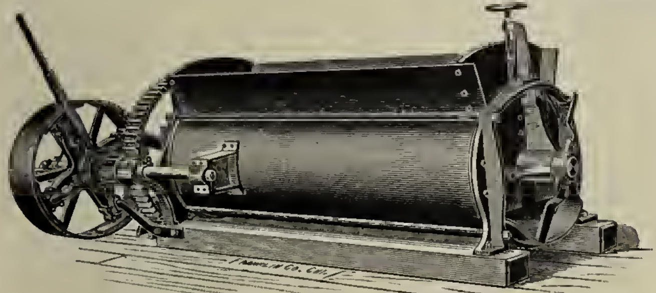
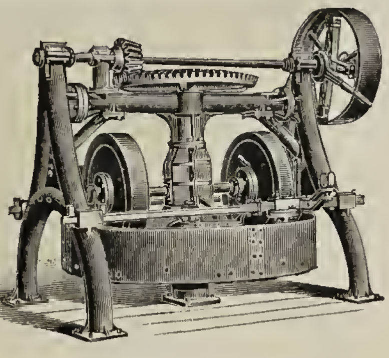


Before Buying
Write for our Prices.

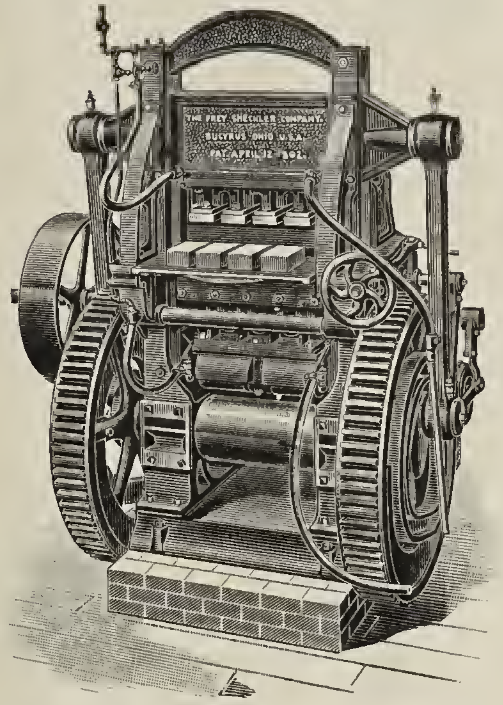
No. 1 Giant Machine and Automatic End Cut Table.



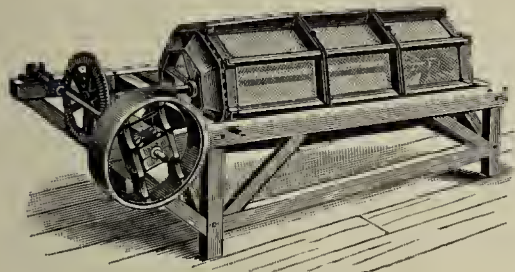
Pug Mills and Granulators.



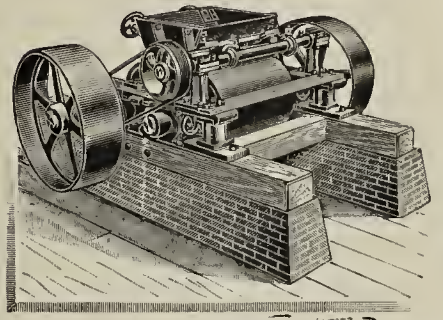
Dry and Wet Pans.



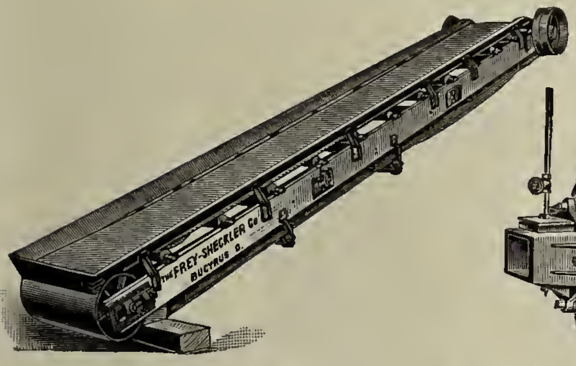
4-Mould Semi-Plastic Brick Press.



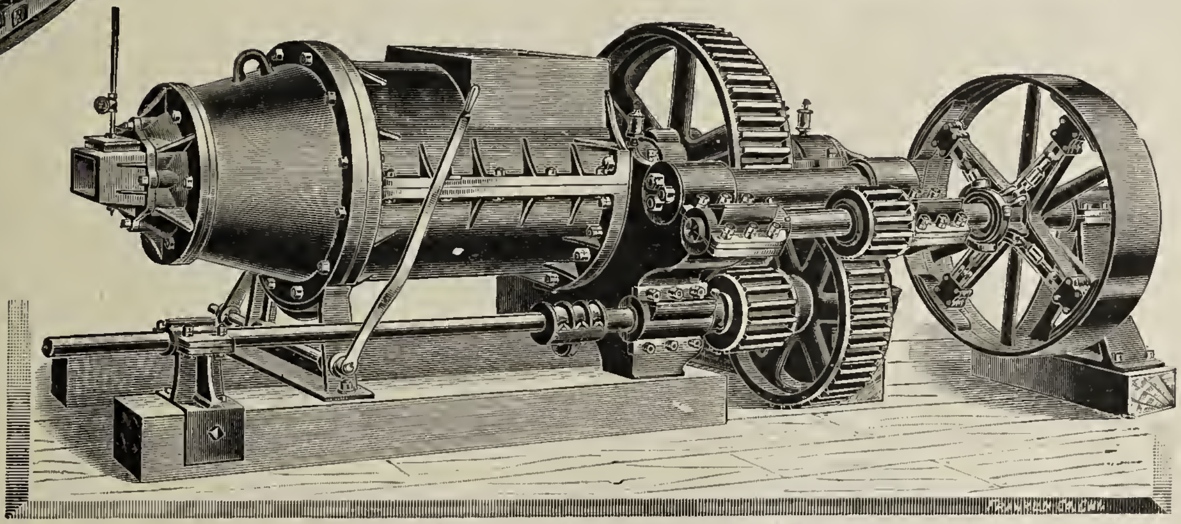
Clay Screens.



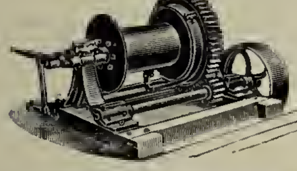
Crushers.



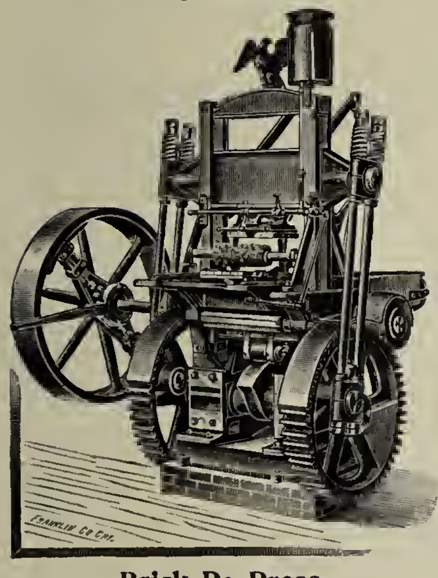
Clay Conveyors.



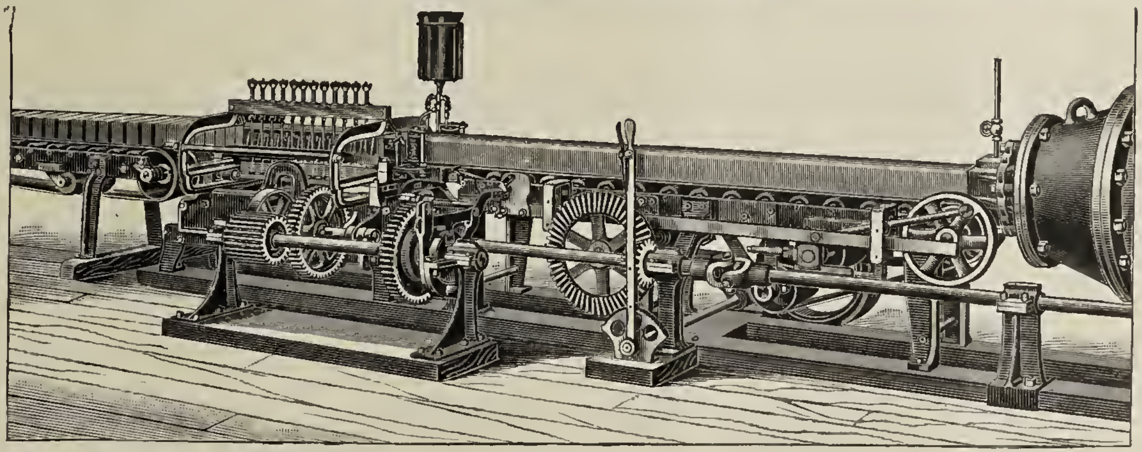
Special Bucyrus Giant Brick Machine.



Winding Drums.



Brick Re-Press.



Bucyrus Automatic Table for Side Cut Brick.

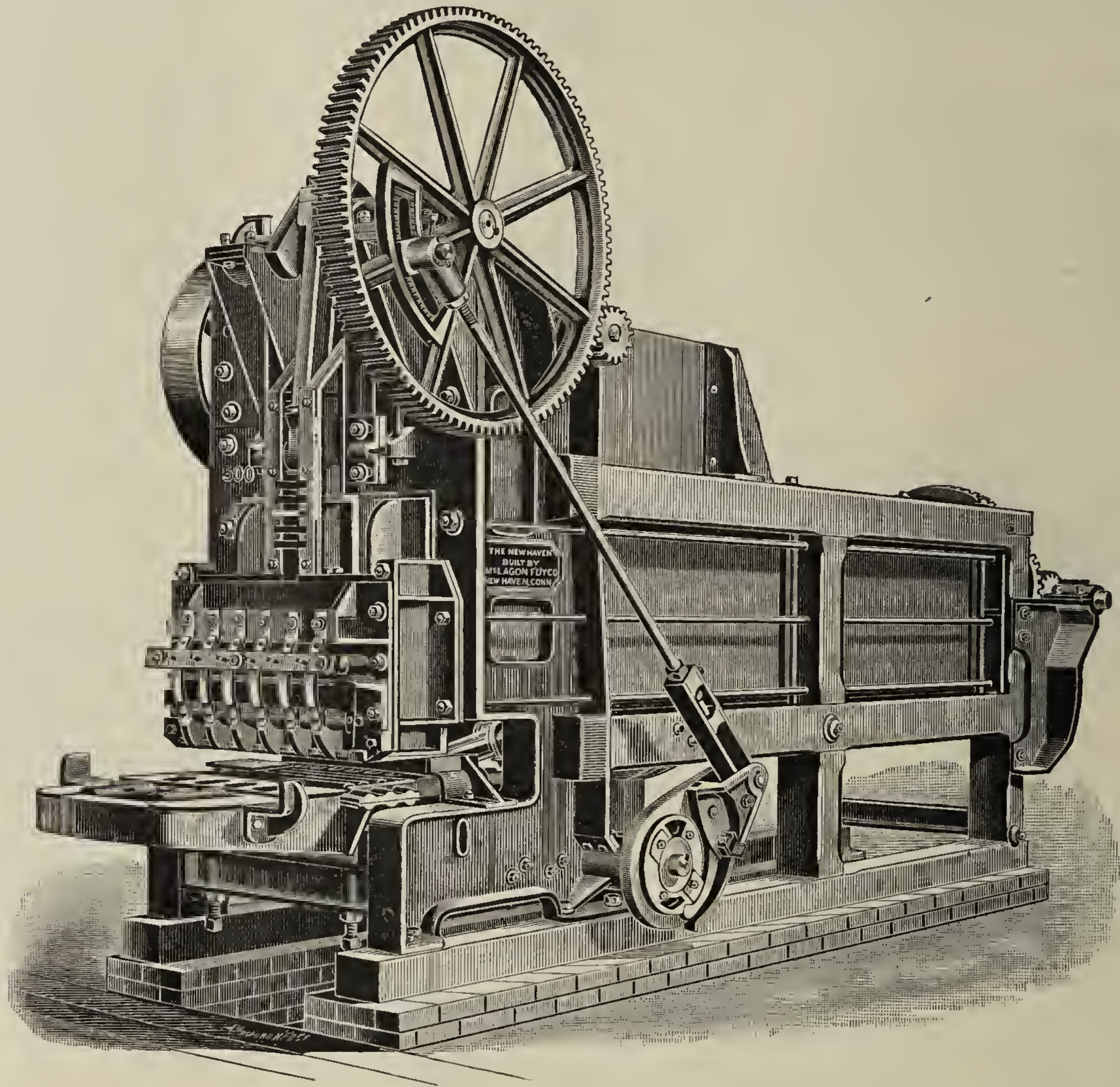
The Frey-Sheckler Co., BUCYRUS,
OHIO, U. S. A.

Up to This Time,

No Owner of a "New Haven" has Failed.

Up to This Time,

No "New Haven" Machine Has Failed to Give Satisfaction.



This machine weighs almost **Nine Tons.**

All parts finished with special tools and are interchangeable.

The usual output about 45,000 per day.

The Eastern Machinery Co.,

NEW HAVEN, CONN.

WONDER MACHINERY,

For Brick and Tile.

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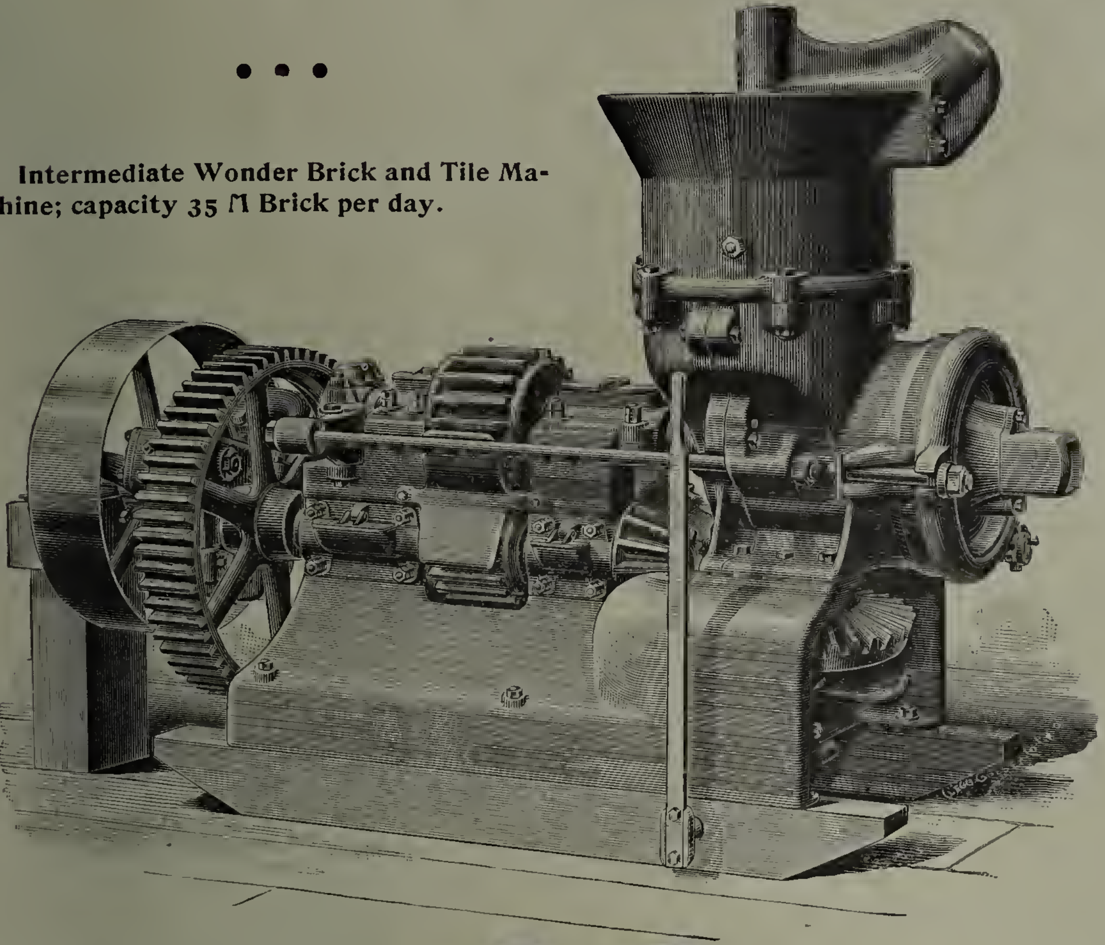
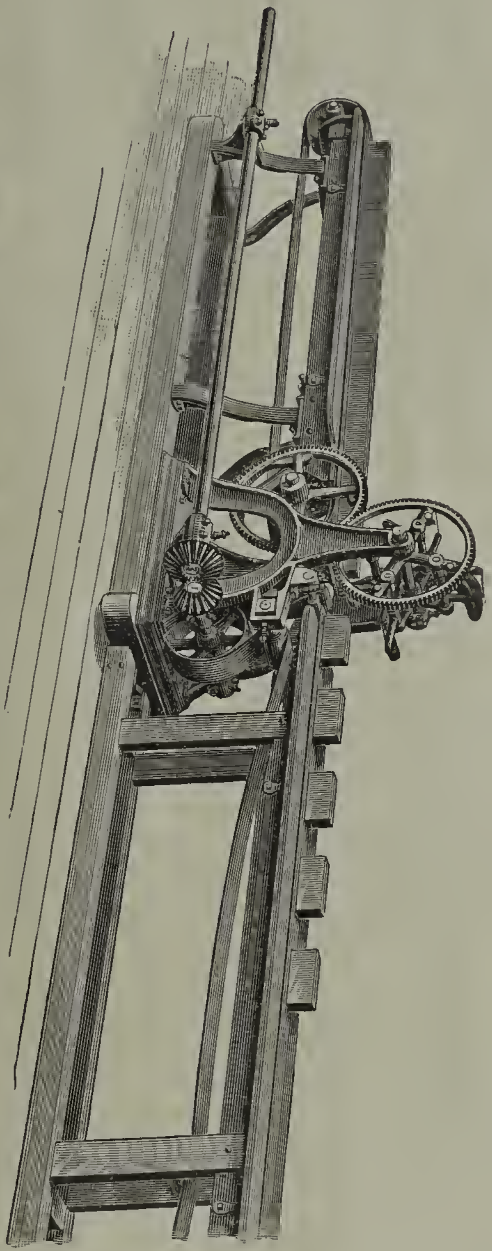
Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



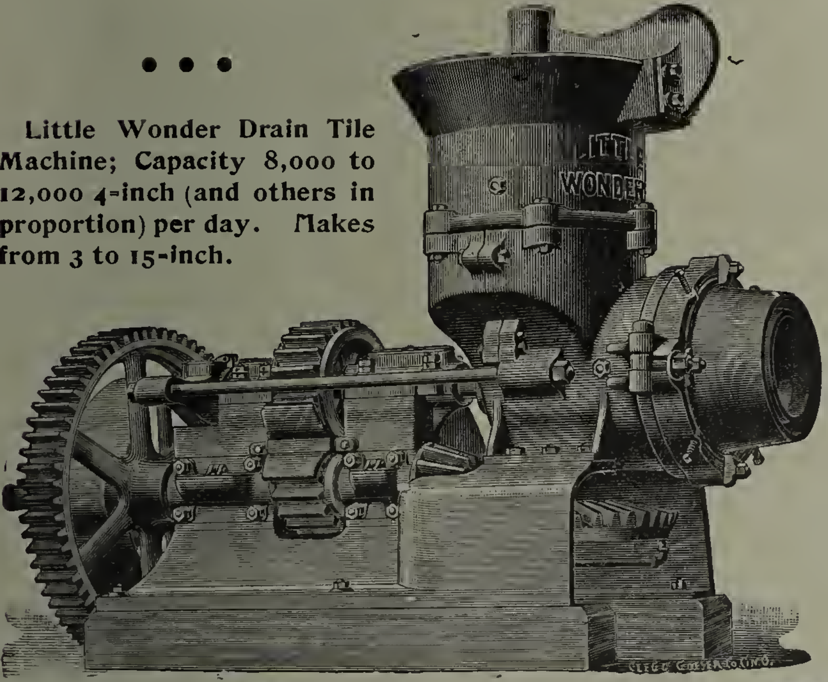


Cunningham's Single Stream Automatic End Cut Brick Cutter.

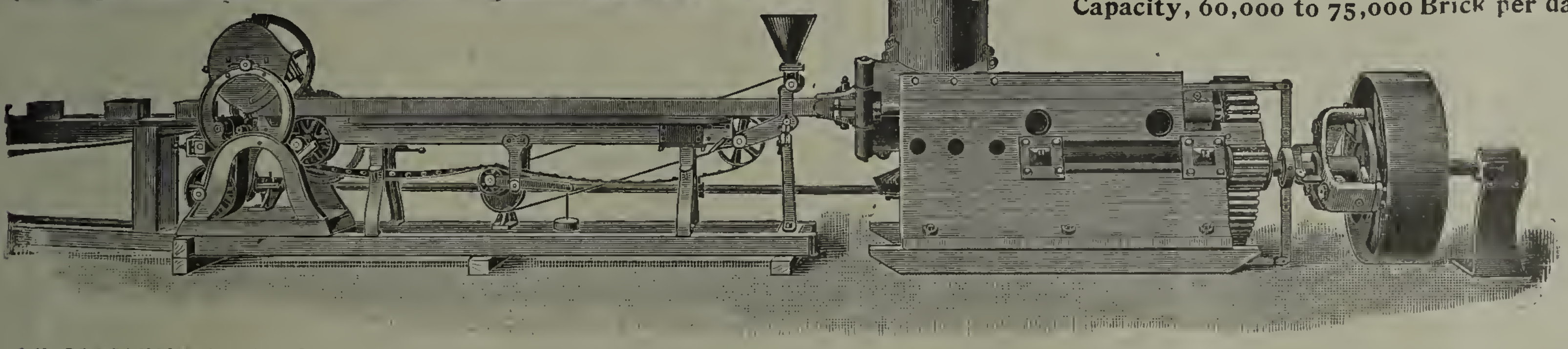
• • •

• • •

Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.



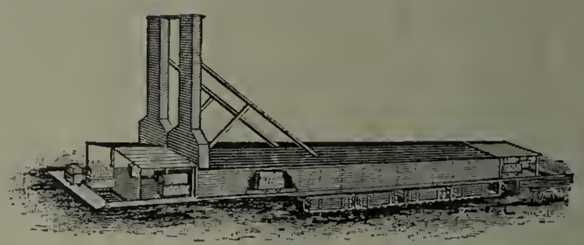
AS MANUFACTURED BY

The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

Iron Clad Dryer....IN THE LEAD



DRYING BUILDING BRICK.

CHICAGO, July 18, 1894.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—We have had one of your 12 track dryers in use for nearly three years, and two six track dryers for more than two years. Since you have improved these dryers by means of the receiving tank and pump system, we are drying 175 to 180 M brick per day, with a saving of 20 to 25 per cent of steam used under the old system. It is possible to dry up to 200 M bricks every 24 hours without injury to the ware, and we have done this on several occasions, when we were compelled to run over time.

Our experience with other dryers formerly used on our plant and the results obtained by other manufacturers in this neighborhood with hot air and fire dryers, compels us to say, that in our estimation, your dryers are more economical and show better results than any we have seen. We use 2 boilers 5x18 feet for these dryers, and at times have to reduce the quantity of steam used, to prevent getting the bricks too dry. Pressure carried 85 pounds.

Yours respectfully,
WECKLER-PRUSSING BRICK CO.,
Alexander Prussing, Sec'y.

DRYING PRESSED BRICK.

MONTREAL, P. Q., September 13, 1895.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—Replying to your favor as to how the dryer erected by your Mr. Lederer is working, I have much pleasure in telling you that we have no fault to find. We dry our bricks easily in twenty-four hours, and so far, without a hitch of any kind.

Your system of returning condensation is undoubtedly the best the writer has ever seen, it needs very little attention and is a decided success in every way. We are drying dry-press, square, ornamental and plastic builders and pavers with equal success.

Wishing you a deserved success, we remain.

Very truly yours,
LA PRAIRIE PRESS BRICK & TERRA COTTA CO.

DRYING SOFT MUD BRICK.

MILWAUKEE, WIS., November 5, 1895.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—One season has passed with us in the manufacture of brick, where we used the dryer you built for us, and I must state that we have had more success than we expected, as our clay is very hard to dry, and we could do nothing drying our brick out doors, they all would check. Our repairs have not amounted to 5 cents, and think it recommends itself. If we had to build another dryer, it would be the Iron-Clad Dryer only.

Yours truly,
MILWAUKEE BRICK CO.,
R. Reinke, Vice-Pres.

DRYING PAVING BRICK.

LOUISVILLE, KY., April 12, 1895.

WOLFF DRYER CO., Chicago, Ill.

Gentlemen:—Replying to yours of the 11th inst., will say that the dryer you recently put in has worked splendidly, exceeding our expectations. It dries our brick perfectly in twenty-four hours and would dry a good many more than we make, which has been 30 M per day, re-pressed brick.

Our green brick measure 9¼ x 4⅝ x 2 9-16. Your dryer has far exceeded the old Penfield, in which it took four days and then did not dry. Will be pleased to hear further from you.

Yours truly,
KENTUCKY VITRIFIED PAVING BRICK CO.,
P. Bannon, Pres.

Write for prices and illustrated catalogue to

WOLFF DRYER CO.,

358 Dearborn St., Room 303, *CHICAGO, ILL.*

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THE CLAY WORKER

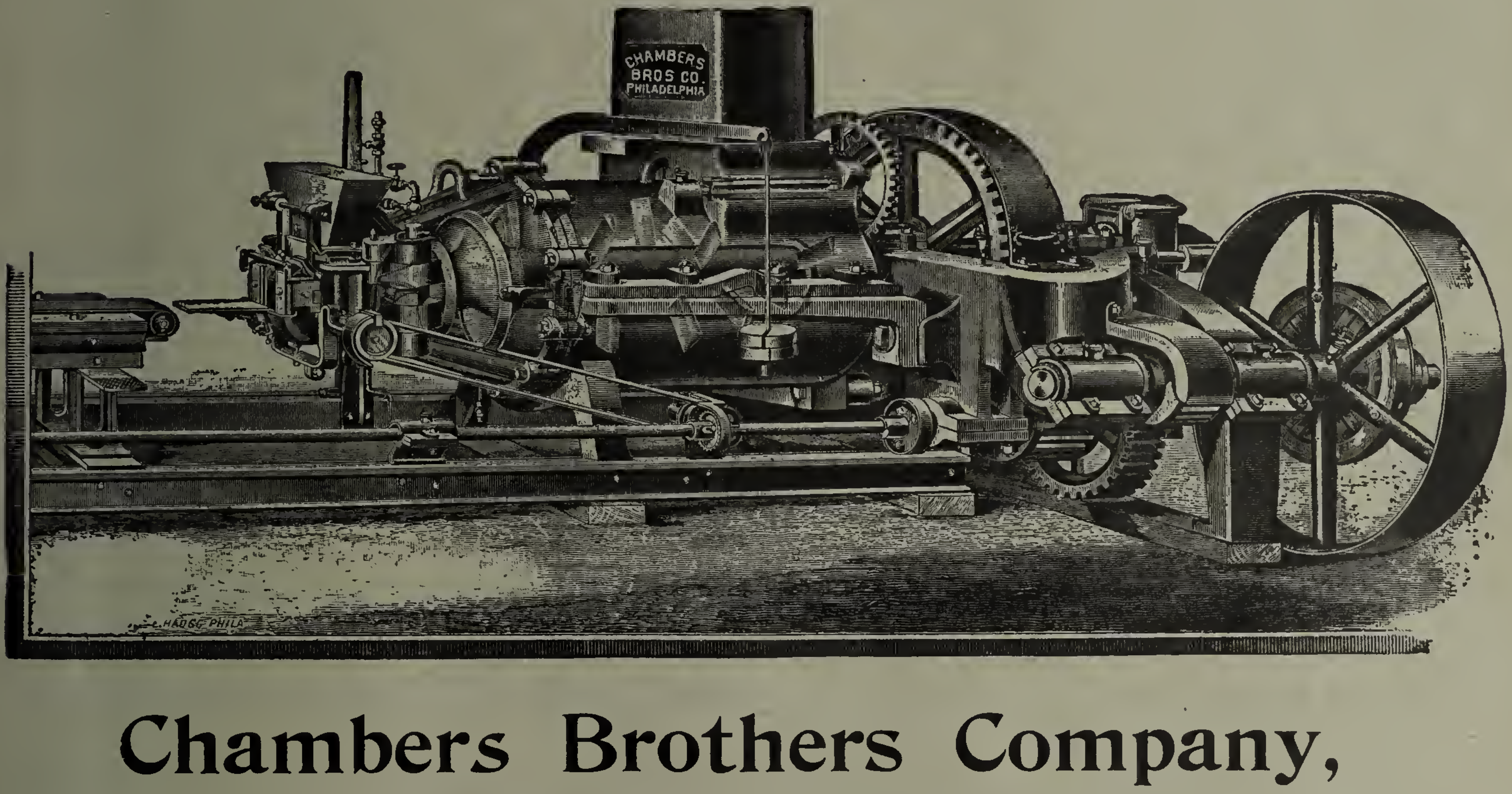
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS. INCLUDING BRICK TILE TERRA-COTTA SEWER PIPE POTTERY ETC.

T. A. RANDALL & CO. PUBLISHERS.

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXV, No. 6. INDIANAPOLIS, IND., JUNE, 1896. $2.00 a Year in Advance.

Brick Making Machinery.



Chambers Brothers Company,

FIFTY-SECOND STREET, BELOW LANCASTER AVE.,

PHILADELPHIA, PA.

J. E. EASTES, Chicago Agent,
174 South Clinton Street.

The Cummer Dryer is a Direct Heat Dryer.

. . . NO . . .
Boilers,
Pumps,
Steam Pipes,
Big Fuel Bills,
Experimenting.

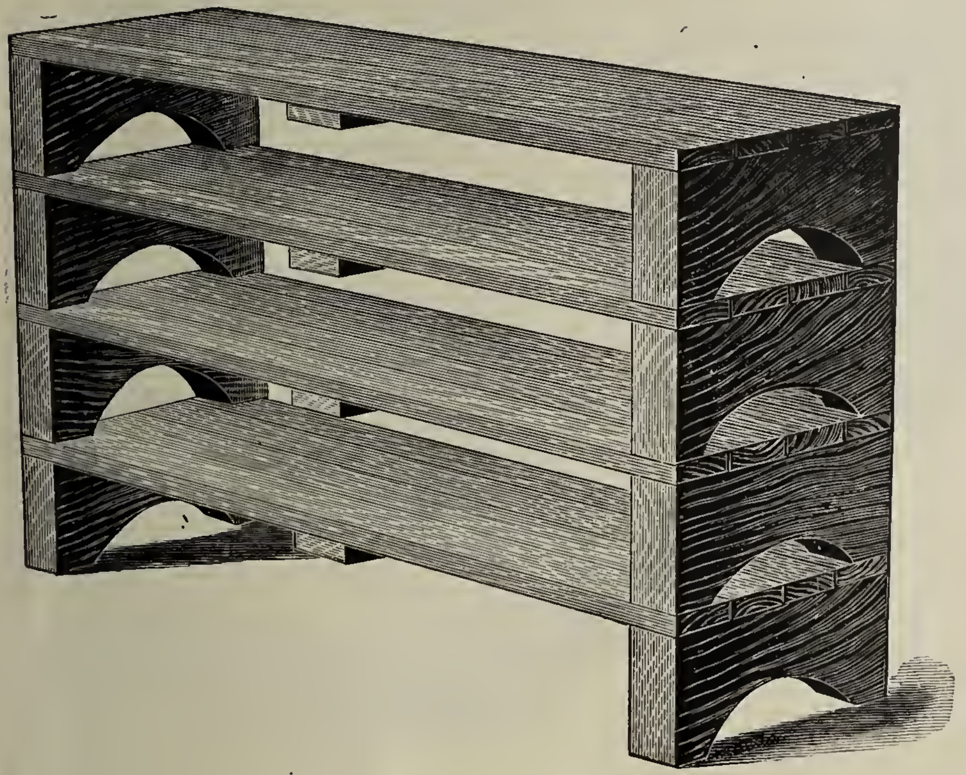
. . . YES . . .
We Guarantee Results and will guarantee to dry your brick with a given amount of fuel. For instance, if your brick each carry one pound of moisture and you want to dry 20,000, we will guarantee to dry them with less than 3,000 pounds of **Slack Bituminous** coal.

CONVERTED
If you have a Dryer that is not satisfactory, it can be **Converted** into a "CUMMER" at slight expense.

The CUMMER REVOLVING CLAY DRYER has many users and is well known.
Clay can be dried cheaper in it than by any other method.

The F. D. Cummer & Son Co.,
CLEVELAND, OHIO.

THE
HARRINGTON AND KING PERFORATING CO.
CHICAGO, ILL.
THE H.&K.P.CO.
PERFORATED SHEET STEEL FOR CLAY SCREENS
SEWER PIPE
BRICK.
TERRA-COTTA
FOR CHUTE SCREENS.
DRY PAN FOR SCREENS.
FOR REVOLVING SCREENS.



IF YOU NEED..

Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

Rack Pallets,
Hacking Pallets,
Pallets for Dryers,
Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

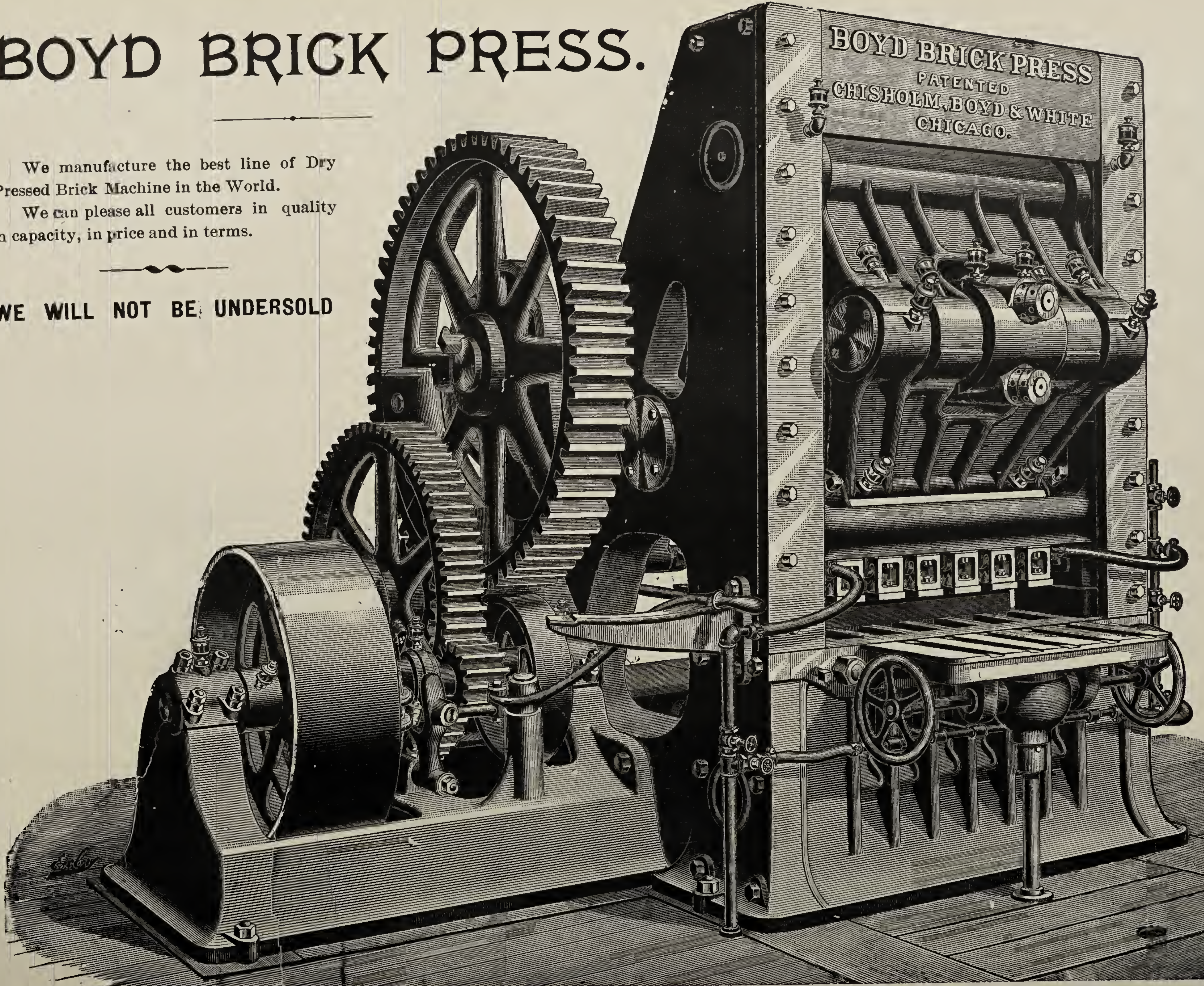
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

BOYD BRICK PRESS.

We manufacture the best line of Dry Pressed Brick Machine in the World.

We can please all customers in quality in capacity, in price and in terms.

WE WILL NOT BE UNDERSOLD



The CHISHOLM, BOYD & WHITE CO., 57th and Wallace Sts., **Chicago.**

A SURE THING.

We will construct and equip a Brick Plant of any capacity desired for any responsible party, furnishing Brick Presses, Power, Kilns, Clay-preparing Machinery, Shafting, Belts, etc., and erect the necessary Buildings. We will make and burn one or more kilns of brick, and turn the Plant over to him in proper working order under guarantee of satisfactory results as to quality of product and cost per 1,000; the loss to be ours in case of failure.

Why experiment when you have a sure thing?

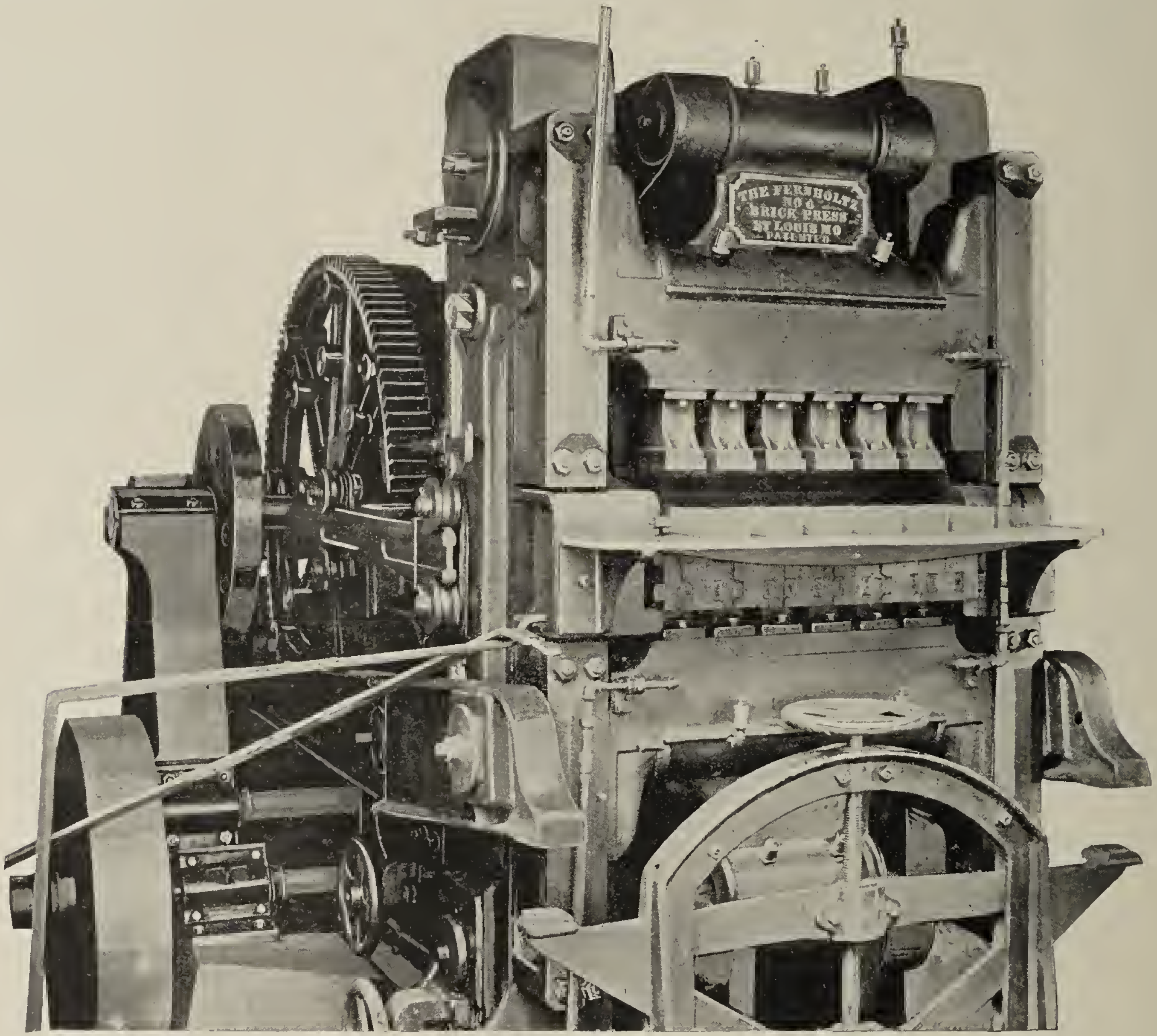
THE CHISHOLM, BOYD & WHITE CO.,

57th and Wallace Streets. CHICAGO.

The Fernholtz Improved Brick Press and

A Combination that Comprises the Essen-

THIS press is the result of fifteen years of practical experience as a successful press brick and press brick machine maker, backed by inventive and mechanical talents of a high order. It is unequaled for strength and easy running, requiring only 6 to 7 horse power to operate the largest 6 mold press. All the parts subject to strain are made of the best bessemer steel and every part can be seen and got at easily. The thickness of the brick can be changed or regulated without stopping the press, and every press is fitted with the Fernholtz mould which is generally admitted to be the best mold in use. For fine pressed and ornamental brick this machine is unequalled, the pressure on and movement of the clay in the mold being such as to prevent granulation and insures the most perfect product possible.



The Fernholtz Six-Mold Brick Press.

We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

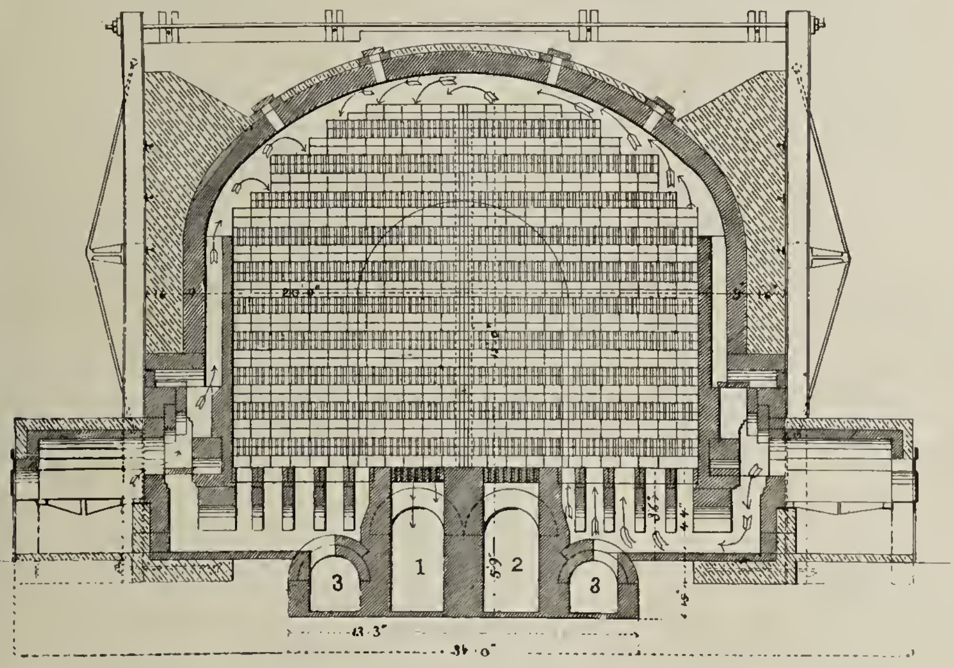
The Fernholtz Brick Press Co.,

1214 and 1216 Poplar Street, ST. LOUIS, MO.

Myers Balanced Up and Down-Draft Kiln

tial Elements of Success in Brickmaking.

AFTER pressed brick are made, be they never so fine, they must be well and thoroughly burned or the material, time and labor involved in their production is wasted. How best to burn pressed brick is therefore a vital question. We answer it confidently and offer the trade the **Myers Balanced Up and Down=Draft Kiln** which embodies the surest, best and most economical method of burning yet developed. By a system peculiar to this kiln the draft is under complete control at all times, and a large part of the heat goes through the brick to be burned twice and there is consequently a great saving in fuel and a larger per cent. of first quality brick produced than is possible in other kilns. By our system, the escaping heat from a cooling kiln can be utllized to dry off and partially burn a green kiln. The brick may be dried off or watersmoked with an Up-Draft and finished with a Down-Draft. Thus the top brick are not over-burned in getting the bottom brick hard, as is usually the case with down-draft kilns. And vice versa, the bottom brick need not be overburned or melted to get the top brick hard as with up-draft kilns. In no other kiln can the burner controll the heat at will as in the Myers kiln, in which the fires can be reversed as often as desired during the burning of a kiln. We are prepared to prove in a thoroughly practical and satisfactory way that our method of burning pressed brick is at once **the best and cheapest.**



No. 1 Damper to Stack Open. No. 2 Damper to Stack Closed.
No. 3 Hot Air Flues leading to next Kiln closed whilst burning.

Correspondence solicited. For full particulars address

The Fernholtz Brick Press Co.,

The Equipping of Dry Press=Brick Plants a Specialty. ST. LOUIS, MO.

"NEMO ME IMPUNE LACESSIT."

Clay-Working Machinery.

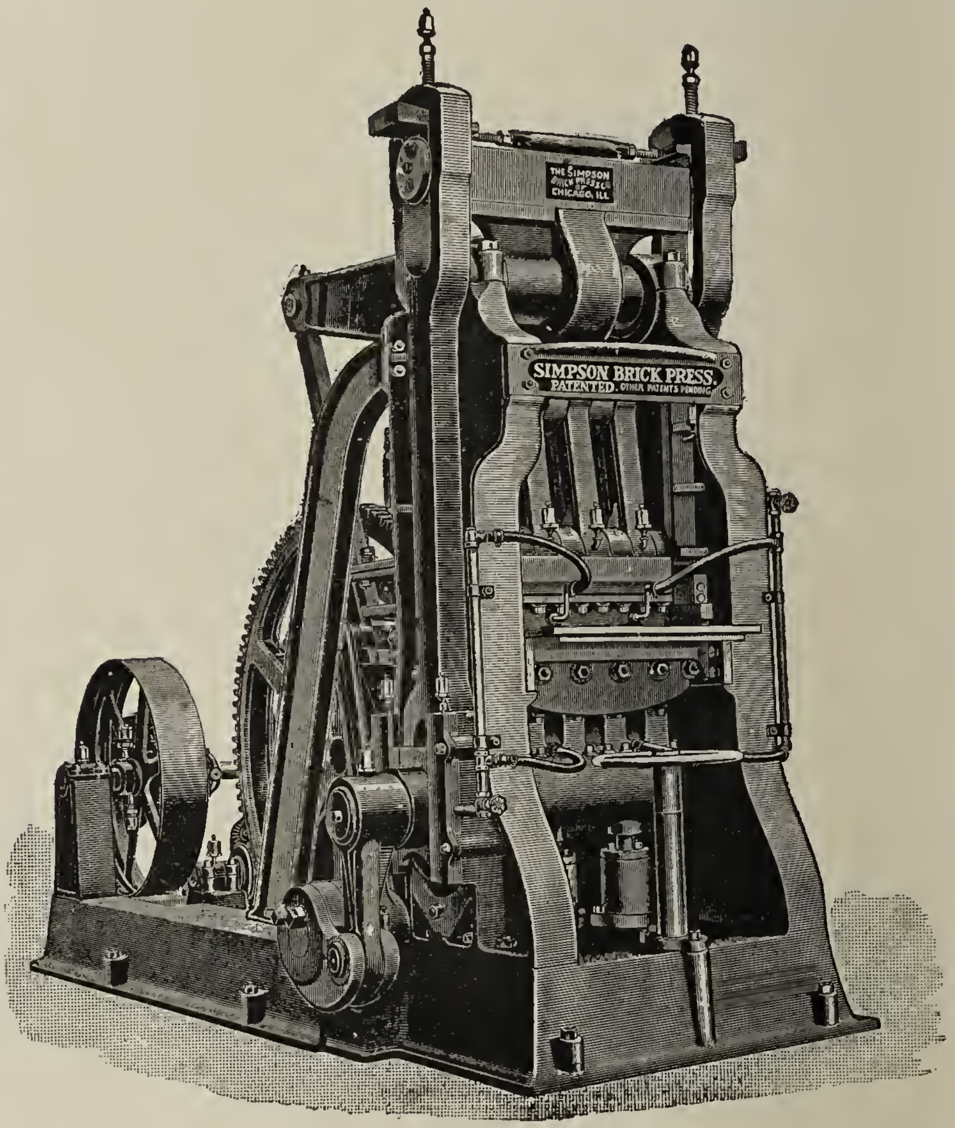
The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line of Brickyard Equipments. . .

Complete Plants Constructed and Guaranteed. . . .


THE SIMPSON BRICK PRESS CO. CHICAGO, ILL.
SIMPSON BRICK PRESS. PATENTED. OTHER PATENTS PENDING

OUR MACHINERY has long since **passed the experimental stage,** and is considered the standard by competent brickmakers. Write for catalogues.

THE SIMPSON BRICK PRESS CO.,

Chamber of Commerce
Chicago...

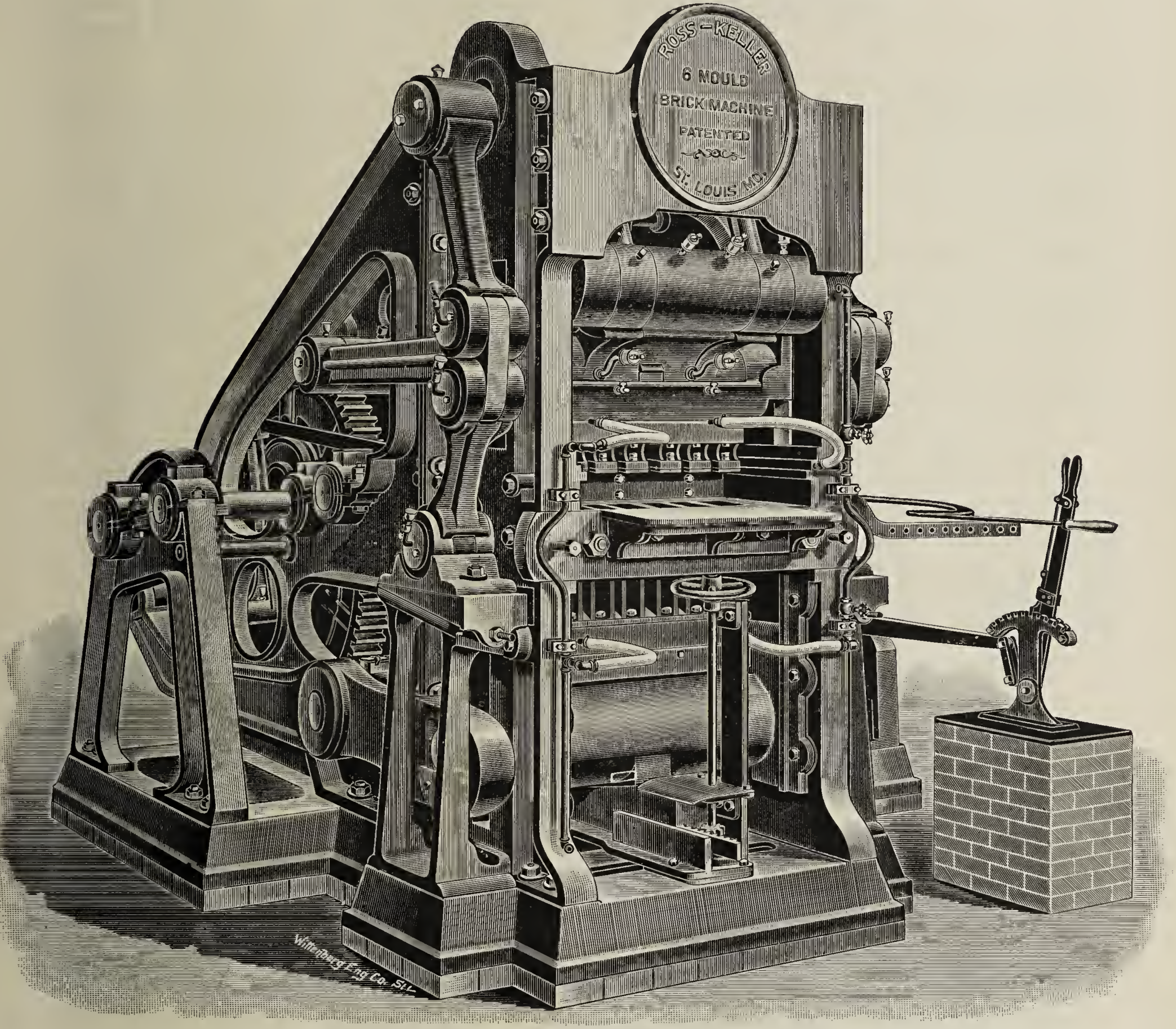
Agents for Canada:
WATEROUS ENGINE WORKS CO.,
BRANTFORD, ONTARIO.

The Latest Improved

Ross-Keller TRIPLE·· PRESSURE Brick Machine.

Manufactured in four and six-mould sizes. Weight of four-mould machine 58,000 pounds; capacity 24,000 brick per day. Weight of six-mould machine 75,000 pounds, capacity 36,000 brick per day.

BRICK SET IN KILN DIRECT FROM MACHINE.



The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

If you want the best come and see us, or write for price and full particulars, address

Ross-Keller Brick Machine Company,

Office 108 Rialto Building, — ST. LOUIS, MO., U. S. A.

Columbia Brick Press.

All working parts are made of Steel.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

The pressure is absolutely equal on top and bottom of brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

Any part of the gearing can be removed without taking machine apart.

The mould box can be taken out in a few minutes, without disturbing the other parts of machine.

The "COLUMBIA" presses clay or shale as dry as a hydraulic press, or so damp as to approximate a stiff mud brick, so that the range of products is from building brick to pavers. No other press does such a variety of work.

The "COUMBIA" is the only brick press on the market that meets ALL the needs of a brick plant.

For circulars and prices, address

H. B. HILGEMAN,
General Agent "COLUMBIA Brick Press,
. . . . and "COLUMBIA" Mould,
306 Oriel Building, ST. LOUIS, MO.

Terrazo Cement Tiles.

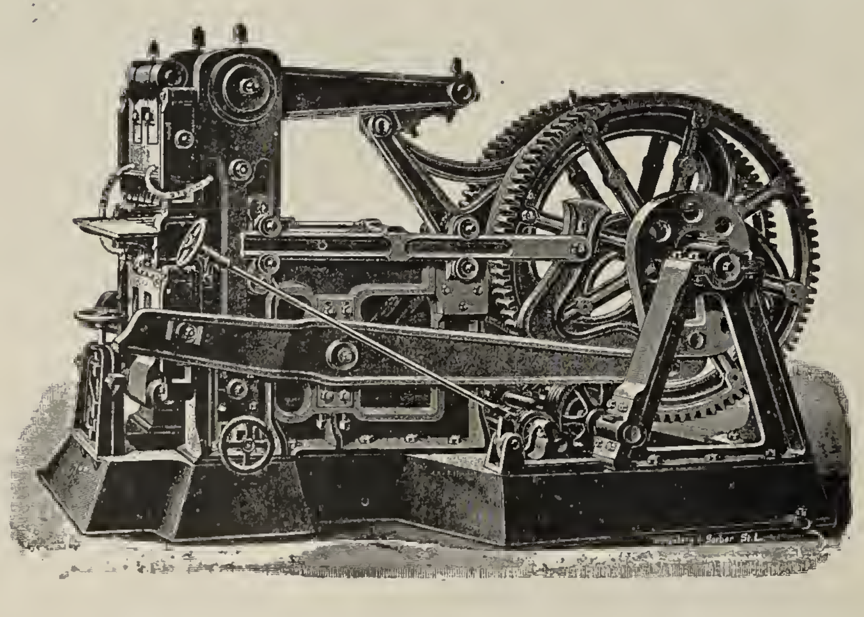
Complete Plants furnished for making the celebrated **"TERRAZO" Tiles.** Used to the exclusion of all other tiles in all floors, halls, etc., of the following among hundreds of structures in Germany:

JOHANNIS CHURCH, ROYAL AGRICULTURAL COURT, ROYAL DEPARTMENT OF THE INTERIOR, DRESDEN; GERMANIA PALACE, BERLIN AND ANHALT RAILROAD DEPOT, IMPERIAL ART AND MECHANICAL MUSEUM, ROYAL MILITARY ACADEMY, BERLIN; IMPERIAL POST OFFICES, DRESDEN, BERLIN AND . . . . . . LEIPSIG. . . . . . .

Terrazo Tiles, any color, design or size. For circulars, estimates, etc. Address

H. B. HILGEMAN,
General Agent of THEO. WELGE, for the sale of Dr. BERNHARDI SOHN, G. E. DRAENERT, GERMANY, Machinery and Processes for making TERRAZO CEMENT TILES.
306 Oriel Building, ST. LOUIS, MO.

The Progress Brick Press



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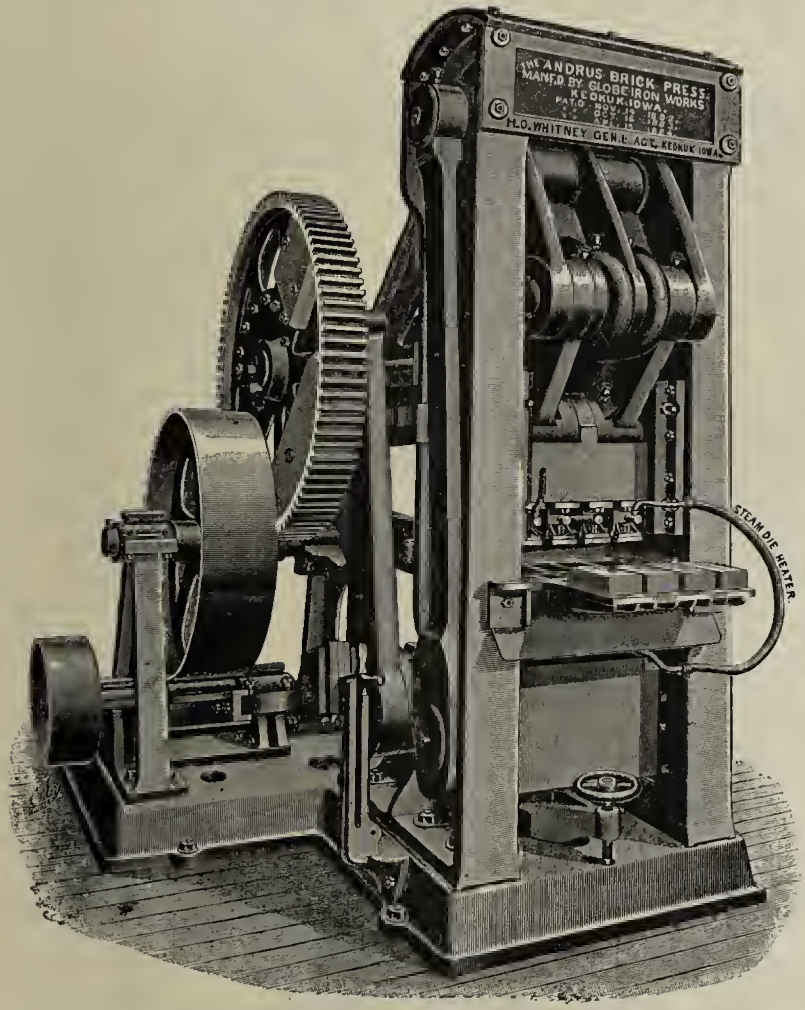
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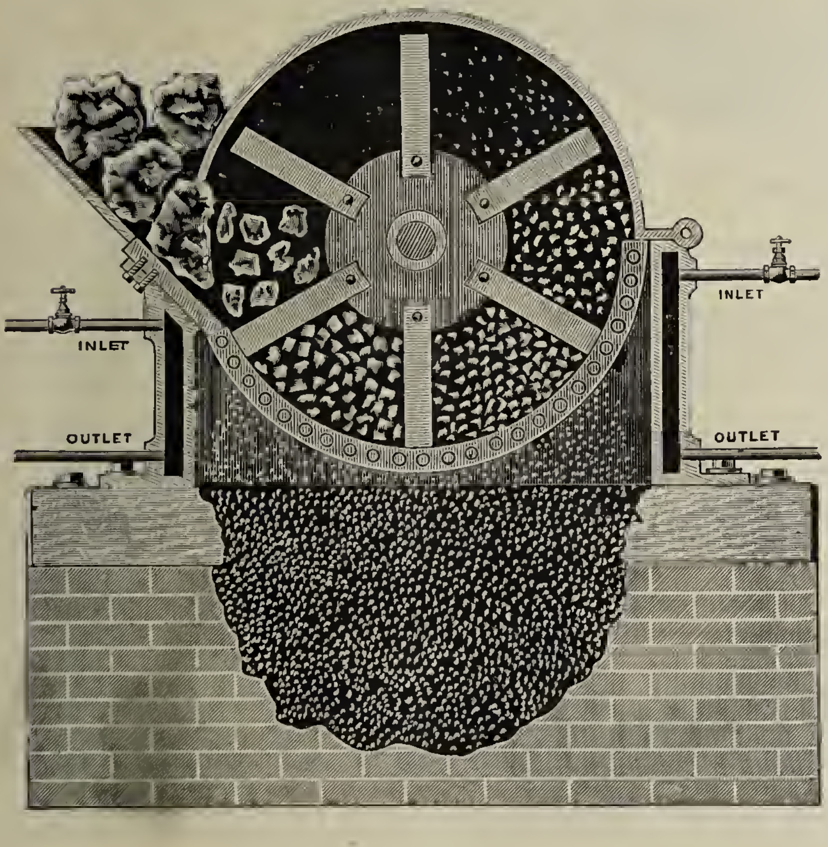

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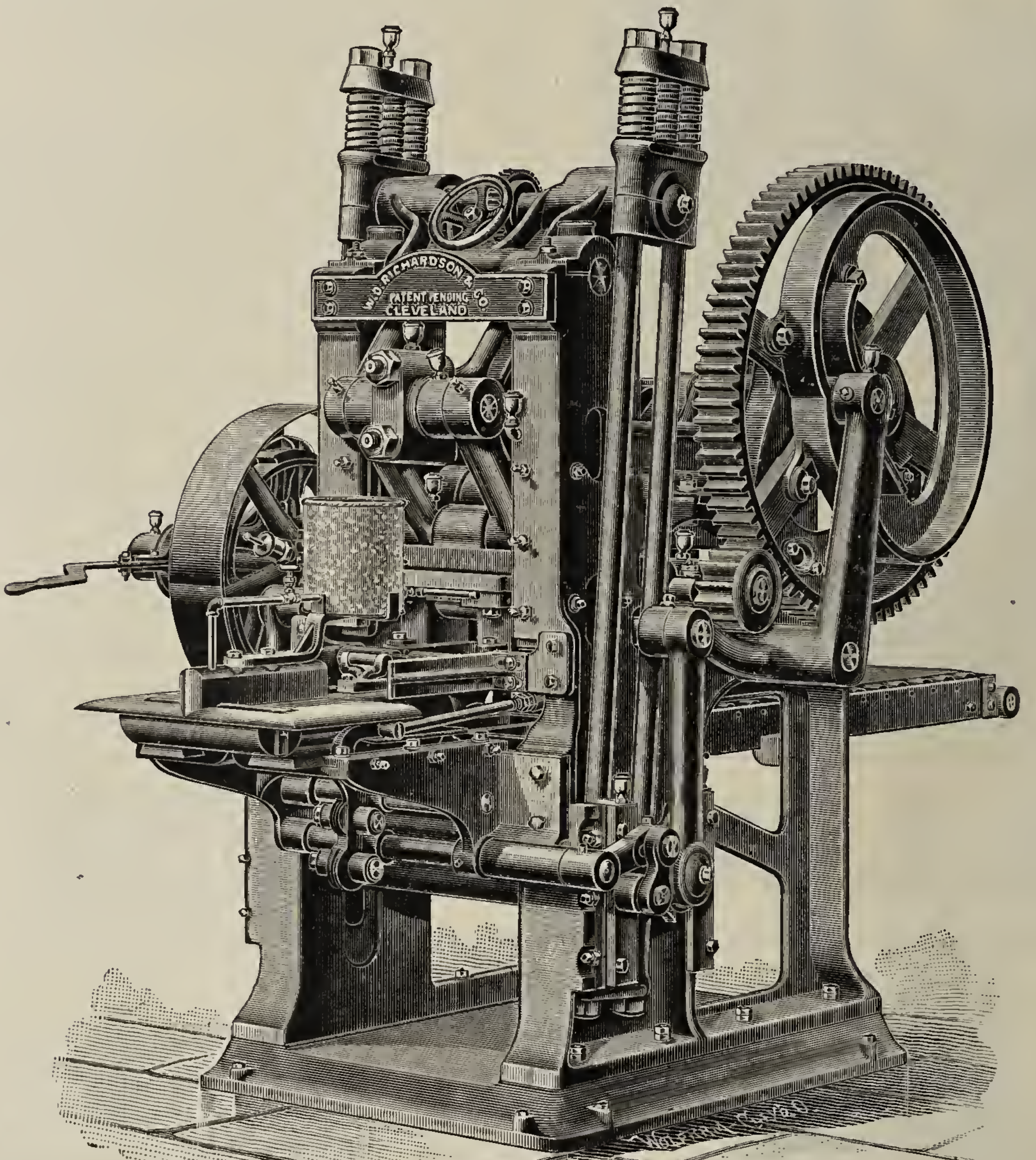

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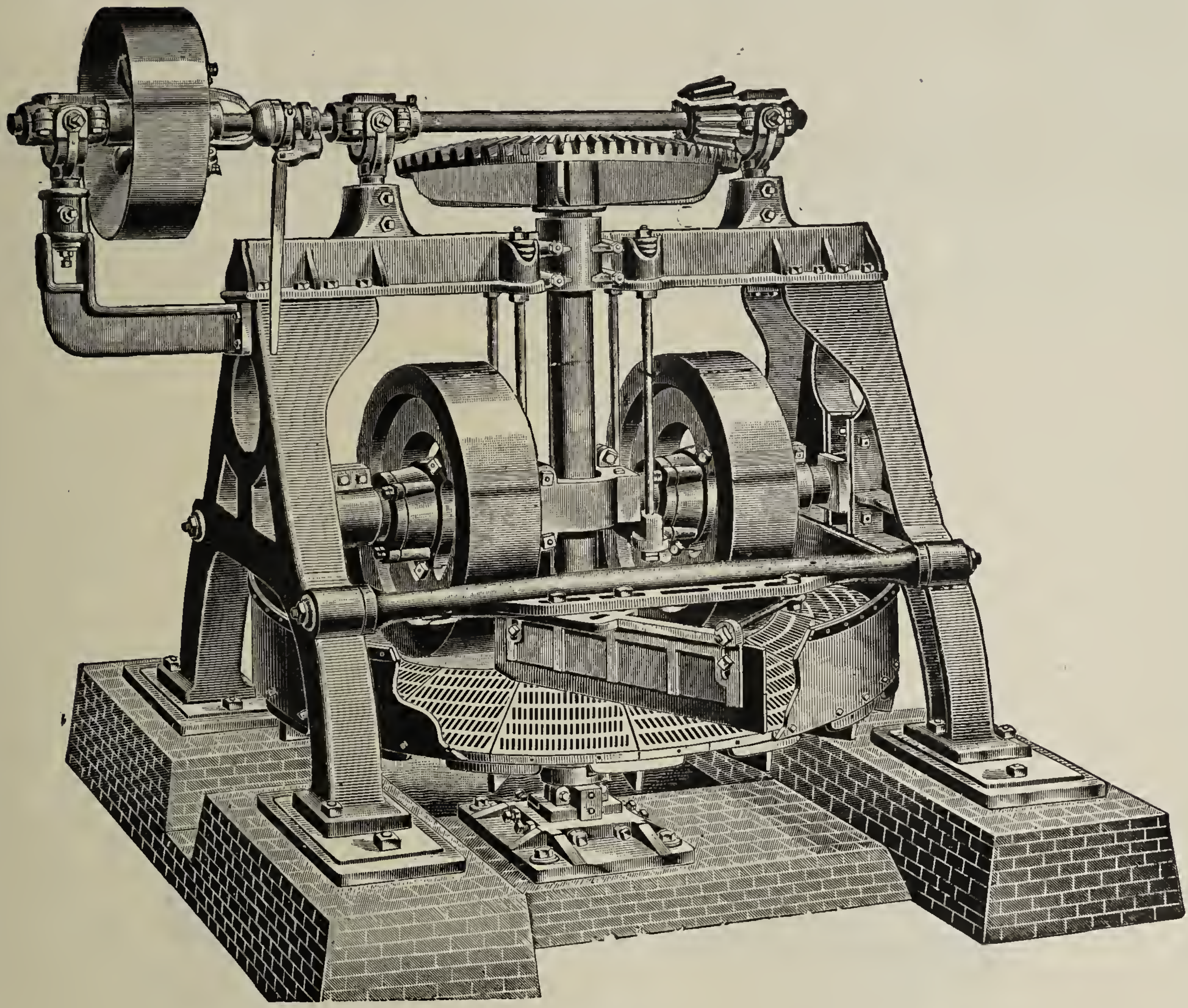

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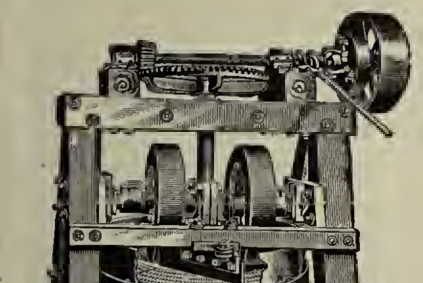

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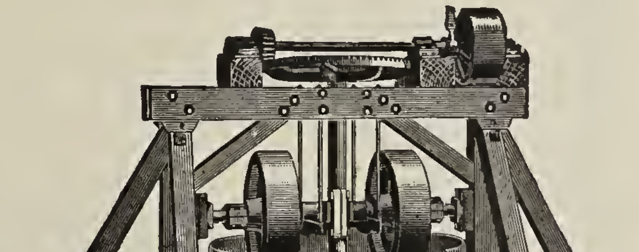

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THE CLAY-WORKER

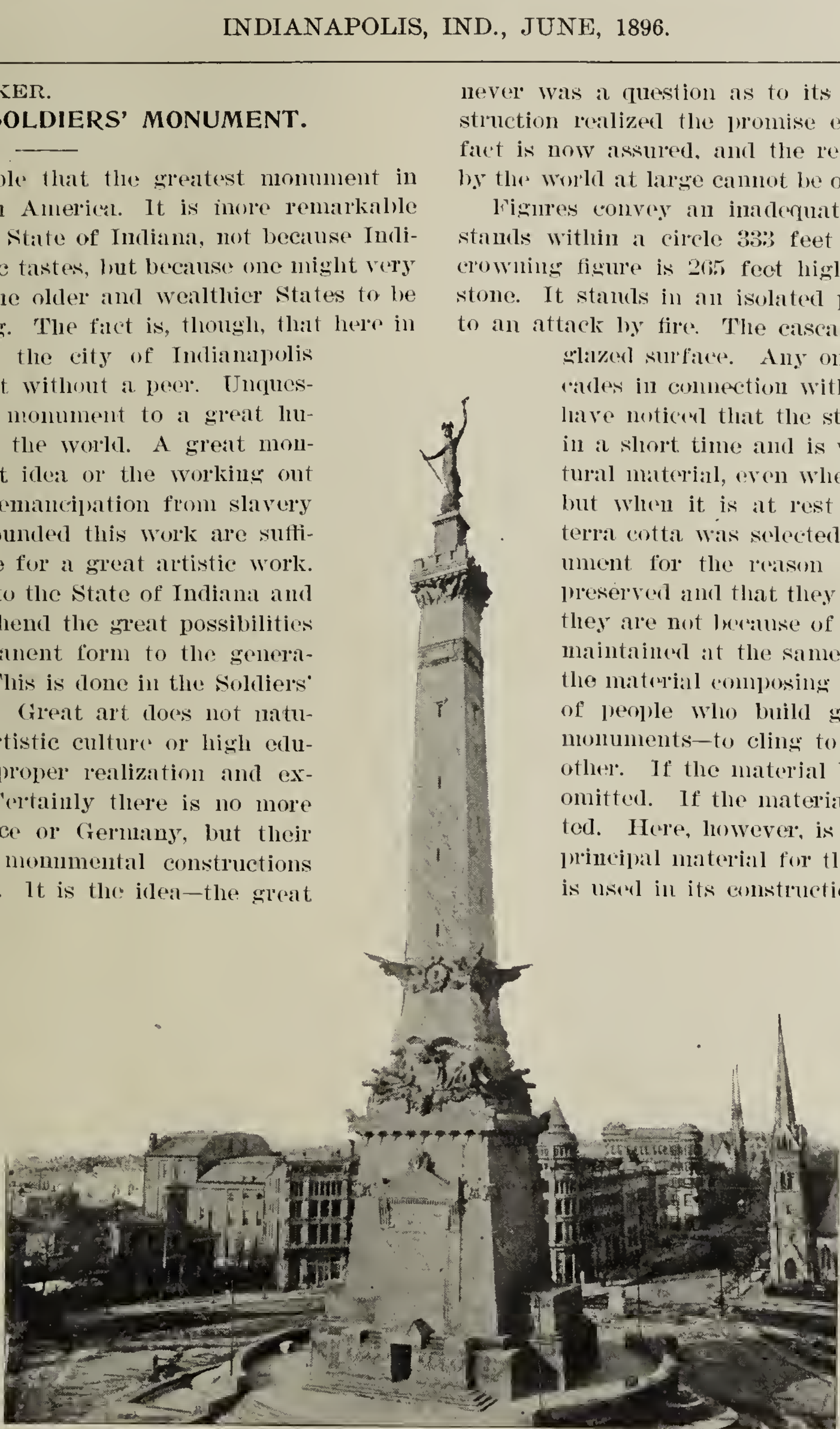
THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXV. INDIANAPOLIS, IND., JUNE, 1896. No. 6.

Written for the CLAY-WORKER.

THE INDIANA SOLDIERS' MONUMENT.

IT IS QUITE remarkable that the greatest monument in the world should be in America. It is more remarkable that it should be in the State of Indiana, not because Indianians are lacking in artistic tastes, but because one might very naturally expect some of the older and wealthier States to be first in such an undertaking. The fact is, though, that here in the State of Indiana and the city of Indianapolis there is to-day a monument without a peer. Unquestionably it is the greatest monument to a great human event which exists in the world. A great monument must follow a great idea or the working out of a great principle. The emancipation from slavery and the issues which surrounded this work are sufficient to produce the motive for a great artistic work. It has remained, however, to the State of Indiana and its citizens to fully comprehend the great possibilities and express them in permanent form to the generations which are to come. This is done in the Soldiers' Monument at Indianapolis. Great art does not naturally come with ages of artistic culture or high education. It comes from a proper realization and expression of a high idea. Certainly there is no more cultured nation than France or Germany, but their expressions through their monumental constructions are rarely essentially great. It is the idea—the great original impulse—which producing great artistic work.



THE INDIANA SOLDIERS' MONUMENT.

Several years ago, before the monument was finished, a young man was in Paris and was associated with artists, architects and sculptors of that city. It was a habit of his to occasionally refer to the fact that in his own native city in America there was in process of construction a monument which promised to rival all others which had been constructed before. Naturally there were expressions of dissension. Why should this be so? Why are not the monuments of Paris, or London, or Berlin, or certainly those of Rome, the greatest? Following such a conversation and discussion, a photograph of our own monument, as it was to be when finished, would be produced, and there never was a question as to its relative excellence if the construction realized the promise exhibited in the picture. That fact is now assured, and the relative estimate placed upon it by the world at large cannot be otherwise than as stated above.

Figures convey an inadequate impression. The monument stands within a circle 333 feet in diameter. The top of the crowning figure is 265 feet high. The monument itself is of stone. It stands in an isolated position where it is not liable to an attack by fire. The cascades are of terra cotta, with a glazed surface. Any one who has seen the great cascades in connection with the monuments abroad must have noticed that the stone becomes very black within a short time and is very unsightly as to the structural material, even when the water is coming over it, but when it is at rest it is violently ugly. Glazed terra cotta was selected for the cascades of this monument for the reason that the gray color could be preserved and that they could be easily cleaned (which they are not because of poor janitor service), and thus maintained at the same tone and color as the rest of the material composing the monument. It is the habit of people who build great structures—buildings or monuments—to cling to one material and despise the other. If the material be stone, terra cotta is largely omitted. If the material be terra cotta, stone is omitted. Here, however, is a structure where stone is the principal material for the exposed parts, though brick is used in its construction, and terra cotta is used for the most trying situations, where it is liable to be affected by the stain of the water and the changes of temperature, violent as they may be in this climate. In this respect the material is entirely satisfactory. It is fair to say, however, that the cascades of this monument are inadequate in size, with respect to the monument itself. It was the idea of the architect and a number of others interested that cascades of this dimension should not have been constructed, though the majority of the Commissioners thought otherwise. It is the hope of many interested in this monument that time may see a change made to carry out the puprose of the original designer.

A severe winter has proved conclusively that no better material than terra cotta can be used for the construction of great cascades, one of which is to be found on either side of this structure. The same length of service of stone would have shown it in a very unsatisfactory condition. The terra cotta for these cascades was furnished by the American Terra Cotta and Ceramic Company, of Chicago, of which W. D. Gates is President, and is certainly a credit to them.

LOUIS H. GIBSON.

Written for the CLAY-WORKER.

CLAYS IN GENERAL, AND THOSE OF INDIANA IN PARTICULAR—DEFINITION, ORIGIN, CLASSIFICATION.

NO MINERAL RESOURCE of the earth has been longer used or has been made into such varied products for the benefit of the human race as clay. Found in all countries, easily obtained, and, when moistened, readily molded into any shape which the fancy can invent, it is no wonder that prehistoric man, emerging slowly from that animal stage in which, for thousands of centuries, he had existed, made early use of it. To his undeveloped mind no better form of amusement probably presented itself than that of dabbling in mud and molding it into fantastic shapes—just as on the borders of many a pond or stream "mud pies" are made by the youthful progeny of the nineteenth century. Some of his rude products—sun dried—became permanent, were used by him as drinking vessels, and so begat in his crude mind an impression of their usefulness. He began to fashion them, not for amusement, but for use, and the clay industry of the world had begun. From such a beginning into what enormous proportions has it grown!

Clay products, when properly made and cared for, are among the most lasting works of man. Wind or rain, frost or fire, has little effect upon them. The most ancient remains of man's industry are the pieces of pottery vessels picked up on the sites of his former habitations or removed from his burial mounds. The oldest buildings on earth are those made of sun-dried brick. From these rude vessels, relics of man's first handiwork, to the delicate and costly chinaware of our shops—from the adobe walls on the plains of Persia and Mexico to the magnificent fronts of pressed brick and terra cotta of our present cities—what steps of human progress, what proofs of man's advancement in the art of clayworking!

—Definition of Clays.—

The term clay is, in popular language, given to a large number of widely different materials. To most persons it calls to mind any soft, structureless, earthy matter, which, when moistened with water, will become plastic and sufficiently firm to be fashioned into any desired form.

To the manufacturer it may be either the above or an artificial mixture of several or many constituents, ready to be turned, molded or pressed, and then burned or baked to the required hardness.

To the chemist and geologist it has a far wider meaning, including all rocky material whose chief constituent, or "clay base," is composed of two parts of aluminium, two of silicon and seven of oxygen, chemically combined, and united with two parts or molecules of water. To this clay base has been given the name "kaolin" or "kaolinite," and, when pure, its percentage composition is as follows:

Silica (SiO_2)	46.3
Alumina (Al_2O_3)	39.8
Water (H_2O)	13.9

This kaolin is the basis or necessary part of all clays. It often exists in an almost pure state, but in most cases it is found mixed with numerous other minerals, such as free silica or sand, oxides of iron, lime, mica, magnesia, etc., in greater or less proportions.

To these mixtures (as well as to the pure kaolin itself) the general term "clay" rightfully belongs, whether they appear in incoherent masses, as those to which the name is most commonly given, or in a more consolidated and finely laminated condition—the so-called "shales"—or in the still more thoroughly consolidated "slates." The greater the amount of kaolin or clay base in the mixture the purer is the clay. Still, the mixture is called a "clay" even if it contains no more than 10 per cent. of the kaolin.

—Origin of Clays.—

All clays, soils and sands are, in the first place, derived from the decomposition or breaking up of different kinds of rock. I say "are derived," for the silent processes of nature to-day, as in past geological ages, are grinding rocks into clays and recementing and hardening clays into rocks. There was a time when the surface of the earth was formed of rocks and rocks only, but various natural agencies began and kept in constant action processes of slow decay, and clays, soils and sands were formed, and afterwards, as we shall see, carried as sediments into ancient seas.

The rocks that formed that first crust of earth were largely or wholly igneous in their nature, i. e., they were rocks which had been acted upon by great heat and had not been deposited in stratified layers by water. The most common of them were the granites, gneisses and syenites. As kaolin, which is the base of all clays, may be formed from any of these three kinds of rocks, the process being essentially the same, I shall take granite and try and make plain the origin of kaolin from it.

Granite is an igneous rock composed of three minerals—quartz, mica and feldspar. Quartz is the most abundant of all minerals, and, in one form or another, comprises fully 25 per cent. of the crust or hard surface of the earth. It is composed of two elements*, silicon and oxygen, united in the proportion of one part of the former to two of the latter. The chemical name of this compound is silica, and it is wholly insoluble in rainwater or ordinary acids. Of mica, the second mineral constituent of granite, it is necessary to say nothing in this connection, except that it, like quartz, is not acted upon or decomposed by rainwater. But to feldspar, the third mineral found in granite, especial attention should be given, since it is the source from which all kaolin is supposed to have been derived. Feldspar is the common name given to a group of very complex minerals. The most abundant of these is orthoclase, the kind of feldspar usually found in granite. It is composed of four elements—silicon, oxygen, aluminium and potassium—united in such a way as to form a double silicate of potash and alumina. In other words, it is a silicate of potash chemically combined with a silicate of alumina, the former being soluble in rainwater, the latter, as we have seen in another connection, wholly insoluble. Granite, then, may be regarded as composed of particles of insoluble quartz united to particles of insoluble mica by a cement of feldspar, which is partly soluble and partly insoluble.

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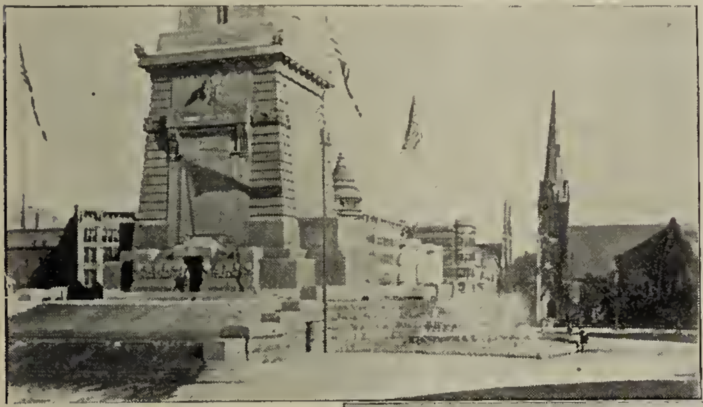
*For those who have little or no knowledge of chemistry I have thought it best to give here a definition of the word "element," as it will be hereafter used on numerous occasions. An element is one of the seventy primary forms of matter which make up the universe. It is a substance which has never been separated into anything simpler. Two or more elements united together form a compound. There are millions of compounds, but only seventy elements. For example: Wood is a compound which, in the chemical laboratory, can be separated into three substances—carbon, hydrogen and oxygen; but no man has yet been able to separate carbon, hydrogen and oxygen into anything simpler than themselves. Hence they are elements. The seventy elements bear the same relation to the compounds as the twenty-six letters of the English language bear to its four hundred thousand words. Or, to state it still differently, the elements form the alphabet of the universe.

Now the oxygen, carbon dioxide and watery vapor, which, in part, make up the atmosphere, are universal solvents, and, in time, will cause the crumbling of the hardest rocks. The oxygen unites with certain elements or minerals in the rocks to form new compounds. The particles of these compounds cohere or unite less closely than the particles of the rock before the compounds were formed, and, in time, lose their cohesion and fall apart. A somewhat similar action is seen when a leaden bar is melted and then stirred until its particles are brought in contact with the oxygen of the air. A new compound, lead oxide, wholly unlike the original bar lead, is formed, which is easily reduced to a powdered state.

The watery vapor in the air, when cooled, condenses and falls as rain. As it passes downward it gathers unto itself a part of the gaseous carbon dioxide of the atmosphere, and unites with it to form rain or carbonated water. When this falls upon the granite, already softened to a certain extent by the oxygen of the air, it percolates it, and the carbon dioxide leaves the water and unites with the potash to form potassium carbonate. This, being a soluble substance is soon washed out by the water, thus destroying the cement which held the particles of quartz and mica together. The granite, therefore, crumbles apart, and there results from it a mass of kaolin (the insoluble silicate of alumina of the feldspar), mixed with quartz particles, or sand, and numerous scales of mica. Thus is kaolin, the basis of all clays, formed by the decay of granite or any rock of which feldspar is a constituent.



THE CASCADES—INDIANA SOLDIERS' MONUMENT.

—Classification of Clays.—

The clay materials resulting from the decay of feldspar may be broadly classified into two great groups—residual clays and sedimentary clays.

—Residual Clays—

are those which have remained on or very near the spot formerly occupied by the rocks from which they are derived. If these rocks contained much feldspar or but little mica, and were covered before their decay by some permeable material, such as conglomerate sandstone, through which the water could easily pass, large beds of comparatively pure kaolin were formed. Such deposits are called residual rock kaolins, and are among the richest and purest known to man. The kaolin deposits of Lawrence and Martin counties, Indiana, are examples of such residual clays.

The surface clays of the southern third of Indiana are also largely secondary residual clays, being derived from the decay of the underlying limestone or sandstone rocks. During thousands of years the rainfall penetrating these rocks has carried with it well known solvent agencies derived from the atmosphere and from the vegetation on the surface. Attacking the rocks, these solvents have borne away the several ingredients which they were competent to dissolve and have left the rest behind. The result has been the production of well disintegrated earth or soil at the surface, merging into clay and partly decomposed rock below. For the most part this clay is in essentially the same state as when separated from the primitive crystalline, feldspathic rocks, as the decay of limestone or sandstone has only restored it to the condition in which it was when deposited with the sediments of which they were formed. It is composed mainly of a mixture of kaolinite, oxides of iron and sand, combined in varied proportions, the kaolinite being the silicate of alumina that was disseminated in small particles through the limestones or sandstones at the time of their formation. This residual surface clay is free from those minute angular fragments of foreign rocks which occur so commonly in most glacial or drift clays. It is never stratified like the latter sometimes are, and its texture is more homogeneous, or alike, throughout. For these reasons its quality for manufacturing purposes is far superior to that of most of the surface drift clays of northern Indiana.

—Sedimentary Clays—

are those which have been removed from their place of origin and redeposited in water. This removal has been brought about by water either in its liquid or solid form. Gentle rains and earth-born torrents, little trickling rills and strong streams are ever at work tearing down the clays from every slope where feldspathic rocks have decayed and bearing them away to lower levels. While being carried onward the clay base or kaolin, comparatively pure at starting, becomes mingled with many impurities, such as the remains of decayed limestones, oxides of iron, etc. It, as well as these impurities, is at the same time washed and ground fine by the action of the flowing water, until finally the entire mixture is deposited as a bed of fine sedimentary clay at the bottom of river, lake or sea, perhaps one, perhaps a thousand miles from the home of its mother rock. Since the first rainfall upon the primitive

crust of the earth this process of disintegration and transportation of clay by water has been going on, and on it will continue until the end of time, for the forces of nature are never ceasing in their action.

As a result vast beds of sedimentary clays are found wherever lakes or seas have at some former period covered a portion of the surface of the earth. In many cases these clays have, by pressure, been consolidated and hardened into "shales." The chemist recognizes no difference between a shale and a clay, and the geologist distinguishes them only by a thin lamination, or capability of being separated into layers, which is present in the shale and absent in the clay, and which is generally due to the former having been deposited intermittently in deep, still water. Shales are classified and named according to the character of the chief impurity which is mixed with their clay base. Thus we have

—(1) Argillaceous Shales,—

in which clayey material (silicate of alumina) largely predominates. In color these are usually drab or blue, though yellow and buff shades are not of uncommon occurrence. They are almost free from "grit," and are often soft and unctuous, or greasy to the touch. They are then known locally as "soapstones," but this term rightfully belongs to the mineral steatite or talc, a magnesian silicate which does not occur in Indiana. Sometimes, however, the shales are quite hard and tough, yielding but little to the pick, and requiring the use of explosives for their removal. But whatever their character when first mined, upon exposure to air, rain and frost they quickly disintegrate into soft, plastic, fine-grained clays of large commercial importance.

—(2) Arenaceous or Silicious Shales—

are those which have a large proportion of free silica, or sand, mixed with the clayey material. For the most part they are drab, buff or yellow in color, though sometimes gray or even bluish. Their value for manufacturing purposes depends largely upon the character of the sand particles found in them. Sometimes these particles are so minute as to be invisible to the naked eye. The shales are then comparatively free from "grit," and are scarcely inferior to the argillaceous shales in value. Again, the grains of sand are larger and plainly discernible to the sense of touch as well as sight. When of this character the deposits are rightfully known as shaly sandstones, and are of little economic importance. Oftentimes scales of mica are scattered abundantly among the particles of sand, and the shales are then known as "micaceous."

The above shales comprise a large part of the rocks of the coal-bearing counties of Indiana, and, taken as a whole, are among the most valuable clay deposits occurring in the State. They are not closely related to the strata found above or below them, and their thickness and composition varies excessively, and is dependent entirely upon the character and source of those streams of water which flowed into the old lakes in which the shales were formed. If the stream was a large one and flowed for a long time with sufficient velocity to carry sediment far out into the deeper part of the lake, the bed of shale is thick, covers a large area and is comparatively uniform throughout. On the other hand, if the stream was small and flowed slowly, the shale bed is correspondingly thin, of small extent and more apt to be varied in its composition. The kinds of rock over which those ancient rivers flowed on their way to the lake determined the constituents of the sediment they brought down, and therefore the character and composition of the shales into which this sediment was afterwards formed.

Much less common than either of the preceding are the

—(3) Calcareous Shales.—

These contain a large percentage of carbonate of lime commingled with the clayey material. Such shales may be readily known by their light grayish color and the readiness with which they effervesce with muriatic acid. Where found they are usually in close connection (either above or below) with a stratum of limestone. Oftentimes they contain remains of the shells of marine or brackish waters. These calcareous shales are of little commercial importance. In some localities, where good clays are not common, they may be utilized in making bricks when the percentage of lime is not too great and is disseminated evenly throughout the shale.

—Underclays.—

Underlying almost every coal seam in the State is a bed of underclay, or "fire clay"—a form of sedimentary clay usually richer in kaolin and silica and poorer in the fluxes than the shales. This fire clay had its origin in the same manner as did the shales, but its freedom from lamination is a proof that it was deposited in shallower water. The relation of these underclays to the coal shows plainly that the former may be regarded as having formed the soils of ancient marshes, and that from them sprang that luxuriant vegetation which in time was changed to coal. The fire clays, then, are the mother soils of the coal seams. They are usually from one to six feet in thickness, and composed of a soft, homogeneous clay, whitish or gray in color, highly plastic, and, when sufficiently free from the fluxing elements, capable of withstanding in a remarkable degree the action of heat. It is important to remember that these underclays of the coal seams are the only sedimentary clays which possess in a high degree this refractory property. Its presence in them is due to the absence of a large percentage of the alkalies and other fluxes. This absence is the more notable since all other sedimentary clays contain these fluxes in quantities sufficient to cause fusion at a comparatively low temperature. Their disappearance from the fire clays is explained by the fact that these clays formerly supported so vigorous a growth of aquatic plants; for it is a well proven fact that such vegetation, aided by organic acids which are formed in the submerged soil, has the power of absorbing from such soil all, or nearly all, the alkalies, iron and sulphur found therein. This leaves the soil rich in silica and alumina, which are the leading constituents of the fire clays. The absorption of the iron oxides also causes these clays to assume that ashen gray color so characteristic of them.

—Alluvial Clays.—

Along the lowlands of the Ohio and Wabash rivers and their larger tributaries are found, at intervals, enormous beds of "alluvial," or river-bottom, clays. These are sedimentary clays of the most recent times, and owe their origin either to deposition in the eddies of those streams or to the slow accumulation of the clayey sediment during the annual overflows of the areas which they occupy. Oftentimes they alternate with strata of sand, or even gravel. In some places they are thirty to fifty feet in depth and free from pebbles or coarse impurities of any kind. They are usually very plastic, owing to the presence of more or less lime and iron oxides in a finely divided state. In Ohio similar clays have been used for several years in the manufacture of paving material, but in Indiana their only use heretofore has been in the making of ordinary building brick.

—Drift Clays.—

One other form of sedimentary clay remains to be mentioned, namely, the so-called "drift clays," or "hardpans," which are the characteristic surface clays of northern Indiana. From the shales and fire clays which, in many places, underlie them, they differ widely in the amount of lime and other foreign constituents which they contain. This difference is mainly due to the fact that they were transported to and deposited in their present resting places, not by water in the liquid form, as were the shales and fire clays, but by a great glacier or moving sea of ice. This glacier, thousands of years ago, flowed slowly over the greater portion of our State, grooving and planing the surface of the solid rocks, strewing for hundreds of miles in its track beds of clay and sand and gravel, pushing before it the accumulated soils and clays of centuries, and mixing, transporting and changing them to such an extent as to well-nigh destroy their separate characteristics and greatly increase the difficulty of their proper classification.

The climate of the region to the north of us was similar, at that time, to that of Greenland to-day, or even cooler. The snow, ever falling, never melting, accumulated there in one vast field of enormous thickness. Near the bottom of this mass a plastic, porous sort of ice was gradually formed from the snow by the pressure from above. This ice took upon itself a slow, almost imperceptible, motion down into the valleys to the southward. As it moved thus onward dirt bands were formed along its margins; stones and great masses of partly decayed rock and clay from hillsides and jutting cliffs rolled down upon it, and were carried on and on, until, by the melting of their icy steed, they were dropped upon the clean-swept surface rock below. In this way all the beds of so-called "drift clays" were accumulated where they lie.

In Indiana they form the surface clays north of a line drawn approximately from the southeastern corner of the State to the Wabash river, at a point midway between Terre Haute and Evansville. South of this line the surface clays are, for the most part, the variety of residual clays mentioned above. Transported and deposited as they were, it is no wonder that the drift clays are too impure for any use but the making of ordinary brick and drain tile, and oftentimes they contain too much lime even for this purpose, numerous analyses showing the presence of as high as 40 per cent. of calcareous material. This is due to the grinding up and mixing with the clays much of the surface limestone over which the glacier passed, as the erosion of that epoch not only removed and commingled the previously formed residual deposits, but planed away the country over a vast area to a greater depth than had been reached by any previous decay. These eroded limestones and the clays with which they were mixed were many of them ground into impalpable powder and deposited before a subsequent decay could take place, so that, as has been well said, "the drift clays are, many of them, rock flour, and not, as are the residuary clays, the products of rock rot."

The beds of sedimentary clay now found upon the surface of the earth are very few of them identical with those first formed after the decay of the primitive crystalline rock. That igneous force which, somewhere, is ever pushing the bottom of the sea upward, long ago raised those first shale beds into dry land. Rain and frost again caused their decay, and again did the agency of flowing water mix and grind and bear their particles to the bottoms of new seas and lakes. No one knows, or can ever know, how often these successive changes of elevation, disintegration, erosion and deposition have taken place in the ages past; but the clay base in the materials of our buildings and roadways of to-day would, if traced backwards, lead us through many a geologic change to the granites and gneisses of the old archaean times.

Summing up the statements under the present heading, we find, therefore, that, based either upon the relation of their present location to their place of origin, or the manner of their transportation and deposition, we have the following classification of our Indiana clays:

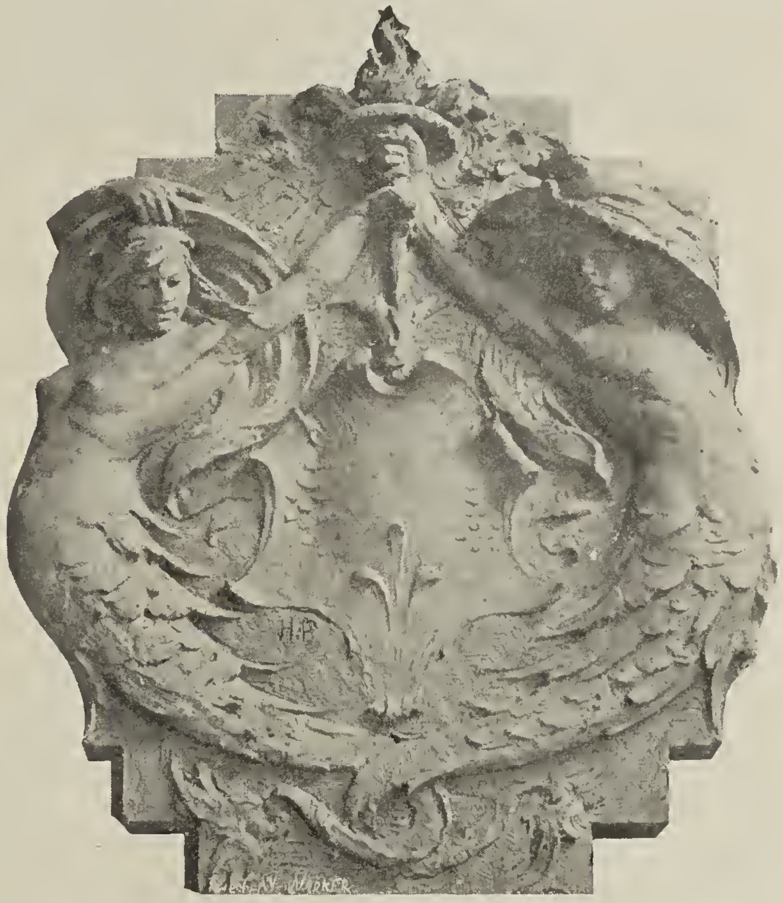
- CLAYS.
  - *Residual.* Remaining on or near the place of their origin.
    - *Rock Kaolins* of Lawrence and adjoining counties.
    - *Surface Clays* of the driftless area of southern Indiana.
  - *Sedimentary.* Removed from their place of origin and deposited in water.
    - Transported by water.
      - Ancient or paleozoic.
        - *Shales.* Laminated owing to deposition in deep water.
        - *"Fire-Clays."* Unlaminated; deposited in shallow lakes or marshes.
      - Recent.
        - *Alluvial.* Deposited by our present rivers and streams.
    - Transported by ice.
      - *Drift Clays.* The surface clays of northern and central Indiana.

W. S. BLATCHLEY.

TERRA COTTA WORK IN PHILADELPHIA.

NORTH, EAST, SOUTH OR WEST, up town or down town, wheresoever the feet may wander or the eyes alight, there will be seen the jeweling or framing of our architecutural attempts with that soft, malleable, impressive and expressive earth's compound, clay, which the modern worker, after baking, for the better mode of advertising his ware, terms terra cotta.

Permit me now to take a backward promenade, say twenty-five years. Would you scarcely credit it? There appeared in New York a young man from the north of England, with face aglow and mind aflame with that empty noun—Hope. For did he not anticipate that here in a new country, a growing country, a country always ready to adopt new and improved methods, energetic and progressive always, would be the Mecca of his success? But, reader, neither you nor I have suffered more anxiety than did this young man, as, day by day, week after week, with that sense of persistency characteristic of the Anglo-Saxon, he waited upon architect and builder, only to be finally told that if he wishes to continue working in terra cotta he would have to return to England.



ORNAMENTAL PANEL FOR RESIDENCE OF JOHN STAFFORD, Broad and Mosses Sts., Philadelphia. Stephens & Co., Architects.

Discouraged, but not beaten, Marcus Spring—that was the young worker's name—fought argumentative theories with the stronger weapons of facts, until one day, in company with a senior architect, his eyes chanced to light on Trinity buildings. "There," said he; "that building is of brick, and see how well it stands, resisting effectually your climatic changes. If brick will stand it, so will terra cotta, since it is a better form of clay."

New Yorkers, however, were not fully convinced, and the years rolled by before any recognition was given to this Bijou of architectural material. Chicago was the first city to honor it, after the great fire—as though she hadn't enough burned earth!—pardon my facetiousness—and our dear, respected Grand Chevalier of the "T" square and Legion of Honor, Geo. B. Post, was the first to honor its use and usefulness in New York city, upon a residence designed and erected by him on West Thirty-sixth street. It is pleasing to know that the conceits and reliefs on this residence were made by Marcus Spring.

The methods then in vogue differ somewhat from the present method. The blocks were made up solidly, and instead of being turned and molded in their plastic condition, were carved with the tools of a wood carver when the material was almost dry. As all the material was then turned out from Chicago, it was invariably of a stone color, due to the lack of education in color and to the peculiar clay of Illinois soil.

Pediment Panel, Central School, York, Pa. Stephens & Co., Architects.

The charming opportunity now afforded for quiet, quaint or very pretentious effects caused a flame of enthusiasm to spread over the country from Maine to the Pacific, and ere long New York, Philadelphia and Baltimore had opened up in an industry requiring many thousands of dollars as capital and many hundred hands for labor.

Eight years had passed, and now the Brooklyn Historical Society's Building, an emanation at the hands of Geo. B. Post, as also the Produce Exchange and the Cotton Exchange, were the first large buildings to have their facades ornamented, age dignified, and more in consonance with brick work than the many harsh and unsympathetic reliefs of stone. We are now living in an age when stone work, while always a very useful accessory, is ofttimes a painful one, the inclement weather causing an exudance of iron, and rusty, black and grimy streaks, chasing each other down a well-tooled stone front, do not, in my mind, lend a charm. Terra cotta is now a charming accessory, a proper relation to the brick, lending its presence in so thoroughly a friendly and harmonious vein, and with a delicacy so subtle and refined, that the broad range of its acceptance should be both a joy and a financial success to the clayworker "forever and a day."

Toward the eighties the question of color arose, and New York agitated the question of red. Boston, less modest and more colonially inclined, requested a buff, and somewhere else a brown, until there arose en masse suggestions that led the many wiseacres to say, "The only way to get it will be to paint it." How delightfully infantile we seem when we are ignorant. What would be said of painting terra cotta to-day?

When one glances casually on the front of the Montauk Club House, in New York, the attention is thereon immediately riveted, and why? Because the decorative feature, bearing out in full significance the Indian name of the club, gave every opportunity to its designers to perpetuate in the ensemble of the past history of America's shores the trophies and implements of the primitive Indian. Here is an education for the rising generation, giving truth and perpetual significance in a material that, twenty-five years ago, was downtrodden, truly despised as an ornament, ignored as a medium of strength.

New York Casino, the facade of Harrigan's Theater, the Hotel Imperial, Madison Square Garden, are a few of the New York buildings, while Philadelphia is represented by the mammoth structure of the Mutual Fidelity Building, Musical Fund Hall, Pennsylvania Depot at Broad street, and the Reading Terminal at Twelfth and Market. The Fidelity Storage, Market street; the new Horticultural Hall, now in course of erection; the Harrison office building, at Fifteenth and Market streets, and store building, at Tenth and Market, and a good bit of color work on Roger's carriage factory, Walnut street, all bear signal evidences of the strong support terra cotta has received during the past five years at the hands of our architects.

An example here reproduced is a panel from the facade of the Fidelity Storage House, designed by Architect C. Balderston, modeled by Prof. H. Plasschaert and set up by Stephen & Co., of Philadelphia.

To Architects McKim, Mead and White belong the credit of having unremittingly devoted their energy in obtaining the charming Pompeiian or mottled effects, and which, I think, was first used by them on the Tiffany House.

Having treated of its rich uses, let us glance now at its poorer abuses. I can recall the measure of consternation when, remodeling the Musical Fund Hall, Architect Addison Hutton decided to relieve the severe looking front with reliefs in capitals, panels and corbels. This was set up, and in a pale buff tint of terra cotta. I opine that the clay had been but sadly baked, for the result was most disastrous. It was finished in the fall of the year, and early in the following spring, in company with three or four architects, we made an inspection. On all sides the material was cracking and peeling off, like sugar from a plum cake. "So," said a gray beard, "that is terra cotta. Well, give me none of the beastly stuff." And think, that was in 1889! Fortunately for the architect, his contract was an iron-clad one, and as the firm has since remedied their past errors we will omit all names.

The next serious problem was the treatment of surfaces, but this was finally overcome by the efforts of a New York architect, C. L. W. Eidlitz, by introducing the combed and crinkled effect of the surfaces, to assure its better retaining or binding qualities necessary for all detail work. The use, or rather the abuse, of setting up projecting cornices of terra cotta in box form or hollow is to be deplored, as it affords an opportunity for the rain to enter, and during severe weather this will freeze, and breaks and cracks will result. However, this is now obviated by making the joints fast and treating them with cement and a solution of muriatic acid.

In closing my paper I do so with the assurance that terra cotta and good brick have to-day reached an altitude at once dignified and expressive, and I venture to say their term is a long one. W. P. LOCKINGTON.

Early in the year a disastrous fire occurred in the eight-story office and store building on Chestnut street, this city. The Haseltine Building, designed and erected under the supervision of N. P. Lockington, architect, in 1888, was entirely gutted, and while the flames spread east and west, causing a loss of $1,250,000, it is happily noted that all the terra cotta reliefs (and there are many) on the facade of this building have most effectually withstood the soul-destroying elements of flame and heat. Indeed, it may be added that the small parts affected by the smoke have an additional picturesqueness. W. P. L.

Written for the CLAY-WORKER.

SUCCESS AND FAILURE IN BRICKMAKING.

MOST NEW BRICKMAKING industries come into existence during periods of unusual business activity. The same rule applies to enlargements of plants, and in most cases "the boring is done with a large auger." In considering the capacity of the plant present demand only is considered. Past demand, which need not be guessed at, is given no consideration whatever, while future prospects are viewed through a lens of large proportions, with the result that a plant of 100,000 daily capacity is put in where one of one-half that capacity would have been ample to meet all demands, at least in the very near future. Or where 25,000 daily product would have answered, 50,000 daily product is thrown on the market. The experience of the past three years has demonstrated this statement.

Let us consider briefly the results of the "large auger" plant business—$100,000 invested, output 100,000 bricks per day, 2,500,000 per month. This requires an organization of adequate proportions, president, general manager, secretary and treasurer, superintendent, bookkeeper, etc. Business during the first, and, perhaps, second, year of its existence is active and works kept fairly busy, and dividend of 10 per cent. or even more is declared. Then demand, or, rather, consumption, decreases, and business grows beautifully less. The management cannot entertain for a moment the idea of curtailing production. The plant must be kept running. Greater efforts must be put forth to dispose of the product. When this scheme fails, the next device is to reduce prices so as to induce people to build. Then a reduction is made; still supply is far in excess of demand, and a still greater cut in prices follows. This to shut out all competitors and small concerns, so that we may secure the whole trade, and yet the stock accumulates.

A TERRA COTTA PANEL IN THE FIDELITY STORAGE HOUSE, Philadelphia. Stephens & Co., Architects.

Then the time comes when the facts must be squarely met; production must be curtailed; the force must be reduced, also wages. This is an unpleasant feature. The employes can be reduced in number. The management, however, is complete and cannot well be reduced without serious embarrassment. Hoping for better demand soon, it is decided not to interfere with the salaried force. Time brings no relief, and it becomes necessary to reduce salaries of officers. Even this does not restore the wandering dividends, and the office of president and general manager is consolidated; also secretary and treasurer are made one, departments are consolidated, and yet dividends are shy. Wherein is the difficulty?

The plant is too large on an average. There is not sufficient demand, one year with another, to support a plant of this magnitude. It takes the stockholders, in some instances, many years to realize the "largeness" of their auger.

This state of affairs leads with unerring precision to low prices. When a plant of this kind wakes up to the situation, after all the efforts to sustain the volume of business have failed, they conclude that they are, perhaps, not making the right kind of brick, and endeavor to sustain their business by making a new line of goods for which their clay is not well adapted. In this they put in more capital, when the trouble is they have already too much invested in the business.

The only remedy is to reduce the capital stock and all expenses. Reduction of capital stock in the case of a national bank is a simple matter. Money can be returned to the stockholders. When capital is represented by machinery, dryers and brick walls it is a difficult matter to turn part of it into money for the stockholders. In most cases the concern refuses to see the true condition of affairs and attempts to fight against fate, and the usual result is the appointment of a receiver. There are many large brick plants in the condition described, at the present time, in many parts of our country.

If men, when contemplating the organization of a brick plant, would carefully consider the consumption of brick in the territory within their reach, and put in a plant that would be only large enough to insure a paying business. A little garden well tilled, a little purse well filled, is best in this case; a small plant, well managed, and one that is usually pressed to keep up with orders, will pay large dividends on the money invested and give steady employment to the operatives, as well as to the officers, while a plant too large pays small dividends for the reason that there are two dollars invested where one dollar would answer every purpose. It worries everybody connected with it, and, worst of all, brings down the price of bricks in their market to a point where there is no profit in the business to them or their competitors.

In many places low prices can be traced to this source. Men who have had lifetime experience know that low prices do not increase production so far as bricks are concerned. I believe it is the experience of nearly every brickmaker that he sells more brick when prices are good than he does when they are low. Organized effort on the part of competing brickmakers is so far the only preventive of ruinous prices in dull times. Let us have less large auger plants, if possible, in the future.

A GOOD OLD BRICK.

There is a brick just about two thousand years old being exhibited at the office of the Don Valley Pressed Brick Company, 60 Adelaide street, east, Toronto, Ont. The brick was taken from one of the inner walls of the Coliseum at Rome, and its antiquity may be imagined when it is said that the Coliseum was opened to the public in A. D. 80. This, however, does not give a just idea of the age of the Coliseum or of this particular brick, for many years before this the Coliseum was started by the Roman Emperor, Vespasian. One of the employes of the Don Pressed Brick Company, who spent the winter in Rome, managed, against all rules, to get one of the bricks from the Coliseum. After two thousand years of wear and tear the brick is just as hard and firm as if made yesterday. It differs from our modern brick in that it is rough, being hand-made and being of a peculiar shape. It is about a foot long, four inches wide and slightly over an inch thick. Pieces of mortar still cling to it, and in its old age this brick is still well preserved.—Ex.

Written for the CLAY-WORKER.

IN DEUTSCHLAND. No. 4.

The Clay-Worker Correspondent at Lauban, Visiting the Pioneer Face-Brick Factory of Germany—The Brickmaker's School.

OUR ONWARD JOURNEY took us due south, our immediate destination being Lauban, a small city having the distinction of possessing the oldest front-brick works of Germany and a trade school established solely for brickmakers. Some distance north of Lauban the somewhat tedious plains of North Germany disappear, and a pleasing landscape of gently sloping, wooded hills, the outrunners of the Silesian mountains, takes their place. Lauban is a quaint town, partly modern, partly belonging to bygone days. Its older, narrow streets have that delightful air of antiquity and mystery which always attracts those whose life has been spent in a country but newly reclaimed from the savage waste. Our stopping place was an ancient inn; at least it looked so on the outside, and we were delighted in the prospect of staying at a genuine old-time hostelry, but our illusions were cut short by the appearance of a waiter in a swallow-tail coat, who showed us our place in a dining room where everything was strictly table d'hote. Having satisfied our curiosity in regard to the appearance of the town, we lost no time in looking for the attractions which brought us to Lauban, and we decided to pay the Lauban Clay Works our first visit. A short walk took us to the factory, situated close to the railway tracks, and, after the usual formalities, permission was granted us by the director to inspect the plant.

—A Model German Brick Plant.—

The works, in point of exterior appearance, we believe, do not find their equal in the United States. All the buildings are built with a regard to the architectural proprieties. Even the barns and straw sheds are built in a neat and pretty style, and it would be well for us to imitate them in that respect. However, the arrangement is somewhat irregular and does not correspond with our ideas of modern brickyard construction, but it is to be considered that the plant was established in the earlier part of the fifties, first on a small scale, afterwards growing around the nucleus to its present extent.

One of the office force was detailed to act as our guide, but we regretted that the man could not give us all the information we desired. The clay is a plastic material, burning a beautiful red. It is thoroughly prepared by being run through two pairs of roller crushers and pug mills. All the brick are made in auger machines in the usual way, and are recut on the simple apparatus, mention of which appears in the May Clay-Worker. Grog is extensively used, brickbats being ground up for this purpose in ball mills.

Much attention is paid by this concern to terra cotta and glazed brick; the latter are chiefly lead glazed. The modeling and pressing department occupy spacious, well-lighted rooms.

The brick are dried on racks, the drying rooms being heated partly by the heat radiated from the kilns, partly by the exhaust steam of the engine. There are two large continuous kilns fired with gas, of fourteen and sixteen chambers, respectively; four muffle kilns, with down draft for very high temperatures, and four muffle glaze kilns. The gas for each of the continuous kilns is produced by three generators, one being always idle for the purpose of undergoing cleaning and repairs. The output is remarkably uniform in color, and the soft brick, as we were told, amount only to 1 or 2 per cent. Great care is taken in the shading of the brick. The stock piles are numerous, owing to the many kinds and shades of brick. The excellent quality of the brick, combined with the continued exertions of the manufacturers to keep it up to the standard, has given to the Lauban ware a reputation extending all over Germany. Of course, the chief market is Berlin, but the products can be found throughout Germany and Austria.

When the Lauban Clay Works were founded by Mr. A. Augustin in 1854 they were then the only concern in Germany manufacturing high grade brick specially for building fronts. The beginning was a humble one, but to-day the company owns two factories, the one at Lauban and another one at Heidegersdorf, several miles distant, employing, together, some three hundred people. A walk through the draughting rooms concluded our visit to the concern.

Counselor A. Augustin.
Director of Brickmakers' School at Lauban.

—The German Brickmakers' School.—

To the brickmakers' school was paid our next call. This institution is located in a vacated old courthouse and has the range of the entire building, which is admirably adapted for the purpose. The rooms are spacious and well ventilated, so that in point of location nothing better could be desired. Mr. A. Augustin, one of the originators and at present director of the institution, welcomed us in a hearty manner, and gave us the freedom of the school, of which we were not slow to take advantage. What we saw was a surprise to us, for, knowing that the institution was established only in 1894, we did not expect to see much in the way of facilities. The equipment in the line of machinery was especially complete, including an elevator for conveying the raw material from the ground floor to the second story, a disintegrator, a pair of roller crushers, an auger machine and cutting table, a roller press, a roofing-tile press, a hydraulic press, a ball mill, a glaze mill and blungers. The power is furnished by a gas engine. Soak pits and tempering floors are arranged beside drying facilities for slow and fast drying. One room is set aside for the making of plaster molds for terra cotta and other molded ware. In the ground floor the kilns are erected, down-draft and muffle. In the burning use is made of the Seger cones, instruments for measuring the draft and apparatus for determining the constituents of the combustion gases, thus ascertaining the efficiency of the furnaces.

Some of the old court rooms and offices are converted into class rooms and laboratories for the theoretical work and the work in chemical practice, drawing and modeling.

A few words as to the object of the school. It is intended to give to young clayworkers in a year's time sufficient practical and theoretical training to enable them to fill the positions as foremen of brick factories. It has been found necessary to limit the course to a year, as many young men have not the time or the means to pursue the longer courses offered by other ceramic schools.

The following is a schedule of the work accomplished in the course:

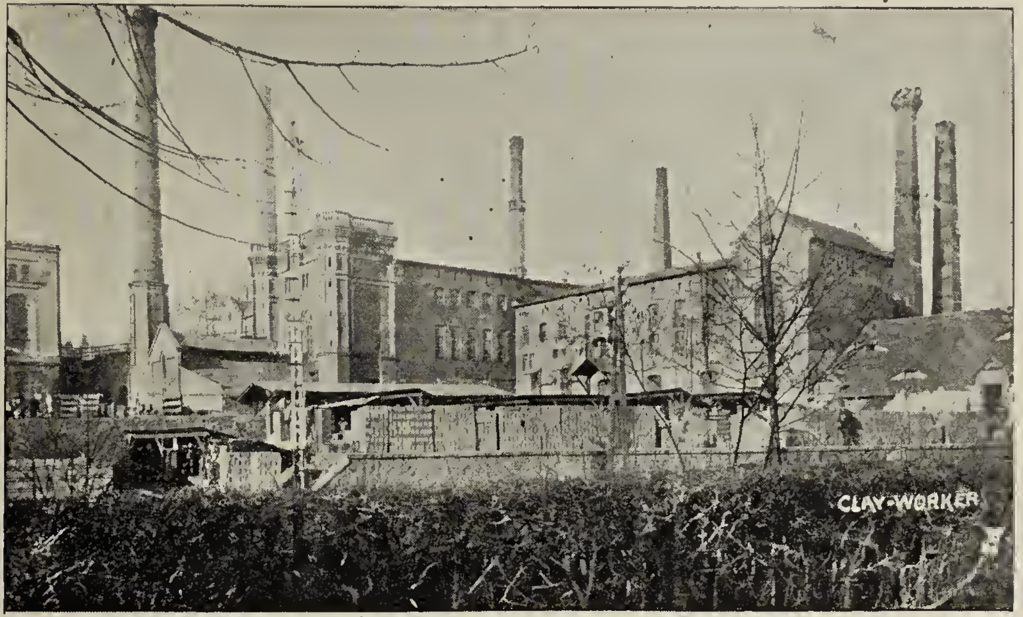
The practical instruction comprises lectures and laboratory work, treating the origin, mining and properties of clay, the manufacture of brick, tiles, roofing tiles, fire brick and terra cotta by hand and machines, the compounding of engobes and glazes, burning and the different kiln systems. Much attention is paid to drawing and modeling. The theoretical part is, of course, limited to absolutely necessary branches, and includes the elements of geology, physics, chemistry, mathematics, mechanics, as far as they pertain to the brick industry, bookkeeping, business law and hygiene. The students were a body of intelligent looking young men. They seemed to improve their opportunity by hard work. With such a man as Mr. Augustin at the head the school will certainly continue to flourish. For the accompanying view we are indebted to Mr. Laschke, the Mayor of the town of Lauban.

Our errand being fulfilled, we resumed our journey, but not before visiting the pride of Lauban, the Steinberg, a hill from which a delightful view over town and country is obtained.

Silesia is rich in clays of all kinds; white, yellow and red burning clays are abundant, furnishing excellent material for the manufacture of pottery and all kinds of building material, and this region is fitly called the face-brick belt of Northern Germany, a number of well-known plants being located in this district, of which the two visited are the most widely known. It was a matter of surprise to us that nowhere are dry presses used for making front brick, although there is plenty of clay which seems admirably adapted for the dry process. Once proved that the dry process is a success, it will undoubtedly, at least to some extent, be adopted, and the dry-press manufacturers will reap a harvest. By the way, dry presses like ours are not built in Germany. Two systems are built only. The one is constructed with a trip-hammer arrangement, like some of the old St. Louis machines, for accomplishing the pressing. The other one is a hydraulic press. Neither machine is in any way equal to ours, the first making too poor a quality of brick, the latter having too small a capacity for making front brick profitably.

BRICKMAKERS' SCHOOL AT LAUBAN.

The next stopping place in our route was Goerlitz, a pleasant city in a pleasant country, one of the important towns of Silesia. There are several yards making brick and roofing tile in the vicinity, but as far as we could observe they offered nothing of special interest, answering, in the main, to the descriptions of the brick plants already given. The brick were made with auger machines, dried on racks above the kiln, and, of course, burned in continuous kilns. The drying floors were constructed straight, above the kiln, the usual construction found throughout Germany. A typical dryer of this kind is shown by the accompanying cut, as built by a prominent kiln builder, Mr. Otto Bock. However, attempts have been made to modify this construction in order to render the drying more regular, to prevent waste of the radiated heat by forcing the warm air to flow through flues or stacks, thus permitting of throwing it to different parts of the dryer at will.



THE LAUBAN FACE BRICK WORKS, Lauban.

—German Methods of Drying Brick.—

A short description of these systems will, perhaps, not be amiss. One of them, a down-draft dryer, is the invention of a Mr. Cohr. In this arrangement the drying floors are constructed at the sides of the kiln, and are divided into spaces, each of which communicates with a wooden stack. These stacks are built sixteen to twenty feet apart. The roof is made perfectly tight so that no warm air can escape, but all of it is forced to go through the stacks. The floor of the drying chambers is a double one, the upper one being a lath floor, the lower one tight, thus forming an inclosed space which connects with the stacks, in this respect resembling the main flue of a down-draft kiln. Now, the air coming from the outside passes over the kiln, where it is warmed and rises, but, finding no other outlet, is compelled to flow through the lath floor into the stacks.

The second system, invented by a Mr. Ohle, is very similar to the preceding one. However, it differs from the first named in this respect: the stacks are done away with and the saturated air escapes between a double roof.

There are yet several other systems in use at isolated yards, but none offering any points of special interest. It is claimed that the simple system of drying by the up draft of the radiated heat gives the best result. We have been told that some tunnel dryers, heated by steam, where the brick are set on cars, are in use, but we never chanced to see one. However, lately, in the last two or three years, some inventions have been made in the line of a continuous chamber drying system, with direct heating by combustion gases, which seem to embody the principles of true economy. The most prominent of these inventions is that of Dr. Moeller, which we will consider in detail later on.

From Goerlitz we continued our tour westward at a leisurely rate, coming within the boundaries of the Kingdom of Saxony. In fair Dresden it was our intention to visit a prominent ceramic establishment. However, fate was against us, for admission was politely refused us. This was our first experience in being refused admittance to a German clayworking concern, but, as we must state, not the last one by far, so that in our further travels we were always prepared to beat a dignified retreat. There still seems to exist some remnants of the old "trade secret" spirit, especially in establishments producing the higher grades of clay ware. Telling a gentleman prominent in ceramic circles about it, we received the reply that strangers are often looked upon as spies sent by competitors who are endeavoring to acquaint themselves with the appliances of the factory. However, these unpleasant experiences were more than overbalanced by the cordial reception accorded us by other concerns.

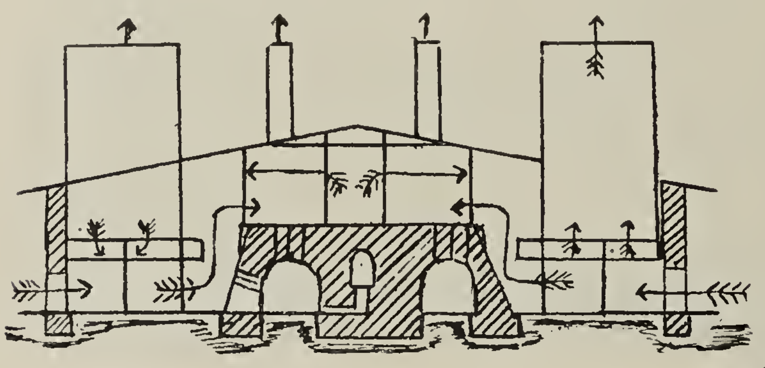


Figure 2. Cohr's Dryer.

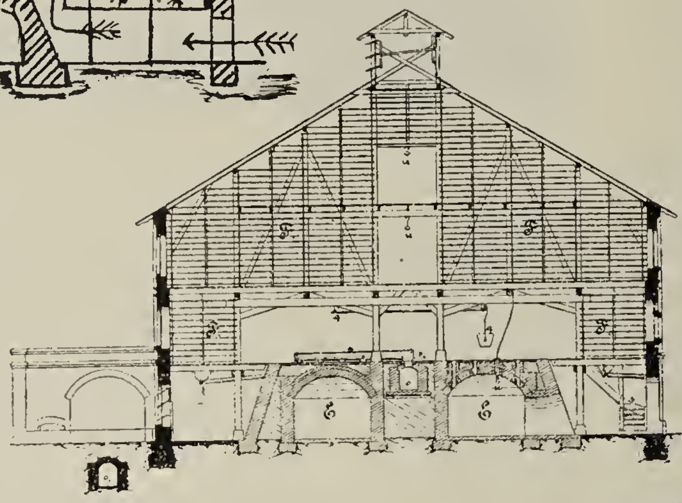


Figure 1 Bock's Dryer.

We found no difficulty in enjoying the stay in German Florence, for Dresden truly is the most beautiful city of Germany, its charming environment rendering it the more so.

(To be continued.)

A FUEL SAVER.

Mr. W. C. Peterson, Superintendent of the Fremont (Neb.) Continuous Kiln Company, writes that business in the brick line continues very dull in that section, but that better times are surely ahead, and, when they set in, the F. C. K. Co., which manufactures brick and not kilns, as their name would indicate, will be ready to meet the occasion. The only new thing, he says, of any importance in that vicinity is a fuel-feeding apparatus, invented and patented by his neighbor, Mr. A. O. Mueller, which he thinks is an excellent contrivance, as with it the work of firing the boilers and kilns is reduced very much and a less quantity of coal is used. He thinks, too, that it will prevent loss from the cracking of brick in the arches, as no cold air is admitted when the Mueller device is used.

TERRAZO TILES.

SINCE the year 1824, when Joseph Aspdin, of Leeds, England, after years of experiments finally succeeded in making a high grade hydraulic lime, which he called "Portland cement," the development of the processes for making it and the widening of its application in the structural arts have steadily progressed. Portland cement takes its name from the fact that the hardened cement resembles in color and texture the widely used Portland stone of England. About the year 1860 the manufacture of Portland cement began to develop into a considerable industry in Germany, and in that country the painstaking researches of chemists and physicists soon solved a large number of the unknown problems connected with the peculiar characteristics of this material and opened the door to many special industries. Of these, one of the most important is the making of the so-called "mosaic cement" and "terrazo" tiles.

Portland cement being a chemical compound, any special application of it must be based upon a fixed standard of purity. Happily the Association of Portland Cement Manufacturers of Germany has adopted a standard which is governed by regulations fixed by the highest authorities. Thus, while every maker of Portland cement belonging to that Association may go as far above that standard as his skill and conditions permit, none may go below it.

One of the most interesting and difficult of the series of problems presented was that connected with the use of colors with the cement. Finally, however, these problems were solved, and as one result it is now possible to make, commercially, Portland cement tiles in any desired color, design or size, and so much stronger than clay tiles that, as they cost but a fraction as much as the latter to produce, and are equal to them in every point of beauty, are destined in this country, as in Germany, to universal introduction.

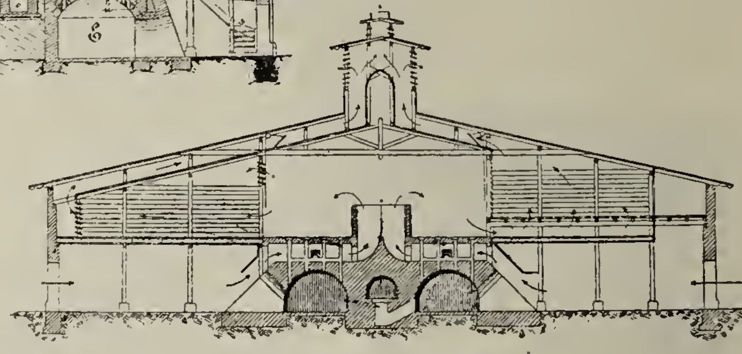


Figure 3. Ohle's Dryer.

—The Process of Making—

Them, as perfected by Dr. Bernhardi, founder of the firm of Dr. Bernhardi Sohn, G. E. Draenert, of Eilenburg, near Leipzig, Germany, is as follows:

Suppose a tile of one color is to be made (the approved dimensions being a trifle less than 8 inches by 8 inches by ¾ inch), Portland cement and the cement colors are mixed in a given proportion, which varies for each color. In a separate box cement and coarse sand are mixed for the purpose of making the base of the tile, as the use of pure cement would add unnecessarily to the cost. This mixture of sand and cement is then put into a steel mold, and upon this base is spread the colored cement. All is in about the same condition as clay in making dry-press brick. The mold is then set into a press and subjected to a pressure of about two hundred thousand pounds. Upon coming from the press the tiles are placed in wooden racks, where, at given intervals, they are moistened so that the setting of the cement and color may be completed. Age is all they require after this, and they are ready for use.

By the use of suitably grooved top and bottom plates any form of mosaic effect is secured.

When it is desired to produce a tile of given design and combination of colors, patterns are used identical in kind with those employed in making the same effects in clay tiles, and the process of inlaying is the same. No skilled labor is required anywhere and the work is light. A man and two boys will easily turn out six hundred plain tiles in ten hours, and, with two girls to assist in inlaying the colors, as many tiles in designs. As the colors are not particularly expensive, it will readily be seen that these tiles can be made at a cost of less than 10 cents per square foot.

"Terrazo" tiles are made of a mixture of colored or uncolored Portland cement and broken stone of any variety that takes a polish. In Germany these are made by hand. At the works of Theo. Welge, Esq., St. Louis, Mo., they are made on the same press and as quickly as the cement tiles.

In 1894 Mr. Welge went to Germany to investigate the art of making cement tiles, and, as a result, bought an outfit from the firm above named, and early in the winter of 1894 began operations. The production of cement tiles, in single colors or designs, proved a simple matter, being little more than the use of certain formulae in mixing and the carrying out of instructions as to the care of the tiles after leaving the press. But the successful making of the terrazo tiles, from the commercial standpoint, under American conditions, was quite another matter. As stated, in Germany these tiles are made by hand, the broken stone being set in wet cement, piece by piece, and the green tile remaining in the mold several hours before being taken out. Then, after being seasoned, the face of the tile is ground and afterwards polished. After about a year's experimenting Mr. Welge perfected a method whereby all is done by machinery, and as a result the terrazo tiles can, according to his inventions, in connection with the Bernhardi press and processes, be produced as quickly and cheaply as the pure cement tiles. What that means will readily be clear when it is considered that the waste, or spalls, in marble, granite, onyx and other quarries and works, may be taken and crushed, and by using a suitable screen, even sizes secured, which, in terrazo tiles, produce effects equal, and in many instances superior, to the original stone.

To those conversant with Portland cement it is unnecessary to say that where the cement is properly handled a degree of hardness surpassing most stones is secured.

And as there is no limit to the size of the product, baseboarding, wainscoting, table tops, hearths, mantels, sanitary goods and a hundred other articles can be made, all with the same outfit. This being true, it will be seen that the general introduction of this industry has a bearing upon architecture little less than tremendous. And this will the more fully appear when it is considered that, exclusive of building, but inclusive of dynamo, where electric power can be rented, the total cost of a plant, fully equipped in every detail, erected in running shape, need not exceed the very modest sum of five thousand dollars.

It is another of the many instances in modern industrial history where the utilization of a waste product forms the foundation of a useful art.

The firm of Dr. Bernhardi Sohn, G. E. Draenert, have appointed Mr. Theo. Welge general agent for the sale of their machinery in the United States, his sole representative being Mr. H. B. Hilgeman, 306 Oriel Building, St. Louis, Mo., the well-known expert in clays, who has undertaken the task of the general introduction of this industry in this country, and who, no doubt, will gladly reply to all requests for information in that connection.

NOT SUCH A VERY STRANGE STORY.

In a recent sermon on the newspaper the Rev. Dr. Talmage told of an aged woman who, while earning her living by knitting, one day unwound a ball of yarn which contained in its center an old bit of newspaper. On this piece of paper was printed an advertisement which told her she was the heiress to vast wealth. The tale is strange enough to sound like romance, yet how many thousands, in unrolling the thread of their business lives, have found their heritage of fortune in newspaper advertising?—Philadelphia Record.

OBITUARY.

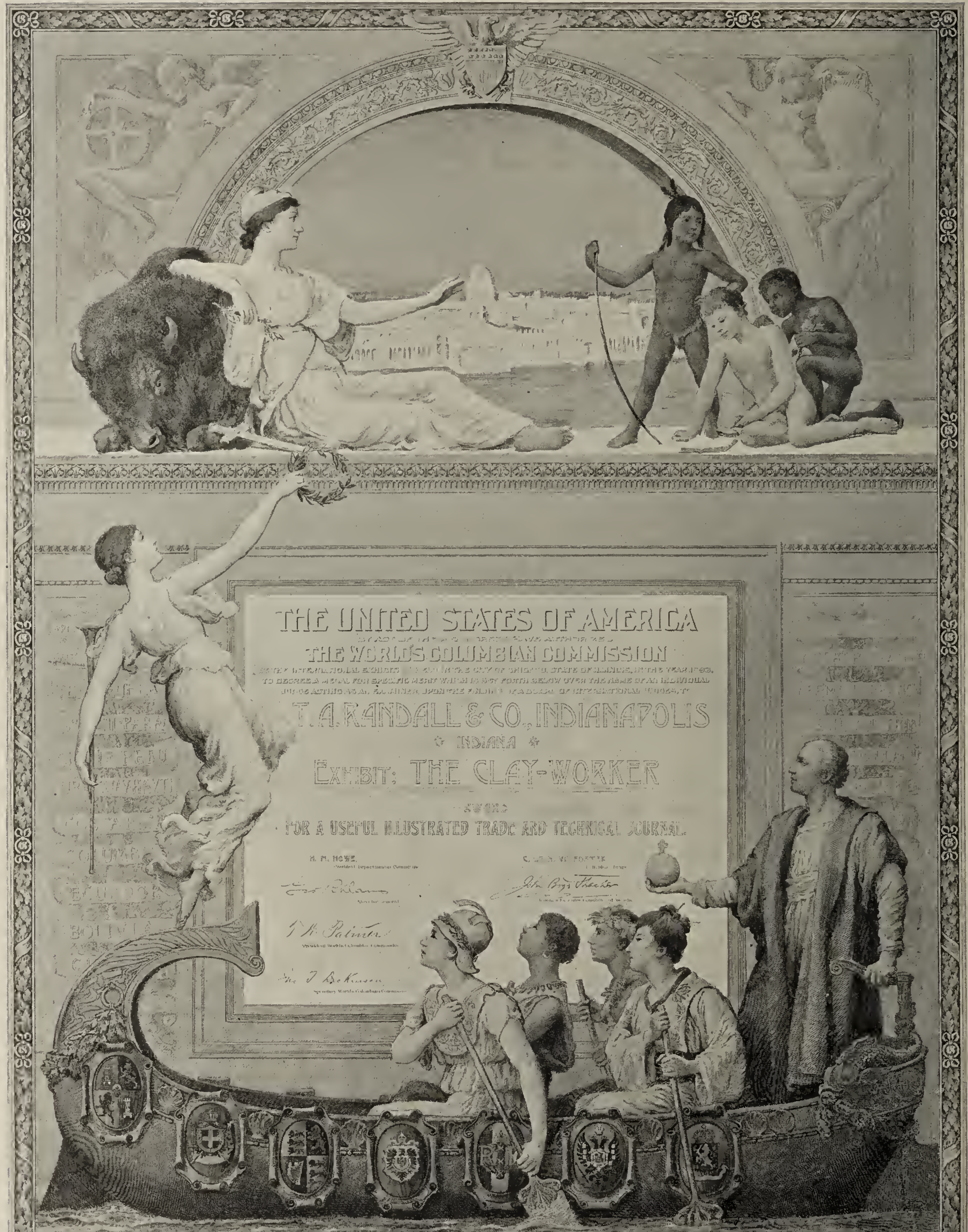
EDWIN T. HOWARD, of the corporation of the Evens & Howard Fire Brick Company, St. Louis, Mo., who died recently, was a native of that city, having been born there Feb. 5, 1851. He was a graduate of West Point, and served in the army for two years, resigning in 1875 to take a position with the Evens & Howard Fire Brick Company, to which he has since given his entire attention. Much of the success of this great concern, which is among the leading fire clay establishments in America, is due to his excellent business judgment and untiring labors. He was an enthusiast in all matters pertaining to clay work, and his untimely death, due, in part, to too close attention to his duties at the factory, is a calamity to the entire clayworking fraternity. He leaves a widow and three children. His elder brother, Laclede J. Howard, President, who has been the manager and business head of the corporation for several years, will continue in that capacity, so the firms business will go on without interruption.

EDWIN T. HOWARD, Deceased.

A PAVING BRICK TRUST.

Said to be in Operation in Iowa, and Suit Brought to Prevent the Letting of Contracts.

SOMETHING of a sensation has been created among the paving-brick makers and users in Iowa by a suit brought by S. A. Robertson, DesMoines, a stockholder in the Iowa Brick Company, to prevent it from bidding on contracts for paving, which the city will let June 1. An injunction is asked on the ground that the paving-brick manufacturers of the city are in an illegal combine or trust for the purpose of regulating prices. He charges that a trust has been formed by all the brickmakers there, and that they are charging the city more for paving brick than they charge outside cities. This is admitted by the brickmakers, who make no denial of the trust, which was formed for mutual protection. Robertson has been frozen out of the management of his company, and takes this method to get revenge. Robertson threatens to stay by the suit to the end. The brick industry is the largest in the city, employing about seven hundred men. There are four companies in the combine—the Iowa, Capital City, Flint and Des Moines Brick Companies.—Iowa State Advertiser.



THE UNITED STATES OF AMERICA

THE WORLD'S COLUMBIAN COMMISSION

T. A. RANDALL & CO., INDIANAPOLIS

INDIANA

EXHIBIT: THE CLAY-WORKER

FOR A USEFUL ILLUSTRATED TRADE AND TECHNICAL JOURNAL.

H. M. HOWE,

John Boyd Thacher

T. W. Palmer

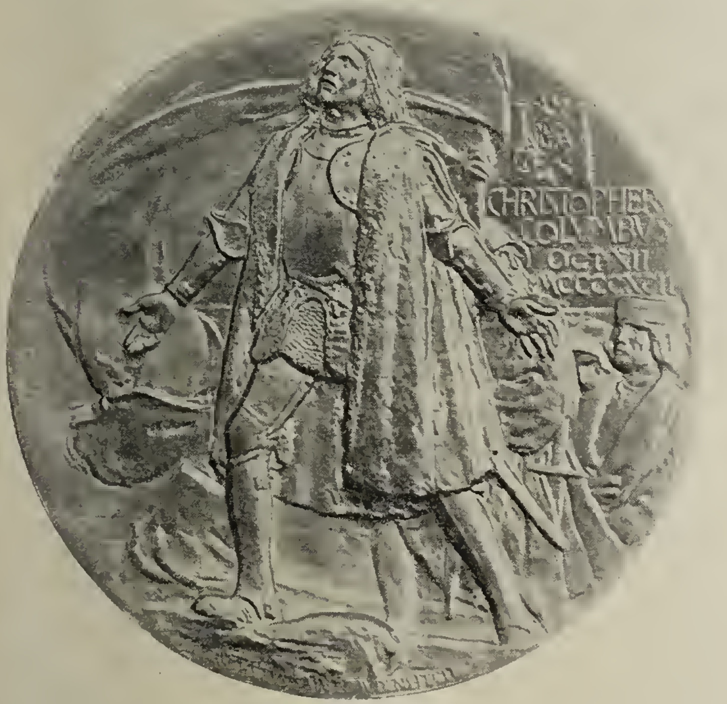
Facsimile of Diploma Awarded the Clay-Worker by The Worlds' Columbian Exposition—**One-Fourth size of Original.**

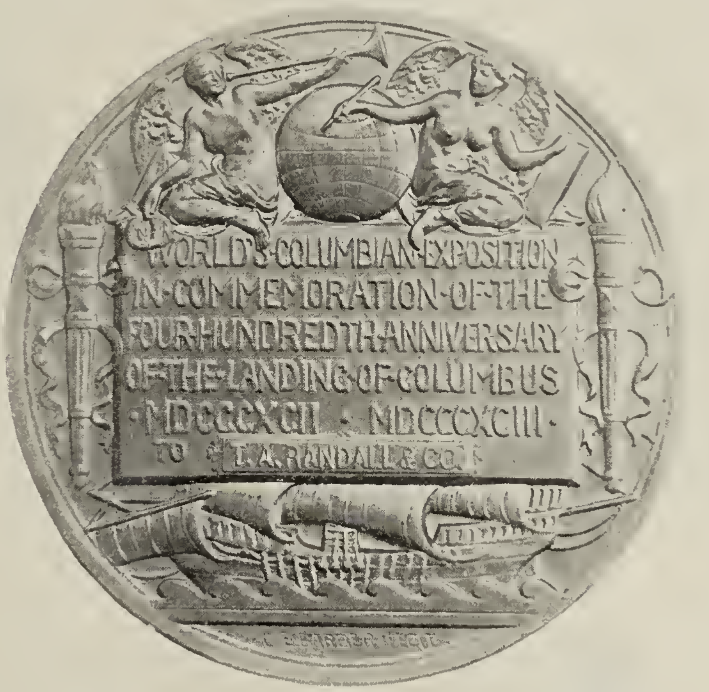
OUR COLUMBIAN EXPOSITION MEDAL AND DIPLOMA OF AWARD.

THE CLAY-WORKER has recently received the medal and diploma of award from the Columbian Exposition, which are here illustrated. The medal is of bronze, three inches in diameter, beautifully executed, mounted so that it can be seen from either side without touching it, and inclosed in a beautiful aluminum case. The medal was designed by Will H. Low and C. H. Barber and the diploma by Will H. Low. The diploma, which is printed on parchment-like Japanese paper, furnished especially by the imperial paper mills of Japan, represents a very great advance in the artistic development of our country. Like documents issued by the Commissioners of the Philadelphia Exposition were commonplace. In 1876 the Commissioners did not deem it necessary to secure the services of highly trained artists for such work.

In the Columbian diploma we have a work of art creditable to our country, to the Commissioners and to the designers. Every detail shows the work of the artist, as our readers may see. The boat representing progress is beautiful in detail, and decorated in a masterful manner. The figures are those which could be designed only by a cultured and highly-trained artist. The figure over the bow of the boat which extends the laurel wreath to American industry is a charming conception. The border which surrounds the diploma, the architectural decorations which are in use for the string course, the arch, the panel and the lettering in the panel and on either side of it are most artistic in treatment.

The Clay-Worker is proud of recognition in this way. It is a recognition by a distinguished authority of our position among a high type of industrial journals. The recognition for distinguished service to the country at large or to a class by the issuing of medals, diplomas or other insignia of high estimate, has not been a conspicuous part of the practice of our government, as it has been among the governments of the old world, where recognition of this character is esteemed one of the compensations of serious effort. A more general recognition in this way from competent sources and public expression in commendation of earnest effort would have the effect, because of its publicity and distinguishing character, of lifting us measurably above the mere plane of materialism.




WORLD'S COLUMBIAN EXPOSITION
IN COMMEMORATION OF THE
FOUR HUNDREDTH ANNIVERSARY
OF THE LANDING OF COLUMBUS
MDCCCXCII · MDCCCXCIII
TO T. A. RANDALL & CO.

THE TILE BUSINESS OUTLOOK.

FOR THE PAST three or four years the States which have in the past twenty years done the most in the underdrainage of the soil have experienced severe droughts, except in a few localities, consequently the sale of drain tile has been reduced to a minimum. Some factories have closed down altogether, and others are run about half time. Altogether, the business has been dull. Besides, the financial depression has contributed to the further injury of the trade, so that many tilemakers have been seriously embarrassed in business. But we think that the depression in the tile trade has not been worse than in many other lines of business. In our past experience such years of depression have come to the general business interests of the country time and again, to be followed with an increased activity in all the trade relations. So we are led to conclude that the worst is passed, and we shall experience a revival in business from this time on. A presidential year is not considered as favorable to trade. The party fight, however, will soon be over, and the recurring rainfalls reported from all points heard from on the continent indicate a return to a normal supply of water. If so, there will be a revival of activity among manufacturers of drain tile.

In the time of unprecedented droughts very few people will lay tile; they don't seem to think they will ever be needed again, the few who go on with the work understanding more fully the beneficial effects of underdrainage to the soil and subsoil. But when the floods come those who thought they did not need to do any draining change their minds and renew their interest in the work of drainage, and the tile trade is once more flourishing. The indications of an abundance of rain are good, and we feel it in the air that there will be an improvement in the trade before the close of the year.

With renewed activity in the work of underdrainage will come the demand for machinery, repairs and the resumption of business by plants now idle. We advise those who can to have plenty of tile ready when the demand comes, as it will. Some inquiries are coming in from States where little has been done in land drainage heretofore, notably Kentucky, Arkansas, Tennessee, Mississippi, Minnesota, Virginia and Texas.

We confidently expect a very great improvement in the interest in land drainage and tile manufacture as the business of the country resumes its wonted activity and we have once more our usual water supply.—Drainage Journal.

Don't think you know everything about your business. Lots of people can give you points of great value. Get information wherever you can.—Dry Goods Chronicle.

Written for the CLAY-WORKER.

A BRICKMAKER IN HADES.

A FEW DAYS AGO, during the last cold snap, I was sitting before the fire in my office, toasting my shins and idly allowing my thoughts to stray whither they would. I had been out dining with a party of royal gentlemen the night before, and it was but natural I should go over in my mind the bright speeches and witty songs I had heard with the dreamy enjoyment that comes upon the morrow of a convivial evening. I was alone in the office, the boy having gone out to lunch, and was presently startled by a loud and imperious ring from the telephone, different from the half-hearted jingle our black-aproned nymph usually gives. Jumping up, I answered it as follows:

"Hello!"

"Hello!"

"Who is it?"

"This is Satan. That you, old man?"

"Yes. What do you want?"

"Say, got anything special to do to-day?"

"Nop."

"Can you come down here? I want to show you what you're goin' to get some day."

"Yes (a little doubtfully). But how about getting back?"

"That's all right. Go right around to the end of the tube and you'll find an asbestos suit. And say, bring down a mint julip; you'll probably need it before you get back."

"All right."

"Be down right away?"

"Yes. Good-bye, Sate."

"See you later, old man."

Going around the corner to the funnel, I donned the suit so thoughtfully provided for me, and, drawing a long breath, with a whist and a jar I was landed, somewhat shaken and considerably out of wind, in the waiting room of his Satanic Majesty.

I was kept waiting but a few moments before being ushered into the impish presence, whom I found seated in front of a mammoth desk, surrounded by numerous files of letters and so forth, speaking tubes and telephones, all systematically labeled. He extended to me one great hairy paw, all grimy from shoveling coal, and motioning me to a chair with a swish of his forked tail, which he curled up under him and used for a cushion, he finished dictating a letter to his chief furnace man, closed and locked his desk, and proceeded to accompany me around his domains, talking the while in this strain:

"You brickmakers are the toughest lot of customers we have down here, and we get so cussed many of 'em it keeps me thinkin' to get up ways of givin' 'em torture enough. They go right through fire. Oh, yes, singe 'em a little, but they come out smiling and make right for the bar like it was only summer weather, so I had to get up something else, and I wanted you to come down and see if you couldn't give me some pointers."

Upon my suggesting that we had enough of his infernal region on earth, he became indignant and replied: "Mere child's play to what we give 'em here. That's the deuce of it. They're so used to it, it seems just about impossible to get 'em down and make 'em holler 'nuff. But come 'long here and I'll show you what we're doin' for 'em."

In order to facilitate his arduous duties he had put all the brickmakers together in one valley, and the sights that met my eyes, coupled with the fiendish laughter of my guide, caused my thoughts to fly quickly back over my past life, reviewing anxiously each act that was at all questionable and gloating with satisfaction over my few little kind deeds.

The first hideous example was a manager—erstwhile an acquaintance of mine—doomed to the eternal reading of an unsatisfactory report before a meeting of ignorant, disgruntled and badgering stockholders, who interrupted him by questions, each of which required a week's explanation in the answering. A few steps further on I witnessed the agonizing struggles of a brickmaker engaged in a fruitless attempt to make a good dry-press brick out of a sandy surface clay, with naught but open-top kilns in which to burn them. His brows were furrowed and his eyes dim with perpetual weeping.

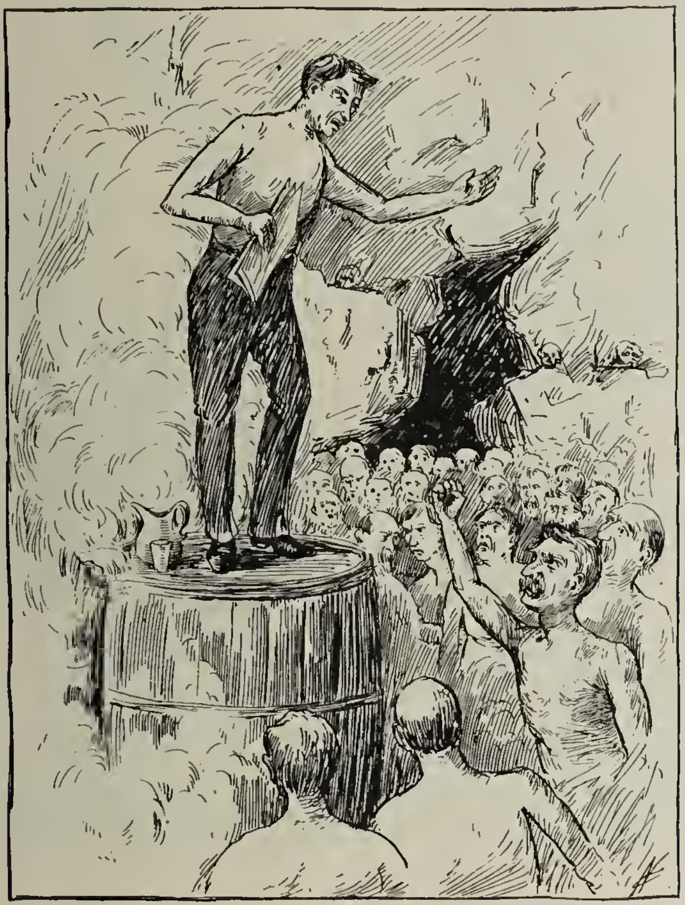
At the third stopping place a man with a careworn face was continually opening up kilns, only to witness the brick go immediately to pieces from the unconquerable lime, while in the distance, upon one of a long string of cars, sat a heavy producer. The railroad company had just doubled his rate of freight, and in the distance, as far as the eye could reach, stretched a line of messenger boys, each with a telegram worse than the preceding, requiring an immediate answer, and saying the buildings were out of material. My host, with a chuckle, next directed my astonished gaze toward a continuous stream of cars coming out of a dryer without a whole brick on them, checked lengthwise and crosswise, and the poor, weary brickmaker powerless to change the draft. When satiated with this he laughed the heartiest of all at a hoarse mortal standing on a barrel, making an eternal speech to a crowd of striking employes, with a placard before his eyes showing an ever-increasing scale of prices.

My sympathies wrung my heart to see an endless array of stuck arches, the proprietor wearing his fingers to the bone prying them apart; nor did it assuage my grief in the slightest to look upon his partner making "lammies" all day and all night, week day and Sunday, month in and month out, forever and the day after.

Over here was a familiar figure unable to cease trying to mix soft coal dust with his clay, and directly in his rear was situated a would-be paving brick plant, the owner engaged in a perpetual struggle against the insidious advances of granulations, brittleness, abrasion and absorption tests, with a small army of city engineers always rejecting his material, even before it was made.

In a quiet, peaceful spot in the Valley of the Shadow of Brickmakers' Anguish, I saw the Philadelphia boys making red brick by hand, and engaged vainly in perpetual denunciation of buff and dry clay, and just across the Great Flue was a Chicago man trying to burn red. Sandwiched in between the roaring furnaces were a number of small houses. In each room it was midnight, and its solitary occupant was tearing out his hair and wearing out his teeth in impotent gnashings at the always present pay day and the never replenished bank account. Upon the other side of the valley was a poor, lone, out-of-door yard, with a one-horse-power machine, manufacturing in an eternal deluge and competing with a yard belonging to the devilish proprietor, operating twenty-eight Chambers machines.

My tears were flowing freely by this time, but they dried up at the sight of a clay bank into which there poured a stream of water exactly in proportion as it was being pumped out, and they ended in a dry sob that shook the domains like an earthquake to see a brickmaker furnishing a building with fronts to be laid up by a color-blind contractor and supervised by an architect who had served his apprenticeship as a pressed-brick sorter.



And so on around we went, seeing in endless variety dryers that wouldn't dry, kilns and burners that wouldn't burn, machines that wouldn't make and customers that wouldn't pay, and at every one my host would punch me in the ribs with a "How's that, old man?" "How soon'll we get you, eh?" and such like remarks, until I swore a great oath, and a solemn one, that never again would I be guilty of wetting my light brick, or sending out seven hundred for a thousand, or overloading cars, or any of those little tricks that are practiced in every trade but ours.

Upon arriving at the office, my entertainer telephoned for the car again, and, divesting myself of my fire-proof clothes and swallowing at a gulp the contents of my bottle, I took another long breath, and, expecting the jar, awoke to find the office enveloped in the dusk of twilight and the office boy just returned from lunch. F. W. BUTTERWORTH.

Written for the CLAY-WORKER.

ROOFING TILE—THE PLANT.

MANY OF THE MOST successful fire-brick makers are located in large cities. They obtain a variety of clays from a distance and buy large quantities of broken fire brick that come from old furnaces, kilns, etc., which they grind and mix with fresh clay and mold into bricks. The roofing-tile manufacturer cannot use any material that has been once burned, but in every other respect he has, in such a location, an advantage over the fire-brick manufacturer. He can obtain from different localities clays of any quality and color, and can supply a large number of his customers by delivery wagons. Clays that will make good roofing tile are far more abundant than clays that will make good fire brick, and the cost of transportation of fire brick is far greater in proportion to their selling price than of roofing tile. One thousand fire bricks weigh about 6,500 pounds and might sell for $30, while the same weight of roofing tile would cover nine squares, and, at $8 a square, would sell for $72. More skill is required and more loss occurs in the making of roofing tile than of brick, but material, labor and transportation are in favor of the roofing tile manufacturer. If the fire-brick maker can prosper with his factory in a city, the roofing-tile maker should certainly succeed. It is seldom that you can find in one locality all the kinds and color of clay that may be required, and it is often the case that the proprietor finds, after the plant is established, that the clay he supposed was just right is not exactly suitable, and that he would have done better if he had selected another location. The manufacture of terra cotta is a kindred industry, and the roofing-tile maker should at least be prepared to furnish all the forms of roof decoration. Terra cotta manufacturers locate their works in cities quite commonly. Why should not the roofing-tile manufacturers do the same?

—Machinery.—

The machinery required for a plant will depend on what kind of a plant the proprietor proposes to establish. Good roofing tile have been made with horse-power machines for preparing the clay and hand presses for pressing the tile, and some drain-tile makers have succeeded in making a good roofing tile by simply adding to their plant a hand press and pallets. But only a small local trade can be established with such an equipment.

The successful manufacturers of this country have made it necessary for all who propose to compete with them to establish a first-class plant, and make not only a variety of forms of roofing tile, but also tower tile for any shaped tower, crestings, finials, etc. To do this requires a competent draughtsman and skillful molders of terra cotta.

In the selection of the machines for preparing the clay the roofing-tile manufacturers have been guided by the changes taking place in machinery for this purpose in other lines of clayworking. In the manufacture of sewer pipe, fire-proofing, etc., the chasers and packers are being discarded for the dry pan and pug mill, and first-class potters have discarded them for the dry pan, washing machine and filter press. We are not aware that the washing machine and filter press have been used in tile factories, but cannot resist the conviction that a system that has become so valuable in the manufacture of stoneware could also be used profitably in the making of roofing tile. It would certainly make the color of the tile more uniform, and might make the clay more refractory, in some instances, by taking from it its soluble fluxes. Perhaps it would remove the element from the clay that produces bloating. The practice of washing clay is very old, and yet but little is known of the effects of washing clay. We wish our chemists and clayworking school would study the subject. The machines used in first-class factories for preparing the clay are the dry pan, screen, pug mill and auger machine. They are so well known that but little need be said in regard to them. As the clay is to be ground fine, the openings in the screen plates of the pan should be about one-sixteenth of an inch. This will necessitate the using of dry clay. The dryer it is the more rapidly and fine it will be ground. No water should be thrown upon it to lay the dust. Various methods have been used to dry the clay, but probably the best way is to store the clay during the dry season in large sheds. This is the practice of dry-press-brick manufacturers. Of screens there is a great variety. The oldest, probably, but not the poorest, is the inclined screen. It is from two to three feet in width, sixteen feet long and stands at an angle of 45 degrees. There are shaking screens, revolving screens and rotary screens. The latter require the least space vertically. Woven wire is sometimes used for screens, but the perforated steel plate is less liable to clog. All the kinds of screens named will work well if dry clay is used, but if wet clay, the proprietor will wish, whatever kind he is using, that he had bought another kind. This makes trade lively. Stupidity, not competition, "is the life of trade." The pug mill is about eight feet long, twenty-four to thirty inches in diameter, and open at the top. It would be desirable to have two of these, one of them to be used exclusively for clays for terra cotta work. Clay prepared for terra cotta molding, especially of large pieces, is full of coarse material, generally of crushed burned clay, which necessitates the thorough cleaning of the pug mill before it is used for tempering clay for roofing tile. It is difficult preventing the clays from becoming mixed. The coarse material is not only objectionable in a roofing tile, but quickly destroys plaster molds. As the clay for terra cotta does not require screening it may be sent from the top of an elevator through a chute into a pug mill in a room designed for the preparation and storing of clays for terra cotta work. An auger or brick machine should be used that is capable of molding blanks, without seams or laminations, for pressing into all shapes of tiles.

—Machines for Pressing Tiles.—

These are power presses, hand presses and steam presses, operating like sewer-pipe presses. There is no power press for making large tile, 144 to the square, made in this country. The Ludowici Company use the Ludowici machine, brought from Germany, and plaster molds. They claim that they have patents on the machines and tile in this country.

The Celadon Company use a machine designed by Mr. Babcock. They use metal molds, and their work is not excelled in this country. They claim patents on the machines and tiles they make.

The Germans use plaster molds in their presses and the English, so far as the writer is informed, use metal molds. The Chicago Terra Cotta, Roofing and Siding Company use the Arnold "Ideal" brick press, with metal molds for tiles. It works well on the smaller forms, but is not suitable for the larger sizes of roofing tiles. We shall not, for obvious reasons, make further mention of these machines, and in what we have said regarding them we simply wish to show that both metal and plaster molds are successfully used in power presses in this country. The Indianapolis Clay Shingle Company use metal molds. The essential features of a good power press are not covered by patents in the United States, and no doubt as soon as there is a demand for them they will be furnished by our own manufacturers.

A sewer-pipe press is a desirable machine to have in a plant, but may be dispensed with. All plain forms of ridge tile may be made very rapidly on such a press, and we believe that it has been used for molding Spanish and Roman tile, as we shall show hereafter. It is quite common to make all forms of ridge tile by hand in plaster molds, as it gives employment to the terra cotta workers when not employed in more skillful work.

ENTRANCE TO FERRIS WHEEL, LINCOLN PARK, CHICAGO. Built of Hollow Blocks and Roofed with Ludowici Tile.

—The Drying of Tiles.—

The different kinds of drying devices used in the manufacture of brick are used, in a modified way, in the drying of tiles. Every roofing tile made on a press is dried on a pallet. Tiles having sufficient plain surface to support them are dried on wooden pallets, Roman and Spanish tiles on pallets of sheet steel. The more rapidly the tiles are dried the less number of pallets required. We find three kinds of drying apparatus in use.

First—Drying rooms. A series of rooms with slat floors and steam pipes beneath. The tiles are wheeled from the press and set one above the other, on their pallets, to the height of from four to five feet. When the room is filled it is closed and steam turned into the pipes until the tiles are dried. The steam is then shut off and the doors opened. As soon as the room is cool the workmen enter, inspect and finish the trimming of the tiles, sending the good tiles to the kiln and the imperfect ones to the dry pan. The objections to this system of drying tile are that the room is not used for drying while being emptied and refilled, about two-thirds of the time; that many of the pallets are occupied with green tile for some time before the drying begins and by dry tiles before they are emptied and refilled; that is, if it takes a day to empty the room and a day to fill it, the pallets are occupied one day without any change in the tile; that, in the hacking of pallets one upon another, if a lower one is winding it will spring all above it out of true and spoil the tile; that the pallets and tiles are handled too many times.

Second—Hot floors. These are slat floors, with steam pipe beneath, as used by sewer-pipe makers. By this method the drying is slower and therefore safer. Tiles are inspected and sent to the kiln as soon as dried, and the pallets refilled and set on the floor. It requires the same labor of handling and has the same objection of putting one pallet on another.

Third—Car and tunnel system. The tiles are put on the trimming table as soon as formed, trimmed and set on the car in racks and passed through a tunnel heated by steam. After passing the tunnel they are inspected and set in the kiln. We believe this system to be the best. Some use a fan to force the air through a nest of pipes. This requires the use of constant power, and, we believe, of more judgment to prevent the warping and cracking of the tile than a gentle current of heated air produced by chimneys. Roofing tile on their pallets, set in racks on a car, are much more favorably arranged for drying than brick are as usually set for the same purpose, and the weight of clay to be dried in the form of tile may not be over one-fifth of what it is in brick in the same space in the tunnel. Simply the exhaust steam should be sufficient for drying the tile.

—Arrangement of Plant.—

A plant cannot be made that would be suitable for all locations, but certain principles of design should be followed in the arrangement of a plant for every location. As the principle cost of the tiles or other products is expended in labor, the first object should be to save labor. Bear in mind that every dollar unnecessarily expended in operating a plant is deducted from the profits or added to the losses. If two more men are employed than should be necessary, at $1.25 a day, the amount paid for their wages would pay the interest on a capital of $12,000. Cheap labor cannot make a poorly arranged plant profitable.

Good management depends largely upon a good arrangement. In a well-arranged plant each workman does a fair day's work and none are overworked. Order and system are manifest and the men take pride in their work and like their employers, while in one poorly arranged some are overworked and some not enough, and all are dissatisfied.

So plan the works that you can increase the capacity of every department without changing the system. Clayworking factories are often erected in which a move to increase their capacity is completely checkmated by a bad arrangement of kilns. An increase of business forces the proprietor to build another factory or extend his works in a different direction, build another dryer and another group of kilns, widely separated from the first, and another stockyard. There can be no question that this will be done at a much greater expenditure of money than would be required to extend each department laterally, if space had been allowed, and the expense of operating such a plant would be increased in a much greater ratio than the capacity of the works. GEO. S. TIFFANY.

To begin well is to end well.
To save well is to spend well.
To stay wise in your enterprise
Is to begin wise and advertise.
—Printers' Ink.

Written for the CLAY-WORKER.

DRYING AND WATERSMOKING BRICK.

BY J. W. CRARY, SR.

THERE ARE SEVERAL scientific gentlemen contributing excellent articles to the Clay-Worker on the principles involved in the drying and burning of clay goods. It is not necessary for me to go into the subject further than the practice and observations of my own experience. Others can deal in the technology of science connected with this subject better than I can, and, perhaps, more interesting to the student. I will just talk brick to the common brickmaker, or to the would-be brickmaker.

We all know the effect of moist heat upon clay, when wet, is to soften it, and, if the heat be dry, the surface of the clay is suddenly contracted and cracks. Now, the question is, What degree of heat will a common "green brick" stand without cracking? This, of course, depends on the kind of clay and its structural condition. Clay that will shrink most in drying will crack most when exposed to excessive dry heat, and this fact would seem to show that the slower the drying the stronger and better the clay goods, whatever they may be. Indeed, I know this to be the fact with all kinds of clay. Brick dried on pallets under a shed are much stronger and better than brick dried in the sun, but brick dried on an open yard will dry five times quicker than on pallets under a shed.

R. D. CULVER, Pres., and Gen'l Manager Wabash Clay Co., Veedersburg, Ind.

—What Kind of Artificial Dryer Is Best?—

To my way of thinking a floor dryer is nearest nature's way of drying, because the floor absorbs the water at bottom of the brick and the surrounding air absorbs it from the top and sides. All dryers that depend on hot dry air are at fault, unless the heat is kept below the boiling point.

As soon as the water in the brick is made to expand the cohesion of the clay particles is weakened, and if perceptible cracks do not follow, the brick is made more or less weak and friable, so that the common dryer, that depends on dry heat, that will dry brick in twenty-four or thirty hours, cannot be a perfect dryer. The nearer that a dryer can be constructed to work on the principle of a well "set" brick kiln when in the process of "watersmoking," the more perfect will be the result and value of its operation. I do not pretend to a knowledge of all the dryers in the market, but I do not think that any one of them can claim that their dryer acts on the principle of a brick kiln while "watersmoking."

—Now What Is the Peculiar Action in "Watersmoking?"—

When starting fire in a brick kiln there is no natural draft for the reason that the spaces between the brick are so small and irregular that sufficient vacuum cannot be formed to create a draft without some outside pressure, hence the furnaces must have time to get hot enough to draw the cold air from outside sufficient to create a pressure in the arches that will force the smoke and heat up through the kiln. As soon as a draft is started combustion of fuel in the furnaces increases, and continues just in proportion to the increased heat and draft in the kiln. The water in the fuel and in the brick make a very moist heat, like "dead steam." This heats the brick slowly, through and through, before the outside of the brick begins to shrink, so that steam comes from the inside of the brick to the outside all the time, until the brick is entirely "dried off" and ready for increasing the heat in the arches. If a dry heat were forced into a "raw" kiln of brick sufficient to make "live steam," the brick would soften and the kiln would "water settle" and be worthless. Some very smart brickmakers have contended that dry heat, or very dry wood, was best to "dry off" or "watersmoke" a kiln with. I have seen these men make most ridiculous failures. True, very dry wood can be well used, from start to finish, in burning a kiln of brick, but it takes a careful, expert man to do it, especially when the brick are not very dry.

—A Tunnel Dryer May Be Fixed to Act Like a Brick Kiln.—

I will briefly describe it, and I want every brickmaker to use it, free of royalty, if he likes it. I would construct a tunnel, say 120 feet long. At a suitable place at the receiving end of the tunnel I would build a smokestack sufficient for a good draft. At the discharge end of the tunnel I would have a suitable heating furnace. Now, I would have iron cars, each to hold three to four hundred brick. Brick would be set on cars loose, so the watersmoke would freely pass through them. Now I would fill the tunnel with cars and start a slow, moderate fire. Anthracite coal or hot steam pipes could be used, so that no soot would gather on the brick. Now, I would run this until all the brick on the cars were "dried off," then I would begin to move out the cars of dry brick and replace them with (green) wet brick, and would continue this process to suit the needs of the plant. This system would insure a strong, well-dried brick, almost the same as brick dried in a kiln, only that at no time would the brick be as hot as brick in a kiln after it is "dried off." If they were a little too hot to handle as they come out of the tunnel, the cars could be put under an open shed, or suitable place, until the brick were cool enough to set in kiln. This would only require a few extra cars. There may be tunnels now very much like the one I propose; if so, all the better for the owners of them.

—The Heating and Cooling of Brick of Primary Importance.—

Everything to make a perfect brick may have been done except the burning; if that be bad, all is bad. As yet no manufacturer of clay goods of any kind has been able to make a perfectly uniform success of every kiln he burns unless he strictly observes the great essential rule, "Heat slow and cool slow." I do not mean to say that the slower you heat and cool off a kiln the better it is, but I do say that you must be sure that you err a little on the slow side. Whenever you hear a man talking of his burning brick by exact time and with a certain amount of fuel, you are badly fooled if you spend your time or money with him.

Works of the Wabash Clay Co., Veedersburg, Ind.

Many write to me about their troubles in burning brick. Their brick are "whitewashed," or they are too much burned at bottom and not enough burned at top of kiln, or some parts of the kiln are cracked, the brick break and have no "ring." Now, all this comes from hasty action and want of skill and good judgment. The "whitewash" is the unoxidized or unburned salts in the brick, too rapidly heated and too quickly cooled. The bottom part of the kiln was burned too much for want of sufficient draft and too much heat in the arches. The top was too soft, or unburned, because the heat was too much confined to the bottom of kiln. Some of the brick were cracked because the heat was raised too fast, and the brick got softened, or "water settled." Now, if this kiln had been "set" so as to give a free, strong draft from bottom to top, then the "watersmoking" done slow, regular and steady, then the fires gradually raised until out at top, then raised to all the "arches" could stand, then that heat kept up until the same degree and color appeared on top, then the well-burned spots covered with fine damp clay, and this process kept up until all the kiln had been covered, then the firing kept up in the arches about ten hours, then the kiln closed and let alone until cool enough to open and handle, the brick would have been thoroughly burned and annealed, and the owner of the plant would have been busy selling the brick and taking orders for more instead of writing to me. If more thought, talent, skill and industry were given, practically and personally, to the proper setting and burning of brick, and less to the patents that can make and burn brick on paper, the would-be brickmakers would have less trouble, more money and good name. I don't object to patent machines and kilns if true expert men are paid to handle them.

Glimpses of the Hillsboro Brown Stone and Pressed Brick Co's Works.

BRICKYARD SKETCHES.

INDIANA PAVING BRICK rank among the best in the land, especially those from the shale deposits of the Wabash valley. There are a number of successful paving brick plants in that quarter. One of the largest and best known for the uniform high grade of its product is the Wabash Clay Company, located at Veedersburg, a small town at the intersection of the Big Four, Chicago & Eastern Illinois and the Toledo, St. Louis & Kansas City railways. This is a fortunate location, so far as shipping facilities are concerned, and in the paving brick business this is a very important matter, for pavers, as a rule, are shipped long distances.

Their shale bank is several miles from the plant, the clay being brought in on flat cars, from which it goes direct to the dry pans. These, as well as most of the balance of the machinery, are from the shops of the Frey-Sheckler Company. Nearly the entire product is repressed and then placed on iron cars and run into an Iron-Clad Dryer, from which they go to small round down-draft kilns, of which they have seventeen, each holding 30,000 large pavers. They also have one "double round kiln," holding 50,000. This was built to economize space, there not being room enough at that end of the yard for two separate round kilns, so one oblong one was built. It looks odd, but very substantial, as do all their kilns, for that matter, for they are banded with sheet metal a yard or more in width, and braced with heavy iron rails in an unusually thorough manner.

The plant has run throughout the winter, making 45,000 brick a day, and they now have stacked up about the factory many million pavers, all of which they expect to market before the leaves begin to fall. They are making a handsome sidewalk brick that is rapidly growing in favor. Their regular pavers are 3x4x9 inches, very dark, and look like they were salt glazed, but the head burner, Mr. W. H. Neff, who has had many years' experience, assured us that no salt was used, the color and glazed appearance of the brick being a natural quality of the clay. The success of this company is due in no small measure to the "git-up-and-gitiveness" of R. D. Culver, President and General Manager, whose pleasant face is pictured on page 551, who not only knows a good thing when he sees it, but has the happy faculty of impressing his views and convictions upon his fellows. It is needless to add that he has a deep-seated conviction that brick-paved streets are best, and especially so when the brick bear the impress of the Wabash Clay Company.

—A Dry-Press Plant.—

A few miles east of Veedersburg, on the main line of the Big Four Railway, in the picturesque little town of Hillsboro, is the press brick works of the Hillsboro Brown Stone and Pressed Brick Company, a corporation that was formed by Chicago capitalists some three years since, when the building world was more active than at present. They had plenty of money, they thought, and liberal ideas to start on. Finding that there was an abundance of excellent clay at Hillsboro, suitable for the manufacture of fine red pressed brick, they purchased eighty acres of land and set about the erection of a substantial plant, first building nearly a mile of standard gauge railroad from the Big Four line to the works, and purchased a large locomotive for their private use. Suitable buildings were erected and a complete dry-press equipment was installed therein by J. W. Penfield & Son. Two square down-draft Eudaly kilns were built and the work of making brick commenced.

The Superintendent was supposedly an experienced man, and, from the fine brick now in the stock sheds, it is evident that he knew how to make and burn pressed brick, but some way the business did not prosper. The brick were not marketed as readily as the directors had anticipated; the working capital, though large to start with, was exhausted, and trouble began which finally ended in a receiver being appointed, under whose direction the entire plant will be sold at auction July 18. Mr. Perry Hatt, of Hillsboro, Ind., is the receiver, and will cheerfully give full particulars relative to conditions of sale, etc. Any of our readers who are thinking of investing in the press brick business will do well to investigate this plant thoroughly. There is, in addition to the clay bank which has so far been drawn on, a twelve to fourteen-foot vein of good shale and a valuable stratum of brown stone. As may be seen by the accompanying illustrations, the works are well arranged. The clay lies above the level of the second floor of the machine house. Under the former management the clay was gathered in self-dumping scrapers and hauled across the trestleway and dropped through an opening into a bin beside the dry pan, from which it was elevated to the screens by cup elevators in the usual manner. The entire arrangement is convenient, and there is no good reason why, with proper management, the plant could not be made to pay. It will have to be operated by practical brickmakers, though, who have a capital of experience in the press brick business, as well as the necessary dollars.

WORKS OF THE HILLSBORO BROWN STONE AND PRESSED BRICK CO., East View.

NOT MUCH DAMAGED BY THE CYCLONE.

To Our Customers and the Trade:

We are pleased to be able to state that the terrible cyclone which recently visited our city did not do us any material damage, and that while we were compelled to close down for two days, owing to the disabling of our steam plant, we are now again in shape to receive orders for the celebrated Christy Washed Clays and for all refractory material used in the manufacture of glass. The principal damage we sustained was to some material in course of construction. This we can replace with but little delay. CHRISTY FIRE CLAY CO.,

By J. B. Clements, Vice President and Gen'l M'n'g'r.

St. Louis, May 30, 1896.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 44.

BEARING IN MIND what has been said about the reducing action of carbon on iron ores, also the similar action on these ores of carbonic oxide, it is by no means difficult to account for many of the so-called vagaries or freaks of the kiln. I may perhaps be considered extremely radical in my views in advising my young readers to abandon all ideas pertaining to "freaks" and supernatural phenomena; also banish from your vocabulary the term "luck" and its derivatives. We may not be able to immediately account for many of the events daily occurring in a satisfactory manner, but we may implicitly rely on every move, sound and even thought being the result of a natural law obeyed. Nothing can occur outside or apart from these laws, and they are within the grasp of the human intellect, consequently a considerable portion of them may, by strenuous and persistent effort, be comprehended and defined. If nature is approached in a proper manner she will cheerfully and truthfully respond to any inquiry, irrespective of age, position or sex, and no old-fashioned craftiness can dodge her. She is always absolutely reliable and never reticent, except when improperly questioned. She cannot be "drawn out" by the artifices of the smartest "cutey," and is alike courteous and candid with the humblest clay digger and the proudest emperor. Nature's injunction is, and always has been—to use the words of Christ's Sermon on the Mount—"Ask, and it shall be given you; seek, and ye shall find; knock, and it shall be opened unto you." Now, if you would acquire accurate scientific knowledge in your business, do not accept "a streak of bad luck," or "it's a freak," as the excuse for a badly burned kiln of bricks; probe a little deeper for the cause, and you will find a broken or ignored law did it. Do not rely too much on appearances. I cannot avoid the repetition of this advice, because this is just how false conclusions are bred, born and matured. Satisfying, or, better, gratifying, appearances will often terminate further reasoning on a subject, but do not be deluded by mere glitter; let reason rule until she strikes the genuine metal. When you have arrived at a point where the why and wherefore of every known phase has been attained you may feel tolerably well satisfied that your conclusions are true, although even this is not absolute proof of the matter.

Now to return to iron and its behavior in clay goods, more especially in brick and drain-tile manufacture. It may be observed that it (iron) is not in evidence until the burning, or last stage of manufacture; then it is available, both as a coloring and a fluxing agent, and upon the amount of reduction taking place in the oxide of iron, the depth of color produced, and, to a great extent, the fusibility of the brick, depend.

If you have followed me carefully in my remarks on the reduction of iron by carbon and carbonic oxide you are in possession of the key which opens the store room of a great number of facts connected with burning for color, and the conditions for rendering an otherwise refractory clay tolerably fusible; in other words, a kiln of bricks under prevailing treatment may require a temperature of 2,000 degrees to thoroughly burn it, while the same kiln may be partially fused by a temperature of 1,700 to 1,800 degrees. The bricks in the thoroughly burnt kill are of a fine deep red color, while the partially fused kiln are black and blackish brown. The natural conclusion of an outsider would be that the partially fused bricks had been subjected to the strongest heat, whereas the truth of the matter is that they had been subjected to the weakest conditions for withstanding heat, and, singularly enough, those same conditions gave the bricks an excess of color. This is a very common mistake, occurring daily, and has been for years. The experienced burner unconsciously brings about conditions which he does not understand, produces a strong reducing action and then gives "her" (the kiln) the usual heat and spoils a large portion before he is aware, or, if he is a careful watcher of his work, he will observe indications of fusing and at once check the heat before much mischief has been done, and reports to the boss "that kiln would not stand half as much heat as the last," which is attributed by both to the varying quality of the clay, or to something infinitely more absurd, a "freak."

Remembering that iron oxides increase in fusibility as they decrease in oxidation; that is, the lower the oxide the more fusible it becomes; thus, a protoxide is more fusible than a peroxide, etc. It is well known, even to the uninitiated ironworker, how readily liquid cinder dissolves sand. Chemically stated, how readily melted oxide of iron combines with silicic acid.

Having merely thrown out a suggestion as to practical application of an intimacy with the chemical properties of iron ores and their connection with numerous phenomena in coloring and burning bricks, I leave the subject for the present in the hands of those interested in these views of manipulating kilns on a chemical and scientific basis, and proceed to the consideration of malleable cast iron.

—Malleable Cast Iron.—

Every process in the manufacture of iron has suffered from empiricism. They are often discovered and given to us by scientific minds, but are immediately seized on by the charletan and distorted out of all semblance by his treatment. This process is purely chemical, depending on the affinity of carbon for oxygen at acomparatively high temperature. You will remember how carbon was eliminated from pig iron by puddling; now precisely the same chemical action takes place in making castings malleable, only the action is very much slower.

The castings, before treatment, are as brittle as glass. They are taken to a furnace constructed for the purpose and carefully bedded and buried in pulverized iron ore, then heated to a good red heat, keeping well under the fusing point of the metal. At this stage the oxygen of the ore attacks the carbon of the castings, and, although the action is not at all vigorous, the carbon is all eliminated from the thin castings, and from a considerable crust of the thicker ones, in the course of a few days. What the puddler accomplishes in an hour and a half it takes the malleable furnace six or eight days to perform, and then but imperfectly.

The principal points to be marked and kept in view are the action of carbon on iron ore and the action of oxygen on the carbon in the reduced metal, for on these actions and reactions depend the successful reduction of iron ores and their subsequent conversion into wrought iron and steel.

—Cast Steel.—

Cast steel was thus named to distinguish it from "shear steel," which was not cast or melted, but some confusion has arisen since the advent of Bessemer and Siemen's steel, owing to the fact that both these last named are cast steels, being melted and poured into molds the same as the first mentioned, but on a more gigantic scale. Crucible steel is therefore more definite and appropriate for the name of the first-named cast steel.

To describe and define steel is as difficult as to describe and define fire clay. There are so many grades of each, and they go down so gradually, that a dividing line is difficult to draw.

Crucible steel may be described, in a general way, as carbonized wrought iron, that has been melted in a crucible, poured into an ingot mold, and hammered or rolled into a merchantable shape and size.

Forty or fifty years ago, and many years previous, the best crucible steel was made by melting converted Swedish bar iron. This bar iron was converted or carbonized in a furnace much upon the same principles as malleable iron is converted in its furnace; in fact, the malleable furnace is the descendant of the converting furnace, but the action of one is just the con-

WORKS OF THE HILLSBORO BROWN STONE AND PRESSED BRICK CO.—West view. Page 553.

trary of the other. In the malleable furnace carbon is extracted from the iron; in the converting furnace the iron imbibes carbon. Now you will easily perceive that iron could not imbibe carbon from iron ore, so, instead of imbedding the Swedish bar iron in the iron ore, it is imbedded in pulverized charcoal (carbon). This is also a slow and quiet process, requiring from six to ten days, according to the degree of carbonizing required. I have remarked on the opposite action of malleablizing and converting. In the one case the castings go into the furnace as brittle as glass and come out tough and malleable; in the other case the Swedish bars go in as tough and malleable as can be, but come out as brittle as glass, and covered all over with blisters. To the casual observer nothing appears more completely ruined or spoiled. These blistered bars, called "blister steel," are broken up easily with a hand hammer into small pieces for the crucible, and with an admixture of a small percentage of steel scrap—old broken files, clippings, etc.—a charge of 60, 80 or 100 pounds is made up; the crucible is lowered into a small air furnace and the contents of the pot or crucible thoroughly melted, then poured into a cast-iron mold of suitable shape and size. In this form it is known as an "ingot," which is next treated to hammering or rolling, as the case may require. Tool steel is generally finished by hammering at a "tilt hammer," making often as high as 300 strokes per minute, but sheet steel, spring steel and other forms in general are rolled.

The hardness of steel made from properly selected material, and having received proper treatment in its manufacture, is governed by the percentage of carbon it contains. This varies from 0.10 per cent., and even less, to 1 per cent. or more, but between the two figures given nearly all the steels made range.

Empiricism and rule of thumb played a great part for many years in the manufacture of steel, and the value of a boss steel melter was estimated by the "mixtures" he had stored up in his "noddle," or in a well-thumbed memorandum book; as a rule, it was in the noddle, for few of these magnates could write. I say magnates, for such they were in their way. Their bearing towards lesser lights with vastly more brain, was vulgar and contemptuous; in fact, the more intelligent a sub or man in lower position was, the broader target he was for their despicable hatred and scorn. They simply gloried in their ample stock of "steel mixtures" and their lamentable ignorance of almost everything else, and, by the by, many of these secret and sacredly guarded mixtures are as useless and absurd in their composition as are many of the recipes for fluxes, glazes and enamels, held to be so valuable to the clayworker by some of the quacks in this profession. If the young clayworker will only get at the why and wherefore of the action of certain oxides, salts, etc., he will soon be able to compound glazes, etc., equal to the best known.

W. WAPLINGTON.

ACCURATE RECORDS IN MANUFACTURING.

IT IS A truism that success in manufacturing depends upon attention to details and upon making many small savings. The first step towards this is accurate, recorded knowledge of details. These must be on record to be available, for no mind capable of generalizing can be loaded up with them. They must be recorded daily, and upon a fixed system. At first glance this, to many, looks impracticable. It is not only practicable, but easy, and not only easy, but a pleasure after the system is once established. It brings order out of chaos, uniform results in place of luck, and success in place of failure.

Let me describe one such system, which has stood the test of time, having been gradually improved by years of constant working.

In the first place, each workman has a block of blanks, printed on stiff manilla paper, with places for name, date, total hours, and a column of printed lines of each kind of work, such as kiln work, brick pressing, clay wheeling, molding, etc., etc., with room on each line for the number of hours and fractions, which check off the total number of hours, and which each man fills up and hands in the next morning after such work before he begins work. He thus reflects at night on his day's work, in making up his ticket, and during his work takes note of time. These are recorded as soon as received in the morning, computed in dollars and cents, with total hours and total amounts, detailed cost in separate columns, the totals checking up. Thus early in the morning, when the memory is fresh, the total labor of the previous day is known in dollars and cents, as well as the cost of each kind of work, in time to correct sluggish men and keep the progress of work in hand. Each foreman also keeps a record of each day's work in his department, with amount produced, which he summarizes by weeks and months, keeping tally on each man. Each kiln setter returns a daily record of his men, total cost and goods set in kiln. Every department and sub-department has some man who can and does keep a constant daily record. Every barrow of coal or clay is recorded each day as used. Every item of repairs, every receipt of material, every team load or carload of goods is on record daily. Every hour's work by machinists or other workmen from outside is recorded.

BRICKYARD SKETCHES—THE WABASH CLAY CO'S "DOUBLE ROUND" KILN. Page 553.

Thus it is possible to reduce expenses promptly. To cull out the men. To correct tendency to lag in work. To foresee amount of pay rolls. To compare day with day, the cost of one kiln with another, the cost of same kiln at different settings with different materials, different coals or different setters and burners and in different weather. It individualizes the men and they watch themselves to have a good record. It enables the manager to compare results from reliable data, to watch his own progress, correct his own errors and to be sure of his results.

This record is kept independently of the time book, which it checks, and it prevents the introduction of improper items in pay rolls. It enables a manager to prove his costs of production in his yearly summary, because every dollar is accounted for. It is to him what the scale is to the chemist, for he can make an accurate analysis of his work.

This system is a time economizer. It acts as assistant to the manager, and enables him to give more thought to general results, and to economies of general management. It enables him to give his personal supervision to new work, new mixtures and improvements, and to keep his own records with promptness and precision also. It gives him a chance to put upon his work the keen edge of his best thought, and to keep at least abreast of his competitors.

THIS DEPARTMENT IS DEVOTED EXCLUSIVELY TO INVENTION AND PATENTS RELATING TO THE CLAY INDUSTRY, AND IS EDITED BY MR. EDWARD C. WEAVER, ATTORNEY AND COUNSELOR, IN PATENT LAW, McGILL BUILDING, WASHINGTON, D. C. COPIES OF ANY PATENT WITH DRAWINGS WILL BE SENT AT COST, NAMELY: FIFTEEN CENTS FOR EACH COPY. ANY INFORMATION AND ADVICE IN REGARD TO PATENTS WILL BE GLADLY GIVEN. ADDRESS ALL COMMUNICATIONS TO THE EDITOR.

WHAT CONSTITUTES A PATENT.

A patent is an instrument granted by some sovereign power to a person named therein, or, more properly speaking, is the instrument showing an exclusive right to have been so granted. In the United States such a grant is exclusively the creature of statute law. There must be a grantee as well as a grantor, and there must be some person or party capable of receiving or taking the franchise or monopoly. The law recognizes three parties capable of receiving a patent grant, viz.: the inventor, the assignee by a properly recorded assignment, and the legal representative in case of decease of the inventor.

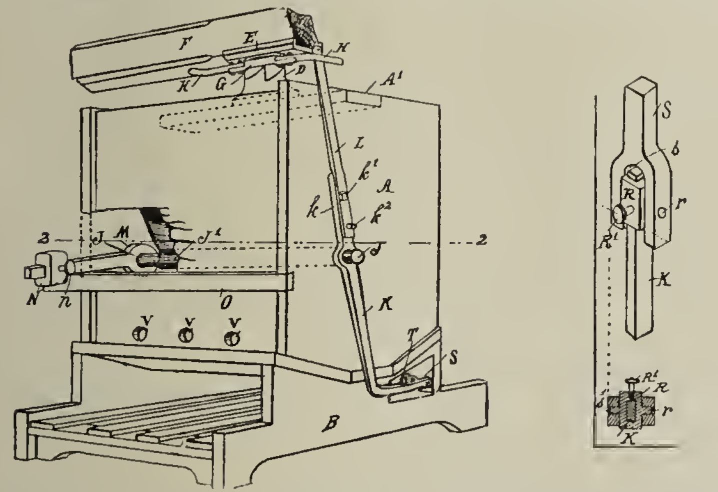
A patent is a grant, presumably, to the first and true inventor, his heirs or assigns for the term of seventeen years, the exclusive right to make, use and vend the invention or discovery throughout the United States. But it does not restrain any liberty that another person may have had in the subject matter before the patent was issued. The contract is that in exchange for this protection the inventor will fully and truly so describe his invention and discovery that when his patent right has expired the public will have a perfect enjoyment of the device and will be fully informed of how to make it.

When it comes to consider the relation of two patents that have been issued to the same man for similar or the same practical subject matter, the earliest to be filed in the Patent Office is to be deemed the prior patent or invention.

As has already been intimated, a patent to a dead man would be void. Also one issued to several persons, where only one is the true inventor, or where it is issued to one person when there are several inventors. This point alone is one that makes the intervention of an attorney almost imperative, as it often requires skill and knowledge to determine who are true inventors and who are mere mechanical helpers. More than one good device has been covered with an invalid patent for this reason alone, and I am frank to say that one of my clients is now using a device that would be a clear infringement had not the opposing patent issued to two parties instead of one. The inadvertence secured for them an invalid patent.

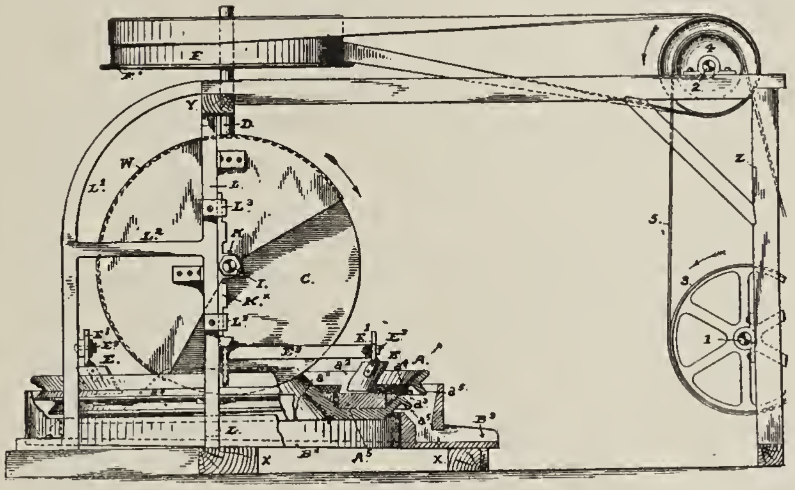
559,094. BRICK MACHINE. Almon E. Bigelow, Spaulding, Ill. Filed March 11, 1895. Serial No. 541,261. (No model.)

Claim—In a brick machine, the combination of a pug mill; a central vertical shaft turning in said pug mill; an arm plate fitting on and turning with said shaft, and provided with detachable arms adapted to operate a mold-shifting device; a sweep plate secured to said central shaft; a sweep secured to said sweep plate; a mold-shifting device, consisting of bent levers secured to a shaft passing transversely through said pug mill, one of said levers having an arm adapted to be operated by the arms on said arm plate, and the lower ends of said levers being joined by a rod adjustably connected therewith; an adjustable counterpoise connected with the shaft of said mold-shifting device; and a stop on said pug mill adapted to limit the movement of said counterpoise, as set forth.



559,170. PAN AND ROLLER MILL. Nicola Fossati, Smith's Flat, Cal. Filed June 4, 1895. Serial No. 551,649. (No model.)

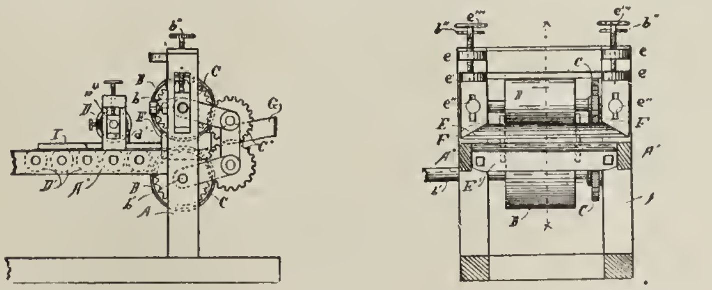
Claim—1. The improved crushing mill, consisting of a suitable stationary bed; the stationary annular trough having standing inner and outer rims, the inner one of which is of less height than the outer one; the revolving pan having a closed center, a flaring outer rim provided with screen-covered openings and having projecting flanges on the outer face thereof above the top line and below the bottom line of said openings, the said flanges being inclined downwardly and outwardly, and extending within the standing rims of the stationary trough; the upright revoluble shaft to which said pan is secured and by which it is supported, and means applied to said shaft to revolve the pan; crushing rollers mounted to rotate in said pan on opposite sides of its axis, but stationary as to their position in said pan; the stationary supports formed of the parallel upright posts and braces and crossbars uniting said uprights; and the movable carriage, provided with axle boxes in line with each other, to receive the roller axles, and adapted to play vertically on the said upright supports, combined for operation as set forth.



2. In a crushing mill of the character hereinbefore described, the combination of the stationary annular trough having standing rims, the inner one of which is of less height than the outer one; with the revoluble pan having a closed bottom and a flaring rim provided with screen-covered openings and the projecting flanges on the outer face of said rim above and below the said openings, the said flanges being inclined downwardly and outwardly at an angle to overhang the inner rim of the trough and to extend within and below the top edge of the outer rim of said trough.

559,739. TILE MACHINE. Joe Vandermolen, Grand Rapids, and John Veen, Vriesland, Mich. Filed June 22, 1895. Serial No. 553,-742. (No model.)

Claim—In a tile machine, a supporting frame, compression rollers mounted in said frame, compression molds or stamps back of said rollers, screws for adjusting the position of said rollers and said stamps and an elbow gear to transmit motion to the rollers; in combination with side guards F at each end of the rollers, a conveyor to carry the stock from the machine, and a knife for cutting the stock, said knife mounted in a roller and pivoted so that it will always, when approaching and cutting the stock, be at right angles therewith, and a spring to hold said knife to position to always cut the stock off squarely, substantially as and for the purpose set forth.



Written for the CLAY-WORKER.

DETERMINATION OF SILICA IN CLAYS.

The Necessity of a Second Dehydration in the Hydrochloric Acid Method.

Taking up the discussion in relation to this subject where I left off in the December issue of the Clay-Worker, I have a table which will show the exact percentage of silicic acid found by evaporating the hydrochloric acid filtrate from the silica down to dryness and dehydrating a second time:

ANALYSIS OF FIRE CLAY.

—Kaolinite.—		
Silica comb	24.43 per cent.	
Alumina	21.02 per cent.	
Water	4.77 per cent.	
		50.22 per cent.
—Fluxes.—		
Lime	.45 per cent.	
Magnesia	.09 per cent.	
Ferric oxide	None.	
Alkali	.93 per cent.	
		1.47 per cent.
—Sand.—		
Quartz	47.84 per cent.	
		47.84 per cent.
Silica (second dehydration)		.41 per cent.
Total		99.94 per cent.

The method used was substantially as follows: Fuse about 5 grammes of the finely ground clay, dried at 100 degrees Centigrade, with 10 grammes of sodium carbonate and a little potassium nitrate. Transfers the platinum crucible, in which the complete fusion is effected, when cool transfer to a platinum dish. Treat with 150 cc of hot water containing a small quantity (10 cc) of hydrochloric acid. Heat on the water bath till the fusion has been thoroughly decomposed and all effervescence of carbonic acid has ceased; then withdraw crucible from dish, taking pains before handling to wash the surfaces of the crucible carefully. Evaporate the solution to dryness and dehydrate any hydrous silica that may be present by heating to 130 to 135 degrees Centigrade in an air bath. Cool the mass, treat with 15 cc of strong hydrochloric acid (specific gravity 1.2) and heat for half an hour on the steam bath. Dilute with 50 cc water, heat again on steam bath for fifteen minutes, then filter. The silica which remains on the filter paper is washed, ignited and weighed. The filtrate from the silica is supposed to contain no silicic acid in solution, but in many instances similar methods to the one just given have been used for determining silica with low results; therefore, I thought it would be worth my while to test the filtrates from the silica by evaporating to dryness, dehydrating a second time at 130 to 135 degrees Centigrade, and note if there be any perceptible indications of more silica. After the second dehydration had been made and the mass treated with strong hydrochloric acid heated on steam bath, then with hot water, I could distinguish with the naked eye a very small residue of silica. Upon filtering, washing these small precipitates with hot water and igniting same in a platinum crucible, I determined that there was about 3 to 4 per cent. of silica which remained in solution, even after the first dehydration. There are very unsatisfactory features about this method, for in almost every attempt to get all of the silica converted into the insoluble state, after a single dehydration the filtrate will invariably show traces of soluble silica. After the solution containing the decomposed clay fusion had been evaporated to dryness, and just before heating in the air bath, the dry mass was thoroughly broken up and no large lumps were left to protect any of the hydrous silica from the same heat treatment received by the more exposed parts which were in the form of a powder. This precaution should be very carefully observed in an analysis for silica, if the chemist desires to have a complete dehydration of the silicic acid. In many of our reference books upon analytical chemistry I have found authors who have failed to make any mention of this in their "hydrochloric acid method" for silica. In all of these analyses which I have reported upon the solution containing the decomposed fusion was evaporated almost to dryness, then by means of a stirring rod the soft, moist salts were broken up, and from that time on till the mass became thoroughly dry I continued to disintegrate these lumps. Finally I had the fusion evaporated to dryness, and in a pulverized condition, which I spread evenly over the entire bottom of the platinum dish. As a rule, chemists believe that the silica in the decomposed clay, after having been kept at a temperature of 130 to 135 degrees Centigrade for an hour, should be completely dehydrated. Each of these analyses which I have tabulated above received exactly this treatment, but in spite of many precautions I found soluble silica in all of the filtrates from the first dehydration. Just at this time, when I became interested in studying and remedying this difficulty, I was surprised to find other chemists who had been working upon the same subject. Dr. William P. Mason, of the Rensselaer Polytechnic Institute, of this city, together with Mr. J. M. Sherrerd, then chemist of the Troy Steel and Iron Co., were endeavoring to determine the best temperature at which silica should be dehydrated. The more I considered their interpretations of results the more I became convinced that we were working upon the same problem, though arriving at unharmonious conclusions. These two chemists had observed, too, that in most instances their analysis of silicates for silica ran low, and they began to explain the slight error hypothetically by assuming that there was a reaction between the free silica and the sodium salts at 135 degrees C. They believed that the silica, after once existing in the free state, was capable of reuniting with sodium again, if the dehydration were carried on at a temperature above 130 degrees C. Their work was conducted in a systematic manner, but, so far as I am able to learn from Dr. Mason, their results were not as satisfactory as he had anticipated in verifying his theory, which I have just mentioned. At the very outset the first question which Dr. Mason asked me in relation to this subject was, "How high do you heat your silica when you are dehydrating?" It is easy to see that the Doctor had become settled in his mind upon one point, which was that the difficulty hinged wholly upon the subject of temperature. He believed that the silica, once having been rendered thoroughly anhydrous, in the presence of sodium salts, could be converted again into the form of sodium silicate, a salt which would be dissolved in the hydrochloric acid and hot water used in the subsequent treatment of the dry mass in the platinum dish, hence the loss of silica. His associate in this work, Mr. Sherrerd, seemed to be convinced that their theory was correct, in spite of their inability to prove it in analytical work. He stated to me, with great assurance, that if the dehydration of silica in the air bath were effected at a higher temperature than 125 to 130 degrees Centigrade, the free silica would recombine with the sodium salts. Mr. Sherrerd claimed, too, that if this operation were carried on at 150 degrees C. a greater loss of silica would be experienced than at 135 degrees C., he claiming that the latter temperature was too high. Just about this time Mr. F. G. Lodge, chemist of the Burden Iron Co., Troy, N. Y., who had worked for many years upon slags, bottom sands and clays, besides upon iron ores and manufactured irons, took part in the discussion with me, and I found that his work agreed very closely with mine, especially in respect to our percentages of silica in the analysis of high silicious substances by the hydrochloric acid method. He, like myself, used different degrees of temperature in dehydrating his silica, together with variations in the length of time, but without avail in arriving at more satisfactory results. In all of the analyses which he had made of refractory sands he never failed to test his filtrate for soluble silica.

It was rather a strange coincidence how this gentleman happened to become associated with us in this work, for his consideration and suggestions upon this subject had not been solicited. I called upon him one day when I had been devoting some of my time to the detection of silica in my filtrate from hydrochloric acid silica determination. At this moment he was engaged in the analysis of a bottom sand, and making a separation of silica. The percentage of silica in a good bottom sand will run as high as 92 per cent., which provided him with a larger quantity of this constituent to handle proportionate to the bases present than in the most silicious clays I had for examination.

The large preponderance of silica in the substance to be analyzed is a feature which seems to effect the percentage of soluble silica after the first dehydration. He, then, had had his full share of trouble in this respect, and was ready to express his theory in relation to it, for, ere the subject was brought up between us, he had tried to satisfy himself in regard to the cause for his results not footing up to 100 per cent., and especially after a thorough qualitative examination had convinced him that the bottom sand contained no substance which he was not determining quantitatively. His results did not foot up so much under 100 per cent. as to render them useless for guidance in practical work; however, since then he has never determined silica by the hydrochloric acid method without examining his filtrate. Charged with a desire to know if other chemists had noticed a tendency for all analyses of sand by this method to fall short a few tenths of 1 per cent. with respect to silica, he said that he had been looking for some substance which he had lost in his analysis of bottom sands that, he believed, was the source of a slight error. He had evaporated the filtrates, which were supposed to contain only the alumina, ferric acid, earthy and fixed alkalies in the form of chlorides, and dehydrated the dry mass at different temperatures. From his results he became satisfied that in the second dehydration, with less than 1 per cent. of silica present in the filtrate, he was able to recover all of it in the two operations. He claimed, too, that he had conducted these second dehydrations at temperatures ranging from 127 to 140 degrees Centigrade, with practically the same results. Referring again to Dr. Mason's and Mr. Sherrerd's theory—that the temperature at which the silica is converted from a soluble to an insoluble state is the all-important and most delicate point to be observed in this method, for the reason that at high temperature, 135 to 140 degrees Centigrade, the sodium salts would react upon the anhydrous silica—these observations of Mr. Lodge, together with my own results on dehydrations at these high temperatures, would seem to indicate that this chemical reaction does not take place. Just what may be the condition of the soluble silica after the first dehydration we cannot say positively, but since this silica can be made insoluble in the presence of a large excess of sodium salts at these high temperatures, points very strongly in favor of incomplete dehydration, rather than this reunion between the fixed alkalies and the silica. Again, the fact of an analysis of high silicious clay having yielded about the same quantity of soluble silica, after dehydrating at 127 degrees C. for over an hour, makes the "sodium silicate theory" even more doubtful.

In spite of this small loss of silica in the analysis of these silicates, it is satisfactory to know that even a trace of soluble silica can be estimated by a second evaporation.

For some little time I have been in the habit of testing my filtrates in this manner when I am obliged to decompose the substance by fusion with sodium carbonate and potassium nitrate.

There is a certain gratification which I take in testing my filtrates in this way that makes it worth while. Since this slight loss of silica is due to the presence of so much hydrous silica after the first evaporation, perhaps it would be possible to avoid this difficulty by treating the pulverized silicate at the very start with hydrofluoric acid and sulphuric acid, but this is rather of an expensive means to use for disposing of a large percentage of the silica, and I prefer to take a little more time in my work and proceed at once to evaporate a second time.

CHARLES FERRY.

Written for the CLAY-WORKER.

SETTING AND BURNING BRICK.

My first experience on a brickyard was about thirty years ago, playing on my grandfather's yard, in Ohio, where my father was at work; then, a few years later, working on my father's yard, offbearing and molding slop brick. Finally I went to western Nebraska, where, for four years, I made brick in different towns on the Platte and Republican rivers.

In 1882 I started a yard in a small way for myself. I made slop brick by hand, and set and burnt as my father and grandfather had done before me. But I was not satisfied with the burning, so I went to experimenting on setting the kilns and improving, until I make very good burns for an open-top cased kiln.

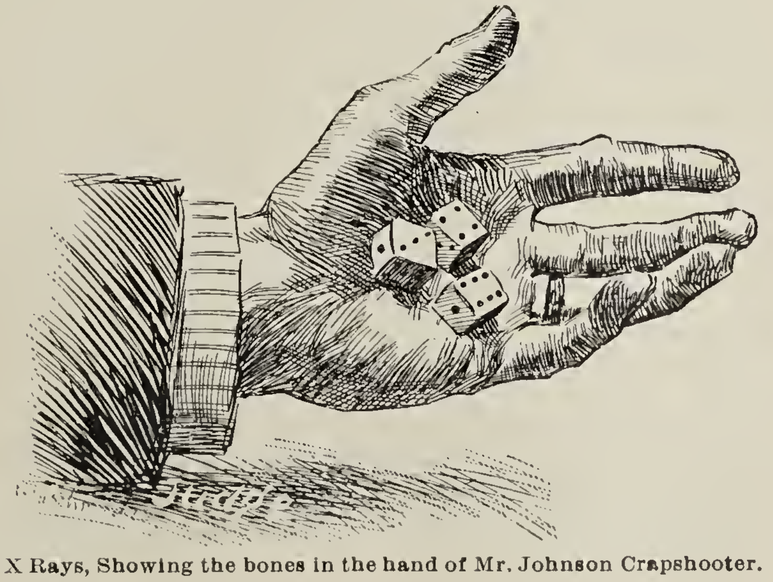
I build my casing twelve inches thick, half the height of the kiln, which I allow to stand and burn in several times. I use a thirty-six-inch grate, eighteen inches wide, with cast-iron doors, which I place in the casing walls. Twenty-six inches of the grate is under the kiln, with ash pits fourteen inches deep, and kiln floor raised above the surface of the ground so as to give room for the ash pits.

I set my kilns thirty-two brick across, forty brick high, arches eighteen inches wide, benches four brick wide and five brick high; close the arch with six overhangers, which I set exactly on each other and about half an inch apart, so that the fire will have free access to the body of the kiln. Above the arch I set three on three to the top. The heads I set so that the brick will be one above the other, so that if a small marble was dropped between the brick at the top it would drop in the arch below. I set the first and last bench in the kiln one brick wide, and set the overhangers one on one, half an inch apart, so that the fire can get out to the casing, which is three inches from the kiln all around, and gradually set closer until within five or six brick of the top of the kiln. From there up it is next to the kiln. I plat with two courses of burnt brick, laid flat so as to break joints.

Before starting the fire I take up one-half of the platting and set it on the other half, so that the steam can get out freely. My kiln gets so hot on top that I cannot put the platting down with bare hands before any red can be seen in the arches. After the steam is off and the arches are getting red is the most critical time in the burning. I then fire very carefully, and even until the kiln is a bright red from top to bottom, then increase the fire until the arches are as hot as they will stand. When I get the same color of heat on top as I have in the arch I close the kiln, and do not have more than 3,000 salmon in a kiln of 100,000 brick, with red brick within one course of the arch.

It takes from six to eight days to burn. I use nut, pea and slack coal mixed. It costs me 90 cents per thousand for fuel, with coal at $2.25 per ton.

W. K.



X Rays, Showing the bones in the hand of Mr. Johnson Crapshooter.

CORRESPONDENCE.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

ENAMELING AND GLAZING BRICK.

AMONGST other things concerning enameled and glazed brick, I have had inquiries asking if it was possible to make enamels that would be perfectly white without having the lustre that perfectly fused enamels generally have. In answer to such inquiries, I say it can be done with perfect success. These dull enamels are very serviceable, but to make them so, they must be applied on the unburnt brick and given a thoroughly hard burn. In the manufacture of these enamels it is necessary to use a good kaolin or china clay. The formula is very simple, being a mixture of kaolin or china clay, cornish stone and feldspar. The proportions of feldspar can be varied according to the nature of the clay to be used in the manufacture of the brick to be enameled or glazed, but the clay must be of a highly refractory grade. This peculiar enamel can be made in several colors by the use of metallic oxides in different proportions, as I have explained in previous letters. There is no necessity for the use of seggars in the burning of these enamels, as they are simply set face to face in kiln; that is, the enamel faces opposite each other. The result of this compound is an absolutely hard surface and perfectly white, and can be used for building purposes, either outside or inside, retaining their color and lasting as long as the brick on which they are applied.

—Burning.—

In setting a kiln of enamel brick without the use of seggars it is necessary to use great care, as the greatest trouble is the enameled face is liable to become spotted with particles of dust of fire clay and other things that adhere to the surface. This can be obviated by using a feather duster and dusting the face of one stand before the opposite stand is set, and so on through the kiln, so that a careful setter may be able to keep these particles off the face of the brick all through the kiln.

The burning problem has been discussed so often by able writers through the columns of the Clay-Worker that it is hardly possible to add more, still it is well known that after all has been done that is possible in the making and applying of enamels, everything may be spoiled through employing a man that is not capable of making a successful burn, as it is absolutely necessary in all cases of burning that the man in charge of the kiln should know what is in the kiln, the nature of the clay, the nature of the enamel and the working of the kiln while undergoing the different degrees of heat and fusion.

—Cooling.—

Especially in the case of enamels and glazes great care should be taken in cooling off the kiln. Just as soon as it is known the kiln is finished, it is a good plan to open all air holes, so that the kiln should have a free circulation of air to rid it from all obnoxious gases. These air holes should be left open from about twenty to thirty minutes, at the discretion of the burner. The kiln should be closely watched, and just as soon as the fire boxes commence to change from a white to a dull red heat all air holes should be immediately closed and sealed up with a mixture of common clay or adobe, and not opened again until it is known the kiln is cool enough so that the bricks can be touched with the bare hand, without the use of gloves or rags, as too sudden opening of the kiln is sure to cause fire cracks, and, in many cases, crazing, and the enamel or glaze is often blamed. The above remarks apply to all enamels and glazes.

—Feldspar and Lead Glazes.—

In the manufacture of glazes for brick these glazes are often confounded with enamels. It seems to be a general impression that all colored glazes are enamels. There is a great difference between the two, as all enamels are positively opaque and all glazes are positively transparent, so much so that a glaze applied to a brick without being stained with metallic oxides will show up the surface of the brick, and enamels, being opaque, will cover the surface of the brick, glazes having a brilliant lustre, while the lustre of enamels has a dull or waxy appearance.

If these metallic oxides enter in the composition of the glaze, such as oxides of manganese and cobalt, then, in that case, the face of the brick is not seen, but they are glazes just the same. The oxides of iron will produce the same result. These feldspar and lead glazes are nothing more or less than a transparent glass, as, when used alone, or fritted in a crucible, and left to cool, the result would be a perfect glass button, of different degrees of heat, according to the quantities of lead or feldspar used.

—Lead Glazes.—

The use of lead glazes, subjected to a high degree of heat, is a dangerous practice, and I would advocate letting it alone altogether, as it is almost impossible to get a good result without the use of seggars, and in the setting of same in kiln. Unless they are set perfectly even in kiln, with the glazed face upwards, the glaze, while undergoing the process of fusion, will run thicker in one place than another, producing a brick that is not salable. They are also liable to be affected by sulphur and other things, as even in the manufacture of encaustic tiling and other goods, where the use of lead is a necessity, there is always considerable loss.

—Feldspar Glazes.—

It is generally supposed that there is great difficulty in making a glaze without the use of lead or borax. Possibly it is so in some cases, but for the manufacture of glaze brick, where the clay will stand an intense heat, the feldspar glazes can be used with good success without any of the dangers the lead glazes are liable to.

These feldspar glazes are perfectly safe, so much so that they may be used and burned without the use of seggars. They are set face to face in open kiln, and it does not harm them if they should not happen to be set perfectly even. The lustre is as bright as the lead glazes, and the lasting qualities are many times greater, so that in all cases of glazed brick I would not advise the use of lead in any case. Undergoing the process of fusion, these feldspar glazes do not run over the edges of the brick if the proper proportion of materials are used. They will attain a perfect lustre without moving, which makes it safe to use them, and, as stated, no smoke, sulphur or obnoxious gases affect them in any way whatever, and they also can be burned with confidence, knowing the above facts.

OPAQUE.

From the Living to the Dead.

My Dear Randall:

In the March 14 issue of your Chicago contemporary there was a paragraph commending the Chicago Building Material Company, stating that several cities, including New Haven, were following Chicago's example and forming similar local companies through which to sell their brick. The item closed as follows: "While the new order of things will be of great benefit to our fellow-brick manufacturers in other States, it seems to prove indisputably that when a good thing is wanted you have to come to Chicago to obtain it, or else pattern after Chicago ideas." This is clear, cool and Chicagoesque when you come to consider that the Central New England Brick Exchange has been organized several years, and includes every brickmaker in New Haven county and nearly all in the State. Also, that we have endeavored to impress upon the Chicago intellect (mind would not quite express it) the advantage to both producer and consumer of a steady schedule of prices. But Chicago is nothing if not modest, and now, under date of May 28, 1896, I read that the same Illinois Building Material Company will go out of existence June 1. I remember reading an epitaph something like this: "It is so soon that I am done for, I wonder what I was begun for." Resquiscat in pace and cut each others' throats.

Now, we Yankees believe that a live donkey is better than a dead lion, and, while we snort and kick, we are always at the manger when feeding time comes. It was not in kicking that Frank Stiles broke his leg, and he is all right now. With a diminished output last year we managed to dispose of all the brick we made in this exchange, and, while we have outside competition, by organization we diminished the number from sixteen to one. One team of sixteen is easier to manage than sixteen single teams.

We are not hoggish, and our prices are less than when we first organized. What the coming year will bring forth we cannot tell, but, like Pat, who bet that Tim could not carry him up four stories on his hod, "Well, you did it, but when your fut slipped at the third story, I had great hopes."

What is the matter with Deo Involente. S. P. CRAFTS.

New Haven, June 8.

Brick Machines and Mr. Morrison's Ideal.

Editor Clay-Worker:

My much-esteemed friend Morrison, in the April Clay-Worker, resumes the discussion of his ideal brick machine, and in doing so brings me in it in such a way that I cannot but respond to his implied invitation to add my quota to the discussion, also. Brother Morrison is a little ambiguous when he says, "What is needed is a process that will pulverize clay as it comes from the mine," without either adding or extracting moisture. The crux of the question is the kind of clay referred to. Clays that will granulate can be so treated with the greatest ease. Here, in my old home as a clayworker, we are doing it every day. With plastic clay it becomes simply a question of how much moisture there is in the clay, and so far as fulfilling the condition imposed by Brother Morrison is concerned (neither adding nor extracting moisture), this would be regulated largely by the season, and, further, by the wet or dry nature of the season. I have seen here in England, where the climate generally is much more moist than in America, plenty of times when the strong plastic clay would have gone through a disintegrator and been reduced to any reasonable degree of fineness, but I have also seen seasons, in both countries, when I do not think it would be possible to put surface plastic clay into the condition prescribed by Brother M. without artificial drying being resorted to.

With regard to the particular type of machine under discussion, the machines I previously described are not strictly identical with Brother Morrison's ideal. In the machines I referred to the clay is first prepared, either by roller crushers or by dry pans or disintegrators, the latter method preferred, then through wet pan, pug mill or open mixer, according to the nature of the clay or the preference of the sizer, and finally goes into the machine, which, in the first part of it, is an auger barrel, with knives and worm, where the clay is worked up very stiff and solid, then charged into molds which come round to the barrel orifice intermittently; from thence the bricks are expressed and passed through a power press, loaded on to trucks or cars and taken away either to the drying sheds or to the kilns and set direct, the bricks being very hard and solid. This, in England, is called the semi-plastic process. Since I last wrote for the Clay-Worker I have had some experience with this type of machine, and which may be of some benefit to our readers. I could not recommend this type of machine for best front bricks. It will make a very good common building brick, but with our clay, the bricks being made so dense, there was a strong tendency to "heart" (as we call it) in burning, and which it was next to impossible to overcome, even with the most patient care on the part of the burner. Owing to the clay passing through an auger barrel in such a very stiff condition, and filling up the mold boxes under pressure, the power required to drive is very great, and the wear and tear is considerable, especially on the dies and plates. The makers of this type of machine are Bradley & Craven, Wakefield; Thos. C. Fawcett, Hunslet Road, Leeds; Wm. Johnson & Son, Armley, Leeds, and Wilkinson, Alexander & Co., Neville Works, Leeds. Any of these firms, no doubt, will be glad to afford all possible information on their respective machines.

If I now understand Mr. Morrison aright, however, these are not exactly the type of machine he wants, but rather one that will take the clay as prepared for it and immediately mold it into bricks and press them. Such are made by the following firms, who will, no doubt, also be glad to send all particulars, viz.: Rich & Scholefield, Kirkstall Road, Leeds; C. Whittaker & Co., Accrington, and some others whose names I do not have by me. With the clay put into the condition Brother Morrison describes, these machines would also pretty well answer his description. Referring back to the machines previously described, I will say that these machines differ more or less from each other, and are not all equally desirable, but this is not the place for me to extol or decry any particular machine. I can say, however, that the generally expressed opinion about them all is that they consume a lot of power. These machines constitute themselves a distinct class, in that the clay is tempered very stiff in an auger mill and molded into individual bricks stiff enough to be set direct into kiln. If this is not the machine my friend Morrison is seeking, but favors the others, that take the clay in a pulverulent condition and mold it into bricks, I would like to ask him what there is about them that he has not already got in the dry-press machines of America. We use here a Simpson press, and I may say that it is surprising how very damp (almost wet) we can use a clay that is of a granular nature, that can be dealt with by the dry pan without clogging up the grates. For this class of clays I should want no other method. If friend Morrison writes for circulars of these various machines he will get more detailed information about them than I can give him here, and I shall be pleased to give him privately any personal opinion about any one of them.

Brother Morrison makes one remark that I am obliged to take issue with him on. He says if such a machine can be made and operated in England, he can't see why another much better cannot be made on that side the Atlantic. Away back a few thousand years, a noted man that we read of once said, "No doubt ye are the people, and wisdom shall die with you," but really, friend Morrison, have the Americans got a monopoly of mechanical ability, etc.? While the Americans no doubt excel in some lines of machinery, it is equally true that the English excel in others, while it is also true that many advanced American ideas have been brought out by her foreign-born citizens. I like to see every man a patriot, but not to carry it so far as to become offensive. I am the last one to speak disrespectfully of America, for, although I have "returned to my first love," my twelve years' "coquetting with Miss Columbia" has left me deeply enamored of her, and any churl who dares to speak insultingly of her in my hearing has to take back his words or cross swords with

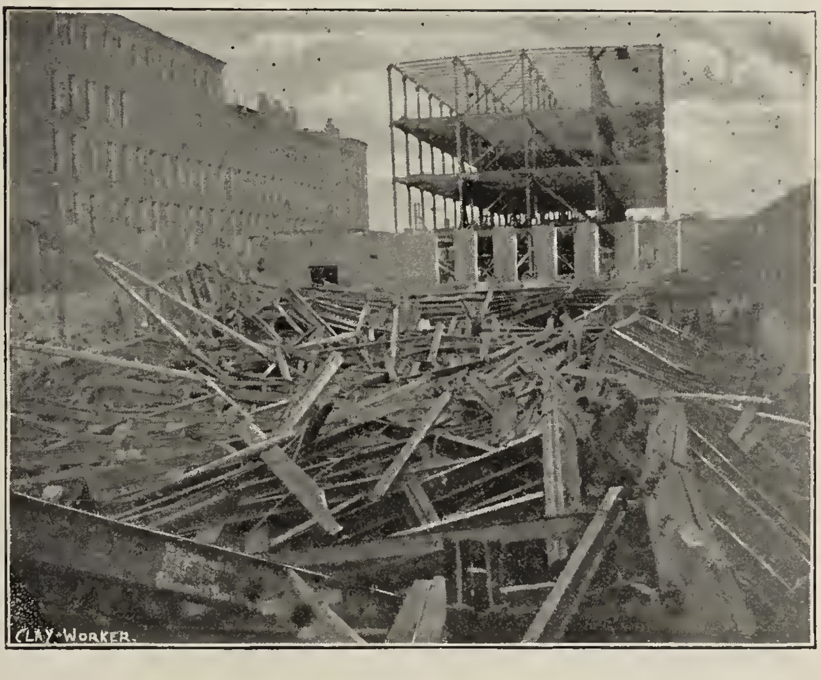
Yorkshire, England. ALFRED CROSSLEY.

The St. Louis Cyclone—But Few Brickyards Wrecked.

Editor Clay-Worker:

Your readers, of course, are all aware that this city has been devastated by a cyclone. The newspapers have given very full accounts, and hence it will not be necessary to make any statement in this article on general lines. News pertaining to brickyards in particular will be the only thing of interest. Damage to the Progress Press Brick Company was quite extensive. The peculiar effects of the cyclone was that it injured their yard on the north side of the railroad track and caused but little or no damage to the yard on the south. The Superior Brick Company had all clay sheds and a kiln shed blown down, and one of their kilns partially injured. The Hydraulic Press Brick Company suffered more or less on all their yards, the one designated No. 6, at Gravois and Chippewa, being the worst. All kiln and clay sheds were blown down and a great deal of lumber blown away. All iron stacks on the other brickyards suffered more or less. The Hydraulic lost one new brick stack on yard No. 1, which fell, damaging one of the new patent kilns but recently erected.

I inclose you a photograph showing one of the Liggett & Meyers buildings. It is situated on the north side of the railroad tracks, the buildings on the left being on the south side, distance apart about one hundred feet. The building wrecked had one continuous wall of nearly one thousand feet in length. The wind came from the west and took the western portion of the iron work, demolishing it as represented in the photograph. It skipped the center portion, which, you observe, remains standing, and went to the eastern portion of the same building, demolishing it in like manner. The center portion remained standing, and on the iron framework there were pine boards left untouched. I do not know that brick manufacturers can take any credit to themselves against ironworkers, but it seems somewhat strange that the iron work should be pulled out of the brick walls, thrown into the center and the walls themselves remain practically uninjured. There may be something in favor of mill construction which has not yet been developed. I will leave this matter, however, for scientists and practical builders to discuss. Another peculiar accident happening at this same building was a pine splinter being driven into a cement joint in a wall which had been laid up over two months. Anthony Ittner, the worthy ex-President of the N. B. M. A., was fortunate enough to escape with comparatively slight damage to his resident property.



WORK OF THE ST. LOUIS CYCLONE.

So far as the St. Louis brick trade is concerned, there has been quite a good deal of talk as to advance of price of material, which has been denied in some instances and ignored in others. The facts are that the price of brick has advanced about 50 cents per thousand. The repair work called for by the cyclone demanded the best product of the kilns, viz.: dark red, medium, hard dark red and straight hard brick. In order to get these brick to supply the demand from the kilns the hard brick, rough hard brick and salmon brick had to be piled out. In piling these out an expense was attached of from 40 to 50 cents per thousand. The price of merchantable brick to-day is $5 to $5.50; ordinary, $5.50 to $6, and strictly hard and red, $6 to $6.50. This is where a large proportion of the salmon, rough hard and common hard brick are used. When the best brick in the kilns are selected, and on the basis above stated, the prices of red brick are from $8 to $10, and they are, of course, only delivered in small lots of from one to five thousand brick, which entails additional expense and time.

A great deal has been said about bringing in brick from the outside. If all the yards in St. Louis were run to their full capacity they could produce 3,860,000 brick weekly. Further comment on this point to readers of your paper is entirely unnecessary, as a little calculation will enable them to determine what these figures mean in rebuilding wrecked houses. The outlook for the fall is not very promising and a dull year is figured on. The loss to brickmakers by the cyclone will not affect their capital or financial standing. BRIC-A-BRAC.

St. Louis, June 6, 1896.

A Little Friendly Advice to W. R. O.

Editor Clay-Worker:

My Dear Friend, W. R. O.: It would appear to me that you think it is your turn to make a few remarks on that enamel that don't run. You have a perfect right to do this, but don't use your esteemed friend, B. Jaquart, as the monkey used the cat's paw, to get the chestnuts out of the fire. A man that has friends must show himself friendly

Secondly, don't begin to halloo before you get me to the clearing; for a man to start out to discuss any subject before he has anything to say, and then to sue for clemency on the ground that he has really not read the article in question, looks like claiming very close relationship with Simple Simon.

Thirdly, don't be terrified. I won't jump on your back. If any reply is necessary I will speak to you face to face, as a man does to his friend. In getting up your share of the agitation on that enamel that don't run, it no doubt is your idea of propriety to go scratching around the back door, but I never do business that way. I. H.

Science and Practice in Brickmaking.

Editor Clay-Worker:

"Scientific investigation not only uproots deep-seated prejudices, but discovers correct methods of arriving at desired results." "Carbon is not available fuel when deprived in any way from combining with oxygen. * * * No known heat can burn it under such conditions, nor will it evolve any heat; on the contrary, it will absorb it. Any one fully recognizing the conditions demanded by science for the combustion of fuel will surely not question any portion of the above statement. Any one not acquainted with the laws of combustion, or, still worse, who ignores such laws, cannot be expected to treat such a question rationally, and an investigation conducted upon a logical and scientific basis is out of the question."—Waplington.

"The scientific man can ride his hobby to death. Practical result is what the manufacturer is looking for in this century." "I have nothing against the scientific man; he has my sympathies, as I think he has a hard row to hoe."—A. N. Oldtimer.

"I claim the time has come when the manager of a brick plant must not only be a practical clayworker, but he must be a scientific brickmaker. There are brickmakers who scoff at the idea of science in brickmaking, but we have got to come to it."—R. B. Morrison.

"It has become obvious that the interests of science and of industry are identical; that science cannot make a step forward without, sooner or later, opening up new channels for industry; and, on the other hand, that every advance of industry facilitates those experimental investigations upon which the growth of science depends. We may hope that at last the weary misunderstanding between the practical men who professed to despise science and the high and dry philosophers who professed to despise practical results is at an end."—Huxley.

—Mixing Coal Dust with Clay.—

Practical results, Mr. Editor, however valuable they usually may be, are comparatively worthless in this case (the mixing of coal dust with clay), from the fact that the evidence is quite as strong against the practice as for it—see Mr. Jacobs's letter in January issue, and other similar statements too numerous to mention—while from a scientific point of view nothing whatever can be said in its favor.

Like Brother Waplington, I was pleased when I saw this question down for discussion at the last Convention, though I must confess I was much disappointed at the way in which it was treated. Not one word from a scientific standpoint—how or from where the coal dust received its supply of oxygen, and at what cost—nothing but the usual reminiscences of experiences, mistakes, etc. Surely from such men as Professor Orton, Mr. Eudaly, and, indeed, all the brethren reported in the Clay-Worker as having taken part in the discussion, including six who have occupied the President's chair, something better might reasonably have been expected.

Mr. Caldwell, in discussing the proceedings of the Convention, says, in the February issue, with regard to coal dust: "Where it is so important to have nearly all hard brick, they would get along badly without it." Does Mr. Caldwell recommend the use of coal dust in the kiln which bears his name? Would not said coal dust be consumed and carried off, without adding any heat, long before the burning proper reached that portion of the kiln? Must not this be inevitably the case in every kiln in which there is anything like proper combustion in the furnaces?

Since the discussion of this subject I have made some small experiments, the results of which I wish to lay before the readers of the Clay-Worker. I had openings left in the bestowing, through which strips of wood could be inserted in different parts of the kiln at various stages of the burning. The result of said experiments confirms me in the belief that Brother Waplington is right when he says: "Assuming the firing to be honestly and skillfully performed, the bricks in the kiln are surrounded by an atmosphere of carbonic acid gas, steam, etc., in which nothing can burn; thus the coal in the bricks is doubly shielded from oxygen, and its only chance is neglect or unskillfulness of the burner, or at the end of the burn."

Granting this, are not all those who claim to reap advantage from the use of coal dust in the bricks losing by imperfect combustion in the furnaces more than they gain from the heat of the coal dust in the bricks? or, as Brother A. N. O. aptly puts it, "gaining at the spigot and losing at the bung?"

I may mention that a very distinguished English civil engineer, Armer J. Alcorn, an old college chum of mine, who is at present engaged in making some extensive surveys here, was with me during a portion of the experiments, and took considerable interest in them. His opinion is the same as mine—that the proper amount of air being admitted to the furnaces, the fuel at top of the kiln can only be burned to carbonic oxide, and a large proportion of it not even to that.

If those who follow this "pernicious practice," whether they "pride themselves that nobody understands it better," or the "wasteful and extravagant are content to blunder on" (there is many a true word spoken in jest), will look into the Colonel Seller stove, from which Brother Waplington has removed the lid, they will find only a candle burning. R. M. GREER.

Tuxpam, Mexico.

P. S.—I am glad to see that the subject of roofing tile is again receiving some attention. I may have something to say on this important question in next issue.

Notes From Victoria, Australia.

Editor Clay-Worker:

It is gratifying to be able to report a certain improvement in the clayworking world here. It may be small, but it is none the less evident, and will no doubt be the precursor of a turn in the right direction. Victoria has plenty of resources. Like most places, it has its ups and downs; it has gone through trade depressions before now, and it has revived. So will it again.

Most of the brickyards are at work again, and, though the larger ones have not their whole plants going, still they are tolerably busy, while some of the smaller works are doing full time. Of course, prices are low yet, and it is probable that for some time they will remain so. Still, bricks can be made at the present price and a living wage paid the workers. There is, of course, little profit for the employers, but a little is better than none.

The Northcote Brick Company held a general meeting a few days ago, at which the chairman announced a dividend of 3 per cent. per share, which, it is to be hoped, will be followed by other similar announcements.

Several of the more important works, such as the Hoffman Company and Cornwall's Pottery, have in hand considerable contracts for the supply of glazed earthenware closet pans for the sewerage works of the city. Over thirty thousand of these are required, of various types, ranging in price from 10 to 30 shillings each. The work is being done of a high quality to meet the very stringent requirements of the Board of Works, and marks a distinct advance in the manufacture of this kind of ware in Melbourne.

A recent visitor to Western Australia, the colony of the latest gold boom, reports in a very dolorous strain as to the state of trade and labor in the chief cities. He says the labor available is far in excess of demand; that men are working for 3 shillings per day; that there are already twenty-one brickyards, one-third of which are now shut down, with large stocks of bricks on hand unsalable. There is some truth in this, no doubt. The depression in the other colonies and the ever-recurring reports of the discovery of new gold fields attracted more men than there is at present work for. This will right itself. The gold is there, but is of no use till raised, which must be a matter of a little time. When that time elapses there will be plenty of work for the brickyards and every one else. Even now matters cannot be so very bad, for he states the price of bricks as being £3 3s ($15) per thousand. Here they are about 15s ($3.75) at present. A letter also received from a friend just recently states that at the present time there are more than sixty brick buildings going up in Perth alone. This does not look like stagnation.

Paving brick, which forms such a prominent feature in connection with your clayworking industries and journals, is unknown here. Our country roads, when formed at all, are made with broken stone or gravel; our streets of broken stone, stone pitchers or wooden blocks. The latter, which undoubtedly forms the best roadway, is used in Melbourne for all the most important thoroughfares. Bricks have been tried in a small experimental way, but were not found satisfactory. This may have been on account of inferior quality of the brick used or want of a proper foundation. The experiments were made some time ago, and the data in connection therewith are not now obtainable. The fact that we have an abundant supply of splendid hardwood timber no doubt has prevented further experimenting with brick. With such timber the authorities are perfectly satisfied, and the result is that both in Sydney and Melbourne the streets are all that can be desired. The American Consul in Sydney, in a very excellent pamphlet on the subject, states that "the chief streets in Sydney * * * excite the surprise and admiration of all strangers, especially of Americans." And it may be said that the streets of Melbourne are in no way behind those of Sydney. The same gentleman has published the following table, giving the comparative cost and durability of the chief materials used in street construction:

Material.	Cost per yard.	Durability, years.	Cost per yd. per year.
Stone	$3.25	16	$ .45
Asphalt	3.00	14	.48
Brick	2.40	12	.44
Australian hardwood	3.30	20	.32

By this it will be seen that Australian wood gains largely over brick in point of durability. It may be, however, that too short a life has been given to brick, upon which point, no doubt, many of your readers might have something to say.

It must be remembered that the Australian hardwood is a vastly different material from the American, being harder, heavier and more durable, and so long as the supply lasts brick will probably not have a chance of ousting it from its position. F. A. C.

May, 1896.

The New York Market.

Editor Clay-Worker:

Up to date the weather, so far as rain, has favored the brickmakers; the first kilns will be free from washed brick. In respect to drying it has been very discouraging; no wind and the sunshine not very powerful, which resulted in extra hacks and many brick being set in kiln far from dry. Some of your contributors say that they do not set brick until they are uniformly dry. All would admit, if that could be done, it would relieve the foreman of a vast amount of care when burning, but how is that desirable end to be accomplished? The weather cannot be controlled; there is a limit to yard room; to run one machine a day and let the rest loaf would not pay, nor could a full gang be held intact till the condition of the weather would permit steady time. As for putting in dryers, here is a facer. If the present output, with the drawback of uncertain weather, is so great as to keep the market low, what would be the result if they had dry brick all the time—yes, and days when it rained, and they could not get in the bank to fill pit? Some men would be at work when there was no production of stock. Certainly the cost per thousand would be increased.

As for putting up sheds to hold clay for such days, that is out of the question, both as regards cost and want of room. Then, too, most yards are on leases. There is one more way left. Competition and progress toward making good square brick say "no," and that is the wheeling of green brick under the shed and hacking them, and waiting till they dry. The item of handling once is thrown away. Can any wheeler take them down from the pile, twelve high, with a bind six high over the two hacks, as carefully as he can from a hack in the yard? The edges and corners will be chipped off to a very great extent. On open yards in the country it certainly cannot be called the "survival" of the best way to make brick that will return the most money. Certainly any advance in cost of manufacture at the present rate is not warranted. To read between the lines of the Clay-Worker shows that the rates throughout the country are about on the same basis—a very close margin to cost of material at some points, and at others a shade below cost. Whether the brick trade will arise, "Phoenix-like," from the present ashes of depression is the cause of serious thought, and not easy of solution. Some sections may decidedly improve; in other and older parts of the country other material may tend to keep prices back. If those skilled men with small yards should multiply, it would no doubt have the general effect throughout the country that is one of the troubles in this section—too many brick made.

—The Consolidated Brick Company—

Opened for business on the 4th of May and has done a fair trade. As mentioned in last number, it is optional about old stock. No new has reached market from along the Hudson. With the limited shipments it is a pleasure to report that the earnings net were on the right side of the ledger.

The first three weeks showed $375 ahead—no great amount, but it is encouraging. It is to be sincerely hoped that there is no half-hearted ones in the management, but when one scans the list it would seem as if there could have been a working for less wages on the part of some, for at least the first year, if the heart was set on the success of the organization.

—Salaries Paid.—

President, George W. Washburn, $8,000 per year; Theo. Peck, Treasurer, $3,600 per year; I. M. Purdy, salesman, $2,000 per year; bookkeeper, $936, or $18 per week, a total of $14,536 per year for four men, with rent and other expenses which must be entailed. It would seem excessive, at least in the one case. One would say it is paying for the weight of the name rather than for ability or experience in that line of business.

—A Late Movement.—

To help the organization, as well as all manufacturers, was the canvassing of the yards about the date of molding to induce manufacturers not to commence till the 15th of May. Before that brilliant idea had evolved itself some of the Jersey manufacturers had their yards ready, while others were getting ready. Why that matter had not been acted upon by a committee during the time the other matter was in process of formation is, like many other movements in the brick trade, hard to explain.

The men who were fighting for organization were afraid to act because they might be blamed for asking too much, while the men who would not join expected that as soon as the new company became a fact the improvement would be felt at once and no restriction of output would be required. If that feeling did exist, it showed but little judgment as well as knowledge of the condition of the trade in building material.

The government report of the state of the crops is watched very closely by those engaged in agricultural pursuits. Why do not the tide-water brick manufacturers make a close study of what to them is money made or lost by the handling of the supply? There is no line of business of the same volume that can be so closely followed without any elaborate method as the brick trade. The amount of stock on hand at close of navigation is known, and comparison each year shows that it will last until new brick reach market, and the number of permits for new buildings show, especially for the first quarter of the year, when the returns are always greater than for any other quarter, whether there is a falling off or a marked increase, so that one can judge for himself what is best, as all this is matter of record each year before it is time to attempt any movement to prepare the yards.

—A Poor Comparison.—

To commence making brick in April with the following figures known, or should be known, to all who ship to the New York market, would seem to be folly. Nevertheless, it did not weigh one iota; it was a rush to get to making. With one manufacturer there will be a case of stop in July unless there is a very decided improvement.

First quarter of 1895: Number of permits for buildings in New York city, 1,102; estimated cost, $27,558,804.

First quarter of 1896: Number of permits, 856; estimated cost, $23,648,035. A shrinkage of 246 permits and nearly $4,000,000 in cost.

First quarter of 1895: Number of permits for buildings in Brooklyn, 673; estimated cost, $3,418,370.

First quarter of 1896: Number of permits, 772; estimated cost, $3,197,629.

A slight increase in building, but a loss in cost for the year, which is easy of analysis—more frame building than brick—as the city fathers allow in the outlying sections the erection of wooden structures. I think echoes of friend Crary's voice reach me as he says, "Would that I had the framing of the building law for that city." A brick foundation or a whole brick building would consume more of the red cubes. In fact, there is this year in Brooklyn almost an equal division of the two classes of buildings—number of brick, 375; of frame, 393, fourteen more.

Rapid transit, to which many manufacturers of common brick have been patiently looking as the means that would help to increase the demand and raise prices, is as dead as Caesar, after seven years of work of different commissions to formulate plans. To sanction the city's right to bond for the $50,000,000 needed, the courts had to pass on it, and they passed unfavorably, so that the brickmakers gave up all hope of help from that direction.

—Strikes—

Still linger among the men on the yards, although there are more old brickyarders looking for a job this year than usual. Up the Hudson more wages was the cry. On one of the largest yards in Hackensack the pit shovelers were advanced, with the result that all the men wanted an advance of $5 per month. They were told to go home, and if they wanted work to come in the morning; if not, to stay off the property. That settled it.

—The Present Market.—

Since last report prices have dropped from quoted rates of April 25. A slight reaction, helped by reduced shipments, was helpful, but still prices are below the figures of that date.

May 2.		May 9.
$4.25@4.75	New Jersey ordinary	$3.75 @4.25
4.50	New Jersey good	4.50 @4.75
4.25	Common hard ordinary	4.00
4.50@4.62½	Common hard good	4.25 @4.50
4.75@4.87½	Common hard fine	4.62½@4.75
5.00@5.12½	Common hard special	5.00

May 16.

	Lowest.	Highest.
New Jersey	$4.00	$4.75
North River	4.00	5.00

May 23.

	Lowest.	Highest.
North River	$4.00	$5.12½
New Jersey	4.25	4.75

May is a month that is between supplies of old and new brick. By the middle of June the arrivals will be full, to judge from past seasons and the condition of the trade. The present rates will no doubt be cut before the national holiday. A. N. OLDTIMER.

Days of Grace Have Been Abolished in Ohio.

The Ohio law relating to negotiable bonds, notes, bills and checks payable at a certain day after date, or after sight, has been amended so that now they shall be "deemed due and payable on the day mentioned for the payment of the same, without days of grace being allowed thereon, except that when such day mentioned be upon the first day of the week or a legal holiday, then the day of payment shall be upon the next succeeding business day."

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PAVING BRICK HAVE COME TO STAY.

It is gratifying to note that brick pavements are being more largely used in paving our towns and cities than formerly. An era of paving is upon us. Only a few years ago Indianapolis had scarcely a square of well-paved, well-cared-for street within its corporate limits. Then there was deep mud within and without. Now we have many miles of good brick and other pavements. The educational influence of a well-paved city upon the towns and cities around it is not to be overestimated. Country towns which, a few months ago, were content with mud, are now laying brick. The time is coming when every town and city will have all its streets and alleys well paved and well cared for. This means a demand for a vast amount of paving brick.

ALL THINGS COME TO HIM WHO WAITS.

We knew, nearly three years ago, that we were awarded a diploma and a medal by the World's Columbian Exposition for the Clay-Worker as "A Useful Illustrated Trade and Technical Journal," but the years passed and neither diploma or medal came, but we never gave up the hope that they would come in the course of time, comforting ourselves, meanwhile, with the assurance that we have merited both, according to the award of the commission having charge of that department of the great exposition. They have come at last. They are beauties and, of course, highly prized by us, and such is the tie between an editor and his readers that his first thought is to share every unusual personal pleasure with them individually. It would be a pleasure to have every reader here in our sanctum to show them in person, one after another, these beautiful works of art, and to explain the significance of every legend upon them. This being impossible, we do the next best thing and, on Pages 546 and 547, reproduce the diploma, one-quarter the size of the original, and picture the medal, exact size, in the best style of the engraver's art, so that these substitutes of the originals may enter every home that monthly welcomes the Clay-Worker, expressing the hope that all who have opportunity will call at our sanctum and inspect the originals.

BRICK AND TERRA COTTA VERSUS STONE.

Our friends, the stone men, and their coadjutors, are given to comparing stone structures to those of brick and terra cotta, with an air which implies that the former is superior to the latter, and the fact that stone work is more expensive than brick work bears out this impression, which, in truth, is entirely erroneous, as the very buildings cited attest, when the entire structure is considered. How few stone buildings are there in which brick do not really play the important part. The major part of the superstructure of most stone buildings is of brick. As an illustration, take the Indiana State House. It is a typical stone building, a magnificent structure, that is viewed with pride by every Hoosier, and particularly by the stone men. Nevertheless, it contains some twenty million of brick. So with our great Soldiers' Monument, which is illustrated on a preceding page, the portion subjected to the severest test, the cascades, are built of glazed terra cotta, because that material will stand the freezing and thawing processes and, being nonabsorbent, is not stained by the water, as stone would be.

In this connection we wish to remark that it is a habit that leads people to build monuments of stone rather than the inherent merit of the material itself. Public monuments usually stand in isolated positions where they may not be destroyed by fire, though in the case of private monuments in graveyards, a little fire in the grass sometimes brings to ruin a large number of stone and granite monuments which grace these fields of the dead. And, by the way, there are no spots on the green earth where more inartistic work is to be found than in the cemeteries of America. This, of course, is not because of the material used, though it must be confessed that terra cotta establishments monopolize a very large portion of those artisans who are gifted with artistic talents. There are very few artists of a high grade employed in stone-yards, while every terra cotta works has its corps of artistic draughtsmen, sculptors and modelers. True terra cotta monuments are not common, though this material has been used in a number of important and successful monumental structures. The example at Perth Amboy, which was illustrated in the April Clay-Worker, should and will be followed.

IN MEMORIAM

"Tread softly—bow the head,—in reverent silence bow."

A year ago we were all rejoicing in the birth of a promising child; it could hardly be called a child, either, for it sprang forth unannounced, and, like the fabled Minerva, full-sized, and armed and equipped for any battle that might be threatened. Its coming was hailed with delight by the whole fraternity of brickmakers, not only for what it proposed to do in its immediate neighborhood, but because it might show how to accomplish grand results in the brick field everywhere. The home of the humblest employe in the brick industry, in its field, at once begun to show signs of improvement under the stimulus of better wages, and proprietors began to realize better showings on the right side of their ledgers, and contractors felt assured of fairer dealing, because they knew just what every man would have to pay for his brick, the only party having the least ground of complaint being the final consumer, the owner of the brick house built under the influence of this vigorous child, and the advance in the cost of any brick structure was so infinitesimal, when compared with the other items of cost, that it was hardly perceptible. Is it any wonder, then, that we of the brick industry watched the developments of this wonderful child and had large hopes for its future? It was christened the Illinois Building Material Company. The name is modest enough in all conscience. There is nothing in it that smacks of trust or combine. It simply proposed, in its own way, to furnish brick for all Chicago and Cook county at a uniform price, and that price to be the lowest figure that would allow living wages to the employes and a fair margin of profit to those who furnished the capital and the brains for conducting the business.

But now comes the sad news of the unexpected death of this promising child, just at that interesting age, when not only what the child is, but what it promises to be, combine to make it dear to all. It was just a year old. From what it had accomplished in its short life we were expecting much from it and the like of it, not only for Chicago, but all brickdom. The immediate cause of its death is largely a matter of conjecture; some attributing it to the withdrawal of one of the principal operators, and others, in turn, ascribing it to the possible interference in the near future of the Illinois anti-trust law. To settle all dispute on this point we are safe in saying it was a clear case of heart failure. If anyone cares to go back of that and ask what caused the heart to fail, he may, for all we care; we stick to our diagnosis—it was heart failure.

Seriously, we regret exceedingly the demise of the Chicago Building Material Company and regard its dissolution as a calamity to the brickmakers of that community. The Clay-Worker has long been of the opinion that brickmakers could and should hit upon some business arrangement which would guard the industry against such cut-throat rivalry as now prevails in most quarters and which allows nothing but starvation wages to employes, and, all too often, results in bankrupting the employer. For a time, we thought Chicago had successfully solved the problem. Their failure should not deter others from attempting to establish similar organizations, for the cause of failure there may not exist in other localities. The continued success of the New England Brick Exchange, referred to in Captain Crafts' letter on a preceding page, demonstrates that, with proper management, such combinations are practicable.

THAT WATER AND OIL MIXTURE AGAIN.

Mr. Anthony Ittner, of St. Louis, writes that he has been informed that a firm named Fink & Sons, (or something similar), are peddling a formula for an oil mixture, exhibiting to their intended victims a great number of testimonial letters from prominent brick manufacturers throughout the country, himself included among the number, and wishes us to advise our readers that, if such is the case, Messrs. Fink & Sons are not, as Caesar's wife, above suspicion, as he has never given them a letter of recommendation. We presume the parties referred to are the same persons who succeeded in selling a formula for an oil mixture to the Atlanta brickmakers last fall, as related in the Clay-Worker at that time. The oil mixture, which is composed largely of water, will work fairly well during real warm weather, but it is not regarded as a valuable acquisition by those who have tried it.

GOLD OR SILVER, WHICH?

We are sure the Clay-Worker finds its way to no nook in America in which gold and silver are not the burden of conversation and discourse about now. Even our readers in foreign lands must hear the echo of the able discussions which are held, not in the halls of Congress only, nor by the aspirants for office in their political harangues, but even quite as learnedly by the local political oracle at the cross-road or village store, as, sitting on the half whittled-away dry goods box, he explains to his impecunious neighbors the difference between free silver and the other kind. The air is full of free silver, fiat and the like. In truth, though, the only serious, unsolved question with most of these agitators is how to get hands upon any kind of silver without having to work for it.

The Clay-Worker is very serene on the money question. It is far more concerned about the demand and supply of brick, and how to make these meet each other profitably. Though silver be never so free we know of no way to honestly get a dollar of it but through the tedious way of working for it, and working hard as our fathers worked for the dollars of the daddies. We have confidence in the wisdom of our statesmen to regulate the methods of coining. How to get the coin out of the mint and into the hands of the people is a far more practical question with the millions. One would think, after listening to the ordinary harangue of the professional statesman in Congress, or the amateur statesman who discusses as learnedly wherever you meet him, and who works with his mouth only, that a condition of affairs is possible whereby there will be little to do but to pick up dollars about as men pick up pebbles, and this is, approximately, what many people understand by free silver. The upstart of all this pother will be a bimetallism, substantially such as we have had from the beginning, with neither gold nor silver the exclusive standard of value, but each a factor in all commercial transactions, this or that to be preferred in given cases, as conditions, not controlled by legislation, may determine.

HOLD FAST TO THE GOOD.

It is not absolutely reprehensible in any one to try the new at the expense of the old, for the new may possess elements of success that the old may at the moment lack. Possibly the new doctor may be better than the old in some respects, though the old has rendered very general satisfaction; or the new merchant may make better terms for a while than the old. Besides, there is often a vague and undefinable notion that competition is desirable in all lines of industry, even in preaching, but nothing is so common as a return to the old love after a short coquetting with the new. There is a sense of security in dealing with one who has won success by years of patient plodding. There may be less bluster and fussiness in the old than in the new, but bluster brings no solid results unless connected with genuine merit, which is seldom the case, for real merit scorns to resort to fustian and display. Ordinarily this return is in a quiet way, no mention being made of the momentary experiment with the new doctor or the new merchant, content to silently enjoy the sense of security and profit that years have insured with the old. But sometimes, as in the case of one of our advertisers, whose business has been represented in the Clay-Worker almost from our first number, the facts are frankly related. Some time ago, partly from the commendable motive of helping the weak, this advertiser gave a young and boasting paper in the same line a part of his patronage. Now, after experimenting to his satisfaction, he enlarges his advertising with us and discontinues the other, declaring that business is business, and charity quite another thing. We accept the implied compliment with modesty, and yet not without a degree of gratification that our labor to make the Clay-Worker not only a source of profit to our readers, but equally profitable to the men who have good things to sell in the line of brickmaking, has not been in vain. It is not only good business sense to try the new, and, if it fails, to return to the old with emphasis, as our friend has done, but it is scriptural, for Paul earnestly exhorted his brethren to try all things, but be sure to hold fast that which is good, and Paul was right.

PAVING BRICK IN THE SOUTH.

"The paving brick business in the South is very good," writes J. W. Sibley, treasurer of the Coaldale, Ala., Brick & Tile Company, likewise of the N. B. M. A. His company has booked some good orders ahead for pavers, also for buff building brick. The work of paving New Orleans goes bravely on, though, for a time, it was delayed through a change of administration. Several other cities in that section are paving their streets, brick being the most popular material.

TRADE LITERATURE.

"MANGANESE, Its Use In Clay-Working and How To Use It," is the title of a handsome little booklet published by Kendall & Flick, Washington, D. C., and edited by James Taylor, who, as our older readers know, is an able and instructive writer, as well as a proficient clayworker. Brickmakers seeking information relative to the coloring of front or ornamental brick will find this a valuable work. We presume a copy will be mailed free to those requesting it.

THE FREY-SHECKLER COMPANY, Bucyrus, O., have favored us with a morocco-bound copy of their thirty-fourth annual catalogue. It is a good-sized book of nearly two hundred pages, and in it is illustrated almost every up-to-date clayworking device, from a kiln door or casting to a monster 80,000 a day capacity "Giant" brick machine. Everything needed about a modern brick, tile or sewer pipe plant is shown, including hand, horse and steam power brick and tile machinery, clay conveyors, crushers, screens, pug mills, wet pans, dry pans, cutting tables, represses, brick cars, barrows, steam engines, etc., etc., of all kinds and sizes. The clayworker who can't find what he wants in the line of machinery in this book is very hard to please. The most interesting chapter of the book is that devoted to Ornamental Building Blocks. It is beautifully illustrated and shows the possibilities of the building block in a way that will astound those not familiar with the advance made in this branch of clayworking during the past year or two. The book is an expensive production, but we presume it is intended for free distribution and that our readers can secure a copy by writing the Frey-Sheckler Company.

M. F. WILLIAMS & CO., St. Louis, Mo., are sending out a circular describing their new shale breaker and pulverizer, in which they claim that this machine will do more and better work, with less power and cost for repairs, than any other pulverizer yet made. The machine seems to have a wonderful capacity for any and everything at all crushable. If you want a pulverizer for any purpose, or of any capacity, get one of these circulars, which can be had for the asking.

"PHOTOGRAPHIC VIEWS of the Great Cyclone at St. Louis," is the title of an interesting book issued by the I. Hass Publishing Company, of that city, for a copy of which we are indebted to Mr. T. P. Plumridge, assistant secretary, Hydraulic Press Brick Company. It contains over forty plates, 5½ by 7 inches, made from photographs taken the morning after the storm, which, with the graphic description of the wreck and ruin wrought by the cyclone, gives a more accurate idea of the horrors of such occurrences than one can obtain short of a visit to the scene of disaster itself. A copy of the book may be obtained by sending the price, 50 cents, to the publishers.

SAMUEL C. COWGILL, Summitville, Ind., has published a very handsomely illustrated catalogue of drain tile, of which he is probably the most extensive manufacturer in the world. In addition to a number of fine views of his factory the book contains much valuable information on the subject of land drainage. Mr. Cowgill deserves great credit for issuing such a beautiful catalogue, as he does, also, for the enterprise he displays in pushing the tile business. If his example was followed by other tile men the business would take on much greater proportions.

STEAM PUMPS of all kinds and sizes are illustrated and described in a handsome booklet issued by the Dean Bros.' Steam Pump Works, Indianapolis. They make a high grade pump, suitable for brickyard use, which, though reasonable in price, has large capacity and long life. If you need a good pump, don't fail to get their catalogue, which will be mailed free, on application, to any of our readers.

"THE CHEMISTRY OF POTTERY" is the title of a valuable work by Prof. Karl Langenbeck, published by the Chemical Publishing Company, Easton, Pa. Price, $2. It is a book of two hundred pages, substantially bound in cloth, and contains a vast amount of information of great value to ceramic students or operative potters. The author has devoted many years to the chemistry of ceramics, and is an acknowledged authority in his chosen field.

ANNUAL REPORT of the Department of Public Works of the City of Pittsburg. This is a handsomely printed and beautifully bound volume showing the work of this department for the year 1894. It sets out in business form all matters relating to the public work of a great municipality in a way to make it clear to those interested as to just what has been done, how it was done, to whom and in what amount was paid for it. It deals in a business way with streets, roadways, water and lighting plants, sewers, wharfs, markets, water supplies and lighting, fire protection, parks, and other public works.

TOOK HIS OWN LIFE.

A sad ending was that of J. A. Gillespie, who committed suicide by cutting his throat with a razor, in his room at the Sibley residence, near Coaldale, Ala., during the afternoon of May 22. Fortunately Mr. Sibley's family were at their residence in Birmingham, and so escaped the harrowing scene. About two months ago Mr. Gillespie, who had charge of the factory of the Coaldale Brick & Tile Company, began to take chloral and opium for insomnia, and, presumably, took too much of it, as, in a few days, his entire nervous system was completely shattered and he became habituated to the use of the drug. In a few weeks he became mentally deranged, and was taken to Knoxville by his brother-in-law for treatment. A few days before his death he returned to Coaldale and attempted to resume his duties. He went about his suicide in a most precise manner. His hone was on the bureau where he had sharpened his razor, and the mirrror was tilted, so he could get a good view of his throat as he kneeled on the floor. He then tied his handkerchief around the razor to keep the blade from bending back and tied the razor to his hand. He made a clean cut from ear to ear, severing both jugular vein and windpipe. He left a wife and two children, and an insurance of $10,000, which had passed the "contestable" limit. He was a member of the N. B. M. A., and, until his health failed, was exceedingly popular at Chattanooga, where he had lived all his life.

A LOSS OF $60,000 ON A SINGLE JOB.

The brickmakers of Chicago have good cause to regret the dissolution of their local organization, as our readers may see from the following item from the Daily Record of the 6th inst.:

> —Result of the Fall of a Trust.—
>
> Commissioner of Public Works Kent said yesterday that the dissolution of the Brick Trust probably will necessitate another advertisement of the bids for the construction of the new lake tunnel. He said the fall of the Trust had reduced the price of brick from $5.50 to $4.25 per 1,000, and this reduction will effect a saving of about $60,000 in the construction of the tunnel.

But some may say this, on the other hand, represents a saving to the city of the amount named. Perhaps! To our mind no municipality has a moral right to profit at the expense of any legitimate industry. The demoralization that is likely to follow "the dissolution of the brick trust" with its natural train of labor troubles may cost the city several times the $60,000 saved in this deal.

The LaSalle Pressed Brick Company, with offices in the Marquette Building, Chicago, have succeeded to the business of George B. Engle & Co., Mr. Engle being retained as general agent, and will continue, as heretofore, to furnish the builders of the Windy City with any and every kind of front brick that the trade requires. He will be pleased to correspond with any outside manufacturers who may desire to place their product upon the Chicago market. Mr. Engle's relations with the contractors and architects there are such as to enable him to control a very large business.

W. Irving Thayer, M. D., of Williamsburg, Mass., advises us that he has discovered a means by which "whitewash" or efflorescence on brick and terra cotta may be prevented. His process, he claims, is both manipulative and chemical, from which we take it that he proposes to treat the clay before the ware is burned. If this can be done effectively and inexpensively, Mr. Thayer has, indeed, discovered a long-felt want, and will, no doubt, achieve wealth and honor accordingly.

Written for the CLAY-WORKER.

THE BLOATED BUMBLEBEE.

M. C. Meigs.

Raise the pickens for the chickens,
  Raise the baby on your knee,
But never raise a rumpus
  With a bloated bumblebee.

Don't you slight him, don't you fight him,
  Even on your own domain;
If you do it you will rue it,
  While you wrestle with a pain.

Don't you boss him, don't you cross him
  When the flowers are in bloom;
If you meet him, try and greet him
  With respect—and lots of room.

Don't attend him, don't offend him
  On the fragrant flowery clumps.
I tell you why, he'll dot your eye
  And give your ear the mumps.

One allusion, in conclusion,
  To the weapon you should fear;
Only one—a needle gun,
  Which fetches up the rear.

If you enrage him and engage him
  In battle with his foes,
Friends will wonder why in the thunder
  You wear that poultice on your nose.

In conclusion, in confusion
  Just break the ranks and run
From this yeoman, dauntless Roman,
  With his hypodermic gun.

SOME OTHER DAY.

There are wonderful things we are going to do,
    Some other day;
And harbors we hope to drift into,
    Some other day.
With folded hands the oars that trail,
We watch and wait for a favorite gale
To fill the folds of an idle sail
    Some other day.

We know we must toil if ever we win,
    Some other day;
But we say to ourselves there's time to begin
    Some other day.
And so, deferring, we loiter on,
Until at last we find withdrawn
The strength of the hope we leaned upon
    Some other day.

And when we are old and our race is run,
    Some other day,
We fret for the things that might have been done
    Some other day.
We trace the path that leads us where
The beckoning hand of grim despair
Leads us yonder, out of the here,
    Some other day.

A MODERN VERSION.

Sing a song of business,
  Paper full of ads,
Ev'ry one will make us
  "Dollars of our dads."
When the paper's opened,
  Then they do their work;
Never take a holiday,
  Never loaf nor shirk.

—Printer's Ink.

WANTED—Re-engagement as manager or superintendent of fire brick works. Advertiser has had a long practical experience in first class work. Address
61d F. B. care Clay-Worker.

WANTED—To purchase an established brick plant, 20,000 capacity, auger machine, steam power, plenty of clay. Town of 6,000 to 30,000. Decribe fully. Address
61c G. D. STRAYER, East Stroudsburg, Pa.

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RECEIVER'S SALE.

THERE WILL BE offered for sale at public auction, on the 18th day of July, 1896, at the brick works near the town of Hillsboro, Ind., on the Peoria division of the Big Four Railway, the entire brickmaking plant and equipment of the Hillsboro Brown Stone and Pressed Brick Company, consisting of eighty acres of clay, ranging from six to eight feet in depth, which makes a beautiful dark red pressed brick. Beneath this is twelve feet or more of excellent shale, from which a high grade paving brick can be made, and beneath the shale a deposit of good brown stone. The brick plant includes a four-mold Penfield dry press, large Penfield dry pan, elevating and screening machinery, forty-horse-power Chandler & Taylor engine and a large boiler, all as good as new and contained in a well-constructed brick, metal roofed building. There are two large Eudaly down-draft kilns and ample stock sheds, in which there are several thousand fine pressed brick; also, a standard gauge railroad, connecting the factory with the Big Four Railway, and a large locomotive. Terms, one-third cash, one-third in six months and one-third in nine months. For further particulars address PERRY HATT, Receiver,
Hillsboro, Ind.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, ST. LOUIS, MO.

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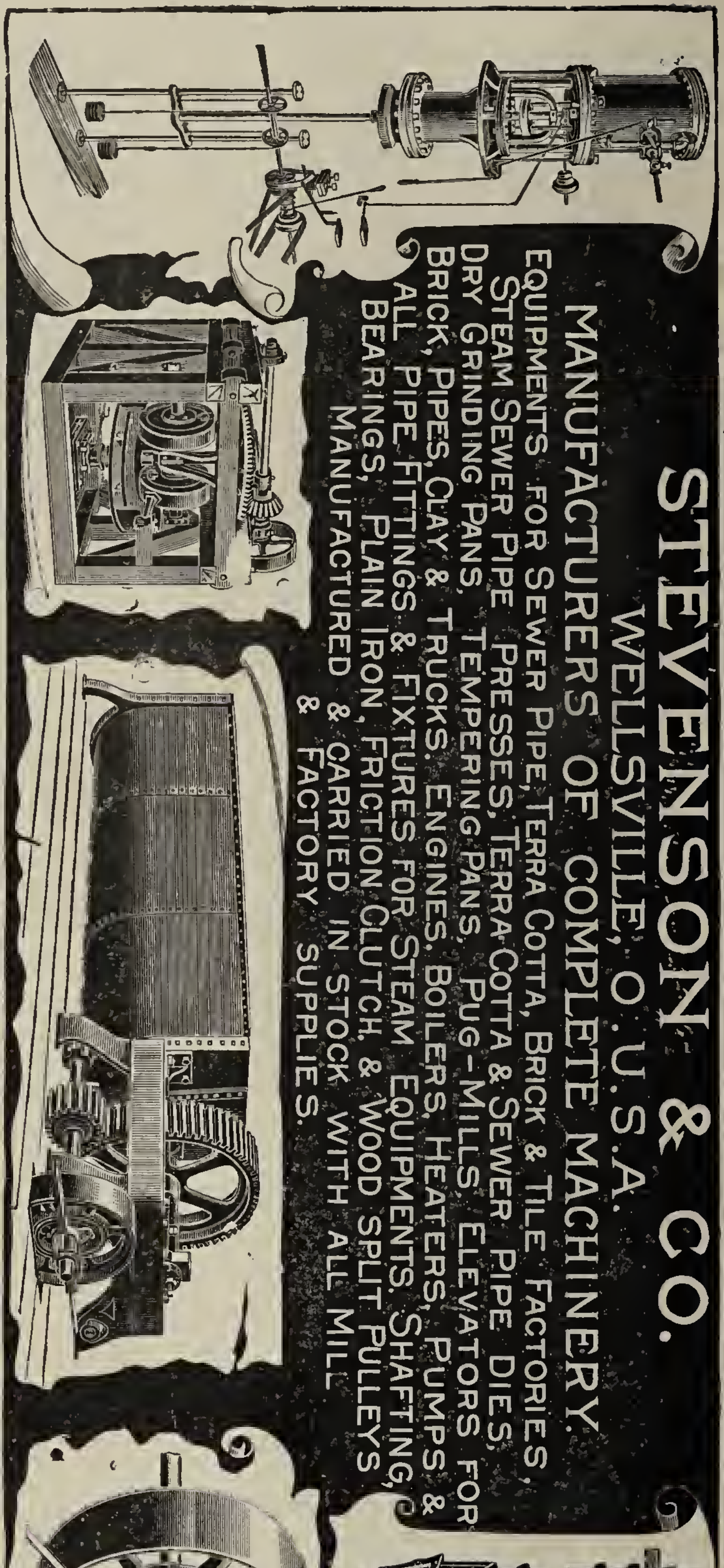
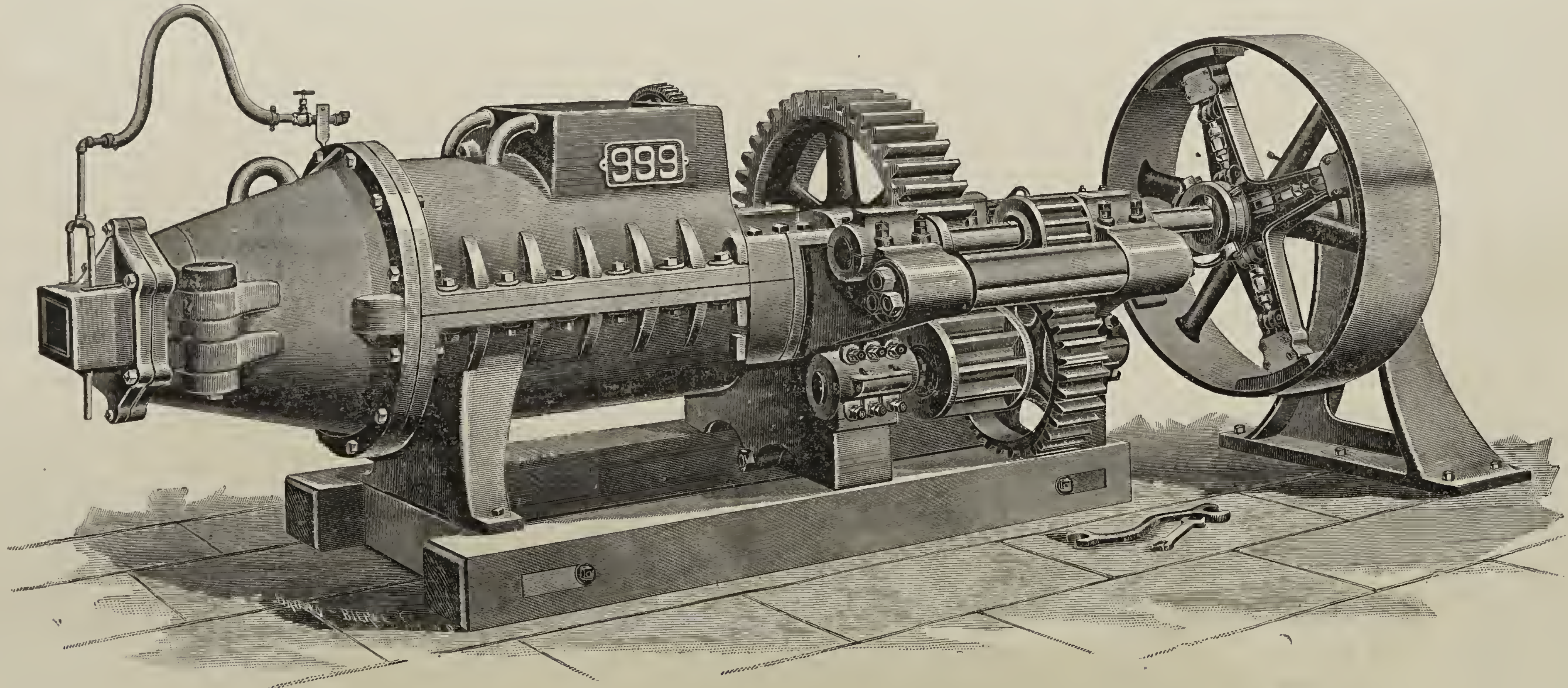


STEVENSON & CO.
WELLSVILLE, O. U. S. A.
MANUFACTURERS OF COMPLETE MACHINERY.
EQUIPMENTS FOR SEWER PIPE, TERRA COTTA, BRICK & TILE FACTORIES, STEAM SEWER PIPE PRESSES, TERRA COTTA & SEWER PIPE DIES, DRY GRINDING PANS, TEMPERING PANS, PUG-MILLS, ELEVATORS FOR BRICK, PIPES, CLAY & TRUCKS, ENGINES, BOILERS, HEATERS, PUMPS & ALL PIPE FITTINGS & FIXTURES FOR STEAM EQUIPMENTS, SHAFTING, BEARINGS, PLAIN IRON, FRICTION CLUTCH, & WOOD SPLIT PULLEYS MANUFACTURED & CARRIED IN STOCK WITH ALL MILL & FACTORY SUPPLIES.

Speculation May be a Better Sounding Name than Gambling,

But it Costs Just as much; Don't Speculate in Inferior Brick Machinery.



Buy the **999** and you will get one that is **a Dead Sure thing every time.**

C. W. RAYMOND & CO., OF

DAYTON, OHIO, make it.

They also make some other things. Send for their Catalogue.

Import Duties on Brick, Clay, Etc.

DURING the early part of the present session a bill was introduced in Congress by Representative Pritchard, introducing some changes in the existing tariff act. This, in turn, has been amended by Mr. Platt, and the bill, as amended, imposes the following duties:

—Brick and Tile.—

Fire brick, not glazed, enameled, ornamented or decorated in any manner, $1.25 per ton; present duty, 25 per centum ad valorem. Glazed, enameled, ornamented or decorated, 45 per centum ad valorem; present duty, 30 per centum ad valorem.

Tiles and brick, other than fire brick, not glazed, ornamented, painted, enameled, vitrified or decorated, 25 per centum ad valorem; no change from present duty. Ornamented, glazed, painted, vitrified or decorated, and all encaustic, 45 per centum ad valorem; present duty, 40 per centum ad valorem.

Roman, Portland and other hydraulic cement, in barrels, sacks or other packages, 8 cents per 100 pounds, including weight of barrel or package; no change. In bulk, 7 cents per 100 pounds; no change. Other cement, 20 per centum ad valorem; present duty, 10 per centum ad valorem.

Lime, 6 cents per 100 pounds, including weight of barrel or package; present duty, 5 cents.

Plaster of paris, or gypsum, ground, $1 per ton; no change. Calcined, $1.75 per ton; present duty, $1.25 per ton.

Clays or earths, unwrought and unmanufactured, not specially provided for in this act, $1.50 per ton; present duty, $1 per ton. Wrought or manufactured, not specially provided for in this act, $3 per ton; present duty, $2 per ton. A. F. TENNILLE.

DOWN IN JERSEY.

The clayworking industries of New Jersey are, at the present writing, rather quiet. All the factories are doing some work, but nothing like what they should be doing this time of the year.

Keasbey's factory is running full time, but principally upon stock, very little shipping being done. Builders are apparently holding back orders until it is absolutely necessary to have the material. Then, no doubt, they will say a cuss word or two because they do not get it fast enough.

The Standard Hollow Brick Works, formerly Isaacs' old place, are now under the management of Robert W. Lyle, who recently resigned from the general management of the Staten Island Terra Cotta Lumber Company. With the facilities this firm has it should be able to knock the pins from under all competitors. The stock of hollow brick in its yards is simply astounding. The brick are piled mountain high, but when one thinks of the sky scrapers now going up in New York city one can easily see what will become of so many brick.

C. Pardee's works are doing some work, but nothing rushing.

The various terra cotta works of this city are running very light, and at the old stand-by, the P. A. Terra Cotta Company, very little is doing. As there is probably one-half million dollars tied up in this plant alone (which, when busy, gives employment to eight hundred men), one can realize the drain on the pocketbook of the proprietors when the wheels are idle, as interest runs on, rain or shine, night or day. The various classes of labor employed at this factory, of course, feel the slack times, likewise the merchants. Other branches of business appear to be good. Many buildings are being erected, but as they are principally of wood only the foundations require brick, which are of the common kind and are now delivered on the ground at $5.75 per thousand.

A recent visit to the vast clay deposits of the Raritan Ridge Clay Company with Mr. Augustine Campbell, the genial head and manager, was a revelation to the writer. Although my business frequently takes me past all these clay districts, very seldom do I take the time to stop and investigate the vast deposits. This being a trip on business, Mr. Campbell very kindly showed me his banks now being worked. From appearance of things there, Mr. C. believes in keeping things cleaned up. The vast deposits of buff-burning clays on this property warrant the assertion that even Mr. Campbell's son, who looks after most of the business, will not live long enough to see the bottom of the pit. This firm furnishes every pound of clay used by the Standard Terra Cotta Company, of this city, and ships vast quantities of various grades to different works outside of Amboy. Mr. Campbell has recently had an artesian well drilled upon this property to furnish water for his horses. Contractor, W. R. Osborne, of Perth Amboy. Some day we hope to give a history of Mr. Campbell's trials and tribulations in mining clays in all the years gone by. From a conversation some months ago, we should judge it would be interesting matter for many of your readers.

Through his ad. in the Clay-Worker Mr. W. R. Osborne has placed one of the famous Star drilling outfits, for drilling water wells, with the Black Diamond Coal Company, of Knoxville, Tenn. This firm is progressive in that it contemplates the erection of coke ovens at Coal Creek, Tenn. The water wells are intended to supply 100,000 gallons per day for the washing of coal. A system of compressed air pumps will probably be used to elevate the water from the wells. There being no valves, the sand or grit that is in many wells cannot destroy or clog the valves, as in other pumps. Some of your readers who make fire brick might be benefited by addressing this company, as they will no doubt need fire brick to line coke kilns or ovens.

R. H. Valentine, Jr., of M. D. Valentine Bros. Company, Woodbridge, recently had Mr. Osborne erect one of those beautiful galvanized steel aermotor pumping outfits, in the shape of a fifty-foot steel tower and an eight-foot steel wind wheel, at his beautiful new residence, Woodbridge, N. J. This elevates water from a well into a tank in the attic of the house, supplying bath and range with water. The V.'s are nothing unless progressive.

While there is a new general manager at the Staten Island Terra Cotta Company's plant, Mr. J. B. Tarsney is still in charge of the fancy brick and terra cotta department. The hollow brick department is still undergoing repairs at this factory. In consequence many laborers are idle, awaiting completion of same.

The Kirschners, of Kirschnerville, Staten Island, are running on a large order of brick for the new St. Paul building, which is to be a twenty-five-story building, on the old Herald building site, New York city. This will be, indeed, a sky scraper, and as the land upon which it stands is not so very large in area, the building, when completed, will look higher than it really is. It tires one's neck now to look up to the top of some of the Broadway buildings, but we venture to say that within a very few years even forty stories will not be such a wonder. Space is cheap up in the air, you know, and with the express elevators now used the offices command ready tenants. It requires acres of clay goods for these buildings, so let them build more and more.

M. O. SKEETER.

PHILADELPHIA NEWS.

The brick manufacturers in and near Philadelphia are, without a single exception, very busy. All the plants are being run to their full capacity, and it is a common thing to see two or more builders in a yard at a time buying or arranging for the delivery of brick to the various operations.

Many permits are taken out daily, and the prospects for the brick manufacturers are exceedingly bright. Hard brick are now selling at $7.50 to $8; salmon, $5.50 to $6; stretchers, $9 to $12, and pressed, $16 to $20 per thousand. These prices are a shade better than last year.

Bids are in for the Reading subway on Pennsylvania avenue. Contract has not yet been given out. In the construction of subway 20,000,000 hard brick will be used. This is a nice little job for all our brick manufacturers combined.

Among the many brick plants visited by your correspondent during the past month was that of Tansey Bros., located at Crescentville, Thirty-fifth ward, Philadelphia. This plant is equipped with Standard dryer, Martin "A" machine and four up-draft kilns. The piling sheds are neat and well built. This firm is turning out the best brick I ever saw come from a Martin machine. I examined their clay and found it fairly good, and if other Martin machine users would exercise the same care and give a little more attention to "help," I am positive they would be amply repaid in the shape of more and better brick. I observed how very careful the "dumper" was to have bricks slip from molds square and clean, and the general attention of all the machine gang to their work. Messrs. Tansey Bros. deserve great credit for the way they conduct their business. I think it would pay some of the manufacturers to spend a day with them and get a few "pointers." Then they could make brick that would not look as if they were molded in a fire horn or tomato can. I trust the manufacturers who are not making as good brick as they are capable of doing will take my commendation of Tansey Bros.' work as an incentive to themselves, as they certainly have equal facilities and equally good machines, all that is necessary being the exercise of a little care, coupled with ordinary enterprise. When they have acted on my suggestion I will be happy to allude to them in commendatory terms in future writings.

One word about brick machines. I am convinced by experience and observation that there are many machines on the market that will produce first-class brick at a minimum cost which have been thoughtlessly condemned by concerns that are commonly known as "big guns."

Mr. E. C. Freeman has leased the brickyard at Twenty-second and Somerset streets, formerly operated by a Mr. Reefner. Mr. Freeman is a young man, full of energy and push, and I predict a long and successful career for him in the brick business.

There is a rumor that Mr. Wm. McCay, ex-President of the Jarden Brick Company, will operate the plant formerly owned by Webster, Gillespie & Co.

The Excelsior Brick Company, of North Broad street, after a long and successful career, will wind up their affairs at the end of the present season, owing to the fact that their clay is, or will be, all worked up.

Mr. Robert Paschall, for many years Superintendent of the Equitable Brick Company's plant at Sixtieth and Pine streets, West Philadelphia, has leased the yard of the late Charles Webster, at Frankford, and is now running full blast. "Bob" has the best wishes of his many friends in his new enterprise. He is a "hustler," and bound to win. PENN.

"THE BRICKMAKER'S BEST ADVISER AND FRIEND."

Publishers Clay-Worker:

If you have a copy of the December Clay-Worker we would be pleased to have you send it to us, as we loaned ours to a St. Louis machine manufacturer to take to his room at the hotel and he failed to return it, and the hotel clerk failed to find it after his departure. We do not want to lose a number, and especially the Atlanta Convention number.

The Clay-Worker is the brickmaker's best adviser and friend, and so long as we make brick and you print it we will be a standing subscriber. THE JONES BRICK COMPANY.

. . FOR SALE . .

Two Simpson Presses.

These are of the latest improved design and just as good as new. Have been run less than a month. Have never been broken and show no signs of wear. The Simpson is the standard machine for making fine face brick

One Plymouth Brick Machine.

Large size made by the Fate-Gunsaullus Co. Has special Auger and Cylinder for making drain tile and a set of tile dies from 3 to 12-inch.

One Plymouth Board Delivery Brick Cutting Table.

One Plymouth Tile Cutting Table.

This machinery has been in successful operation for about three years, is somewhat out of repair but will be sold cheap.

One Freese "A Special" Brick Machine.

A first class machine in good repair, with special augers, cylinders and dies for making paving brick.

One Stevenson Pug Mill.

Wood tub, 9 feet long, gears and clutch pulley nearly new, in good condition except it needs a new set of knives.

One Emen's Clay Granulator.

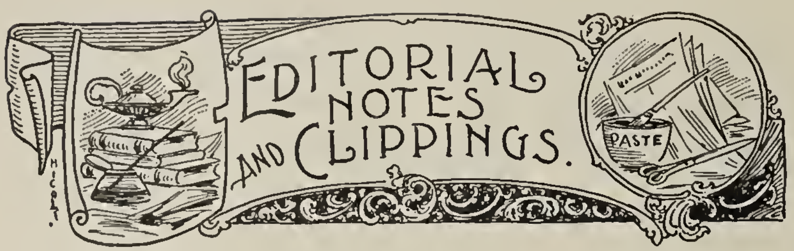
Nearly new. Made extra heavy and strong to order. The only successful machine for feeding clay to pulverizers.

WE ARE "long" on machinery and "short" on money hence have decided to sacrifice some of the former to obtain a little of the latter. If you are thinking of putting in more machinery, we can save you a good many dollars.

Correspondence solicited.

The Cleveland Vitrified Pressed Brick Co.,
809 Cuyahoga Building, - - CLEVELAND, OHIO.

Preserve this Advertisement—It will Not Appear Again.



EDITORIAL NOTES AND CLIPPINGS.

Albion, Neb., has a new pressed brick plant.

Ground is being broken at Rosemont, Pa., for a new brickyard.

A new brick plant is being operated at Mendota, Ill., by Hess Bros.

H. Gore and Jno. Dunnicliff will start a brickyard at Nevada City, Cal.

D. A. Miller is building a brick plant of 30,000 daily capacity at Roachdale, Ind.

F. Crum has bought the Tucker Brick Plant at Palmyra, Ill., and is now operating the same.

C. J. Ward's brick plant, at Elizabeth City, N. C., was considerably damaged by fire the 26th ult.

Jas. D. Glover is organizing a company at New Castle, Pa., for the manufacture of tile and terra cotta.

Samuel Walker has leased the Ryan brickyard at Sault Ste. Marie, Mich., and is now operating the same.

A new brick company, in which Edward L. Merrill is interested, is being organized at Phoenix, Ariz.

The Harrison Brick Company has been incorporated at New Albany, Ind., with a capital stock of $20,000.

C. Yates and Jas. Upton have formed a partnership for the purpose of manufacturing brick at Waynesville, Ill.

Robert Paschall, West Philadelphia, Pa., has leased the brick works of the late Chas. Webster, located on Bridge street.

J. J. Allebaugh and Louis Williams have leased the Langhead Brick Works, at Uniontown, Pa., and will operate it this season.

A. J. Mills, of Hilton, Cal., has made improvements in his plant that will enable him to more than double his former capacity.

Henry Gibson, a brick manufacturer of Deepwater, Mo., was one of the victims of the St. Louis cyclone, being killed instantly.

J. Stockert & Son, New Ulm, Minn., advise us that they are in the market for a second-hand repress. Would prefer a Raymond.

S. Hirsch & Co. have purchased the Stonington Brick and Pottery Company, at Fayette, Miss., and will put the plant in operation at once.

Two men were killed by the explosion of a boiler at the brick plant of Shute & Son, Monroe, N. C., and a colored woman was fatally wounded.

The firm known as H. Kloppenburg Brick Manufacturers, at Springfield, Ill., has been dissolved by mutual consent. Henry Kloppenburg will continue the business.

Greeves & Ackers, the new firm at Hillsboro, N. D., that is building a brick plant, have purchased a New Eagle brick machine of Benj. Craycroft, Vandalia, Ill.

A stock company, in which E. M. Wight is interested, will probably be organized at East Brookfield, Mass., to develop valuable clay deposits on Mr. Wight's property.

Mr. Wm. Mohr has withdrawn from the brick manufacturing firm of Foss & Mohr, Baltimore, Md. Mr. John H. Foss will continue the business in his own name, assuming all indebtedness.

Jno. Roffers, of De Pere, Wis., has just started up his brick plant. Among the first orders to be filled is one for 70,000 brick. He thinks the outlook for the season is very fair.

The Atlanta (Ga.) Terra Cotta Works were slightly damaged by fire last month. The roof caught fire, but the plant suffered most from the water thrown by the fire department.

The Flood Brick and Tile Company, of which Henry, Harry A., Jno. R., Catherine and Frank Flood are the incorporators, has been chartered at Stuttgart, Ariz., with a capital stock of $15,000.

J. B. Marshall, Stewartville, Minn., is increasing the capacity of his brick plant, having purchased a New Eagle brick machine of the Benj. Craycroft Foundry and Machine Works, at Vandalia, Ill.

The Oregon Brick Manufacturing Company has been incorporated at Portland, Ore., to manufacture brick and tile at Oregon City. The incorporators are E. Kraeft, Albert C. Kraeft and Eli Criswell.

The Sandy Ridge Fire Brick Works, Bellefonte, Pa., have been purchased by a new firm, which will be known as the Iron City Fire Brick Company. The company contemplates erecting another plant near Pittsburg.

The explosion of a boiler at the large tile factory of Alexander Moore & Son, at Tipton, O., killed both Mr. Moore and his son, and nearly all of the employes were seriously, and, it is thought, one or two fatally, injured.

Thos. Lewellen, of Yountsville, Ind., sustained damage to the extent of $500 during a recent storm. A large chimney to a tile kiln was struck by lightning and completely demolished, and the kiln was badly wrecked.

The King Brick Company are overhauling their plant at Columbia Falls, Me., and making a number of improvements that will make it the equal of any first-class brick plant in the State. They have a very superior quality of clay.

The death of Mr. Adam Caire, proprietor of the Poughkeepsie (N. Y.) Pottery, occurred in that city May 29. Mr. Caire was a public spirited as well as a benevolent man, and will be sadly missed by his large circle of friends.

Wm. B. Lawton, one of the oldest and most respected citizens of Ware, Mass., died at his home on the 20th ult., after an illness extending over a year. Mr. Lawton had been engaged in the manufacture of brick for many years.

The Swayzee Brick Company's plant, at Swayzee, Ind., was completely destroyed by fire the 9th inst. The loss is estimated at several thousand dollars, there being no insurance whatever on the plant. The origin of the fire is unknown.

G. S. Ettla, treasurer of the Clearfield (Pa.) Clayworking Company, Limited, advises us that his company is building new works for the manufacture of a full line of clay and shale products, and also for the manufacture of enameled brick and tile.

In a recent letter "Father" Crary writes that his two sons, J. W., Jr., and Jas. O., are running his brickyard at Bluff Springs, Fla., and are quite busy, as most consumers in Pensacola specify in their contracts that "Bluff Springs" brick be used.

Mr. Geo. W. R. Comstock, of the Claymont (Del.) Brick Works, in renewing his subscription to the Clay-Worker, says that while his company is doing a much better business thus far this year than during the same period last season, the brick business in that section is rather dull.

Chas. Bailey, for many years a prominent citizen and brick manufacturer of Hooksett, N. H., died there on the 3d inst. from injuries caused by a fall some weeks ago. Mr. Bailey was eighty-five years of age, and had been engaged in the brick business for more than fifty-three years.

C. H. Coy, an extensive brick manufacturer of Denver, Col., was building a large modern brick plant at Cripple Creek at the time that city was visited by the conflagration. Since then the plant has been completed, and is now running night and day in order to fill the orders that are pouring in.

The Enterprise Contracting Company has been organized at East Radford, Va. It is the purpose of the company to manufacture pressed, fancy and common brick. The officers are James H. Phillips, President; Richard McMenamin, General Manager; W. J. Kenderdim, Secretary and Treasurer.

The large barn of George W. Ives, one of North Haven's largest brick manufacturers, was burned to the ground May 19. Henry Phelan, a driver for the brick company, nine horses, one of them valued at $1,000, and two cows perished in the flames. The total loss is estimated at $10,000.

The extensive brick works of John Caruthers, at West Newton, Pa., was burned May 15, including the engine and dry house and most all of the machinery. The loss, which is about $5,000, is partly covered by insurance. The fire is supposed to have been caused by sparks from a passing engine.

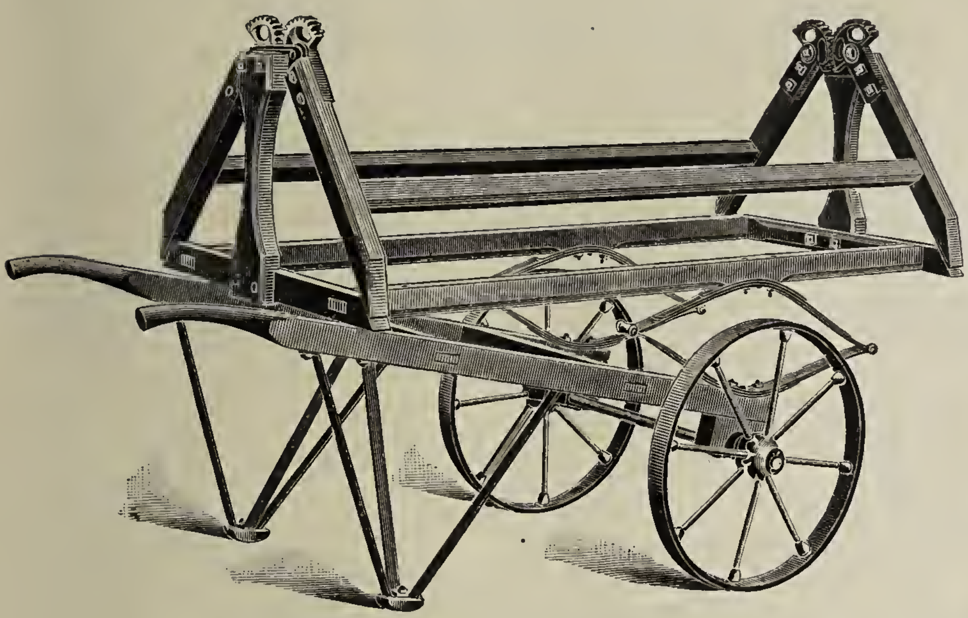
The Eclipse Paving Brick Company, of Hubbard, O., has been placed in the hands of a receiver. This does not mean a closing up of the company's affairs. On the contrary, the works have a large number of orders on hand, and will be operated as before, and it is confidently expected that it will soon be placed on a firm basis financially.

A new brick plant, in which Patrick and John Hickey, of Pittsburg, Pa., and Robert Hickey, of Scottdale, Pa., are interested, will be built at Mount Pleasant, Pa., with a capacity of from 15,000 to 20,000 daily. At the start only building

[CONTINUED ON PAGE 582.]

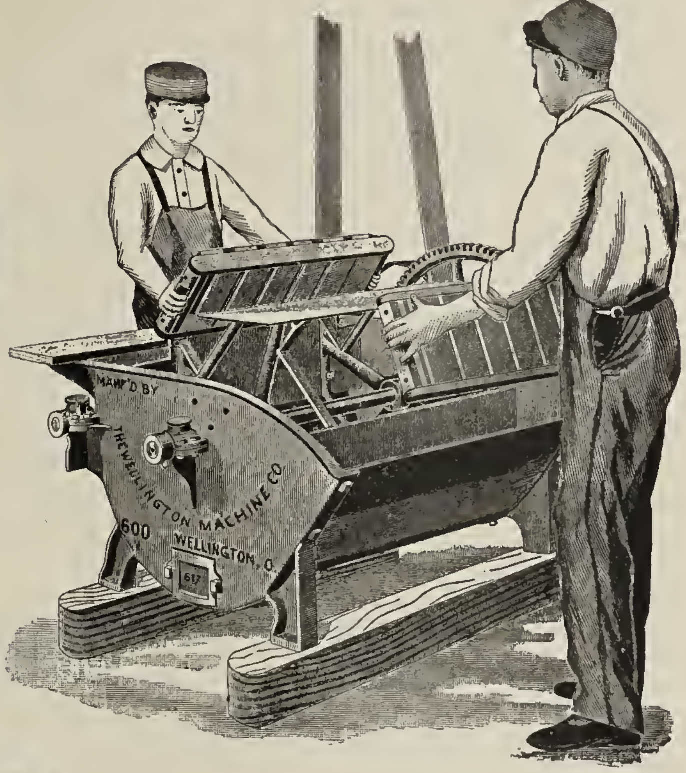
LIES

Are Not Liked by Anybody.
(But our Supp=LIES are Liked
by All who Try Them.)



Double Deck Pallet Trucks.
(One or Two Wheels.)

◆

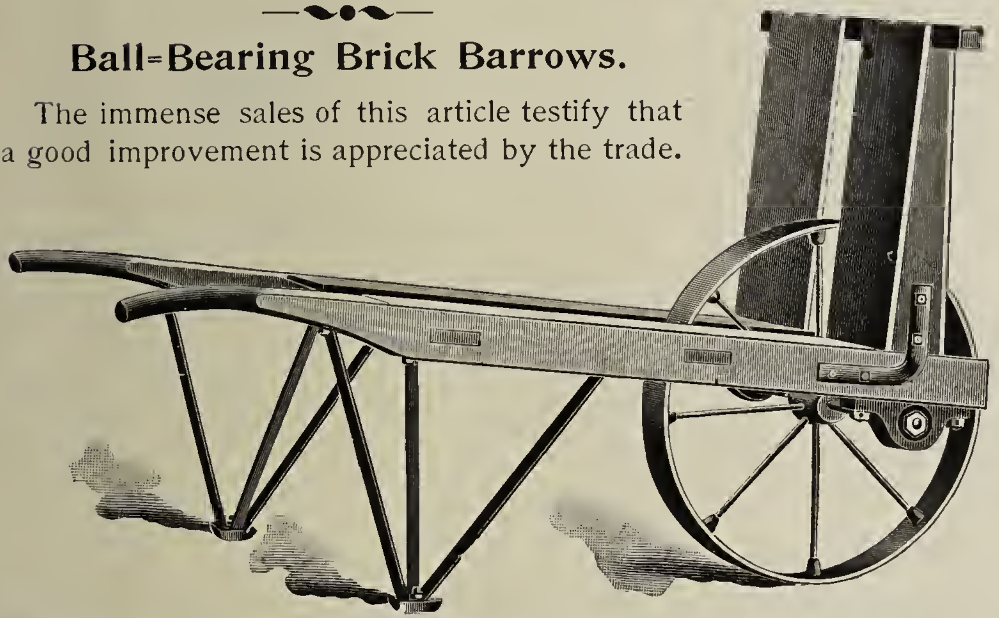

MAN'F'D BY
THE WELLINGTON MACHINE CO.
600
WELLINGTON, O.

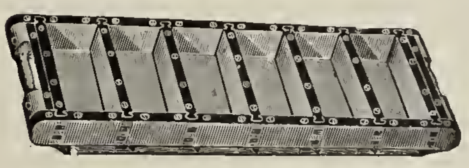
Ball=Bearing Brick Barrows.

The immense sales of this article testify that a good improvement is appreciated by the trade.

Mould Sander.

By far the best and at the same time the lowest priced on the market.





Moulds: all kinds and sizes.

◆

Dump Tables, Sand Barrows, Dump Carts, Elevators, Kiln Castings, etc., etc.

◆

GOODS PERFECT. PRICES LOW.

◆

The Wellington Machine Co.,

Wellington,
Ohio.

(See Page 610.)

For Sale.

Odd sizes of molds. Have not been used:

5 Molds, $8\frac{3}{4}$ x $4\frac{1}{4}$ x $2\frac{3}{8}$.
12 Molds, $9\frac{1}{4}$ x $4\frac{1}{2}$ x $2\frac{3}{4}$.
20 Molds, 8 13-16 x 4 3-16 x 2 7-16.

Second-hand, but used a few days only:

19 Molds, $9\frac{1}{2}$ x $4\frac{5}{8}$ x 2 9-16.
10 Molds, $9\frac{1}{2}$ x $4\frac{5}{8}$ x $2\frac{3}{4}$.
20 Molds, $9\frac{1}{4}$ x $4\frac{1}{2}$ x $2\frac{3}{4}$.

All six-brick molds, with 9-16 partitions.

EDITORIAL NOTES and CLIPPINGS—Continued.

brick will be turned out, but it is possible that in the fall they will take up the manufacture of fire brick. As the Hickey Brothers are all practical brickmakers, there can be no doubt as to the ultimate success of the undertaking.

David Ralston, a brick manufacturer of Seattle, Wash., died in that city May 30. Mr. Ralston had been manufacturing brick in Seattle for the past six years, and previous to that had been in the brick business at Troy, N. Y., for many years. He had a large number of friends in both cities, who learned of his death with deep regret.

The Chattahoochee Brick Company, Atlanta, Ga., informs us that their brick trade is very large and has been for the entire spring. Numerous large buildings are being erected in that city, including the County Court House and the Seaboard Airline Freight Depot. Their business this year will exceed that for the same length of time during last year at least 40 per cent.

John Fields, of the well-known brick manufacturing firm of Fields & Bros., died at his home in Eddystone, Pa., May 13, in his sixty-third year. Mr. Fields had been engaged in the brick business nearly all of his life, having had experience in almost every branch of the work, and was highly esteemed in the community where he had passed the better part of a useful life. He leaves a widow and four children.

Work has again been resumed at the Frederick (Md.) Steam Brick Works, which was destroyed by fire some time ago. In rebuilding the plant a number of changes have been made which have materially improved the works, making it practically fire-proof. Among other improvements is that of a new dryer, which was put in by the American Blower Company, of Detroit, Mich. The company have a large number of orders on hand and anticipate a good season.

In a recent letter E. M. Pike, builder of the New Discovery kiln, says that he is building eight twenty-six-foot kilns for Herman Goetz, Reading, Pa., four of the same size for the Ninety-second-street Brick Manufacturing Company, Philadelphia, Pa. He is also building kilns at York City, Pa., for the Pfaltzgraff Pottery Company, and for the Springfield (Wis.) Paving Brick Company, and has, as he puts it, "a few more orders in sight."

In renewing their subscription to the Clay-Worker, the Ohio Mining and Manufacturing Company, whose office is in New York City, say they have about completed their new plant at Shawnee, O., which will have a capacity of 50,000 brick per day. They have one four-mold Simpson dry press, two Stevenson dry pans, a standard dryer and Simpson's clay steamer and screens, all of which were called to their attention by advertisements in the Clay-Worker.

W. S. Purington, of Galesburg, Ill., writes that while they are only running one plant, they are running that to its full capacity, and are making repressed pavers exclusively, as the demand seems to be for that class of brick entirely. They have made some progress in the last year or so in the matter of shape of their paving brick, but he does not know that the wearing quality is any better than those they made several years ago. They are now making a molded sidewalk tile which they intend to introduce on the market, as they make a very pretty walk

The Lehigh Fire Brick Company, of Catasauqua, Pa., enjoys the distinction of being the first concern in this country to manufacture brick by electricity. Electric motors, aggregating seventy-five-horse power, have been installed by the Catasauqua Electric Light and Power Company, under the supervision of Superintendent Frank M. Tait. The old steam plant has been entirely abandoned. The manufacture of brick, including the mixing, etc., is done entirely with electricity. The output of brick has been greatly increased by this change of power, and, altogether, the entire plant is a model of convenience and economy. It is another successful demonstration of the superiority of modern power over the old steam systems. The brick company introduced new machinery to conform with the requirements of the new power. As no attempts had ever been made before in this country to manufacture brick by electricity, the successful accomplishment of that departure here speaks well for the mechanical ingenuity of Mr. Tait and his assistants.—Catasauqua (Pa.) Record.

NEW TRAIN SERVICE ON THE MONON ROUTE.

Commencing Sunday, June 7, the regular sleeping car for Indianapolis, via the Monon Route, will be carried on the fast mail train, leaving Chicago at 2:45 a. m.

The sleeper will be ready for occupancy in Dearborn Station (Polk-street Depot) at 9:30 p. m., thus giving passengers an opportunity to spend the evening in Chicago, go to the theaters or other places of amusement and retire any time after that hour.

The arriving time at Indianapolis is 8 a. m.

PROFITABLE ADVERTISING.

Most advertisers seem to think that success in advertising depends on the cost of advertising space. The cost of the space is the least important element of success in advertising. First comes the selection of the right advertising mediums; next in order comes the right kind of advertisements, and least important comes the cost of the space.

* * *

A manufacturer of an expensive article of household furniture told us the other day that the percentage of requests for catalogues was smaller and the actual orders larger from Harper's Magazine than from any of a dozen other magazines on his list. When a subscriber to a magazine like Harper's writes for a catalogue he generally means business.

* * *

In advertising, as in other things, "the best is the cheapest," though the best is almost always the highest priced. The fact that a magazine can get a high price for its space is good evidence of worth. It is the invariable experience of large advertisers that high class magazines pay best, though they cost the most.—Exchange.

A Most Effective Yet Inexpensive Pump.

We desire to call the attention of our readers to the Vanduzen Steam Jet Pumps. (See advertisement in another column.) These pumps are of unique, simple design, and so constructed that when placed in position for regular duty, they cannot retain water while not at work, and hence, cannot freeze up in the coldest weather. Being made of brass, they will not crack or break because of extremes of temperature, and will stand greater strain and will not rust. They will always be found ready for work and need no watching nor constant looking after. When put in place it is only necessary to turn on steam and it starts to work, and turning off steam will stop it. It is used for many different purposes, in wells, pits, quarries, mines, river and lake sides, tube wells, in tanneries, mills, factories, on steamships, tugs, ferry boats, and so we might name numerous other uses for this excellent pump. As they operate in conformity to the law of nature, with steam as the active agent, it is an absolutely reliable pump at all times. Thousands of them are in daily use, not only in the United States, but in at least twelve foreign countries, Australia, Hawaii, Japan, India, South Africa, Cuba, West Indies and in Mexico and Central and South American countries, and everywhere they give full and entire satisfaction. The price is so low, and the setting up is so simple that any one in need of a simple steam pump should certainly secure one or two, as the case may require, at once. The cost ranges from $7, for the smallest size, up to $75, for the largest size, which will elevate from 10,000 to 15,000 gallons of water per hour to any height not exceeding fifty feet, vertically measured. Where the height exceeds fifty feet, but not over one hundred feet, two pumps are used, one above the other. These pumps are highly recommended and the manufacturers, the E. W. Vanduzen Co., Cincinnati, O., will take pleasure in sending price and illustrated catalogue free.

THE BEST IN AMERICA.

Publishers Clay-Worker:

You will please find inclosed amount due you for my subscription. Having been a reader of the Clay-Worker for over twelve years, I would feel lost without it, and must congratulate you on its success as a trade journal, being the best in America.

Business is very quiet in Canada. While we are very busy just now, things are not in a very healthy state and the building outlook not very promising for the future. W. F. TALLMAN.

Beamsville, Canada, June 1, 1896.

WATCH FOR RATES VIA VANDALIA LINE TO

The National Republican Convention, to be held in St. Louis, Mo., June 16, 1896.

It is some time yet until the date of the Convention, but it is a pleasure to us to keep in the lead and advise our Republican friends that the Vandalia line is the short line, Indianapolis to St. Louis, running into the new Union Passenger Station at that point. Rates via this popular line will be as low as offered by any other line, and the train service is far superior. Parlor, dining and sleeping car service on all through trains. Arrangements will be perfected whereby private cars to be occupied will be located near the heart of the city. Our Republican friends want the best, and they know when they go via the Vandalia line they enjoy equal rates, speed, comfort and safety. Give us a call. GEO. E. ROCKWELL, D. P. A.,
Indianapolis.

Wonders Never Cease.

SOMETIME since a country preacher was invited by three companions to see Joe Jefferson play "Rip Van Winkle;" after the play was over, the good preacher was asked how he enjoyed the performance, he replied "it would have been a good show if that old fellow they called Rip had been left out." He was honest in his opinion but simply could not tell a good thing when he saw it; so it is with a great many men who purchase brick machinery, they cannot tell a good thing when they see it and buy machinery because it is cheap. Labor-saving devices, improved machinery with strength, workmanship, merit, high grade product, etc., are not taken into consideration; they are governed by low prices entirely. It is no **WONDER** they make mistakes, and **LITTLE WONDER** that their repair bills are so high and a **BIG WONDER** that they do not fail? All of which can be avoided by purchasing improved, labor saving machinery made on honor by

The Wallace Mfg. Co.,

See Back Inside Cover Page.

FRANKFORT, IND.

TILE DRAINAGE.

It is not much use to say anything about tile drainage at present, when farmers in the northwestern part of the State, where the most draining needs to be done, are praying, or at least longing and whistling, for rain. Nevertheless, we are firm in the faith that what has been will be; that there is nothing new under the sun, and that the time will come when tile drains will be almost as badly needed as they ever were in the flatter portions of the State. It is therefore just as well to be thinking about how you will plan to make drains when the time does come, and get clearly in mind some of the first principles of drainage.

A great many drains fail, to the great discouragement of the owners of the land, because they are not properly planned or laid in the first place. The great trouble is that the grade is not even; that there is a rise or fall somewhere of an inch, or even a half inch, which limits the capacity of the entire drain above that point to the extent of the rise or fall. That is, if the tile above the rise is three inches and there is an inch elevation, then the tile above is limited to the capacity of two inches, and the unused place fills up with silt, or vice versa. This fault may rise from two causes. First, not having the proper kind of engineering work done, for whether the farmer does it himself or employs a skilled engineer it is engineering all the same. It may rise from not following the orders of the engineer, and in this way a workman can very easily damage the farm to a far greater extent than his wages. These are matters to think about and turn over in the mind, so to speak, before the time comes when dollars will be imperatively needed.—Farmer, Des Moines.

"BIG FOUR" TO ST. LOUIS.

"No Tunnel Route."

The National Republican Convention will be held in St. Louis June 16, 1896. There will be many thousand people in that city on that occasion. The "Big Four" offer to the public the most comfortable and luxurious line to St. Louis with elegant Through Wagner Sleeping Car service and unexcelled Dining Car service from New York, Boston, Buffalo, Cleveland, Columbus, Cincinnati, Indianapolis, Washington and all Eastern and Southeastern cities.

"BIG FOUR" TO CHICAGO.

Best Terminal Station—Lake Front Near Auditorium.

The National Democratic Convention held at Chicago, July 7, 1896, will draw heavy crowds of delegates and visitors from the South and Southeast. The superior line to Chicago is naturally the "Big Four," because of its direct connections in Central Union Station with all lines from the South and Southeast, and its magnificent through service of Buffet Parlor Cars, Wagner Sleeping Cars, Private Compartment Cars and Dining Cars between Cincinnati, Louisville, Indianapolis and Chicago. The excellent terminal facilities at Chicago place the "Big Four" at the head. The down-town station is located on Twelfth street and Lake Front, near the Auditorium. Regular stops are made at Hyde Park, near the Coliseum, where the Convention is to be held, Thirty-ninth-street and Twenty-second-street Stations, convenient to all points on the South Side.

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE—For bargain in second hand dry press and plastic brick machinery, see page 579.

FOR SALE—One complete four-mould dry press outfit, nearly new. Address,
R. M. FOSTER, Room 208 Temple Bldg.,
6 1 d St. Louis, Mo.

WANTED—Situation as superintendent or burner. Best of references. Address,
TERRE HAUTE,
6 1 c Care Clay-Worker.

NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
6 t f d Wellsburg, W. Va.

WANTED—A good second-hand drypan. Parties will state condition, capacity, maker and lowest cash price and particulars. Address,
R. E. F.,
6 1 d Care Clay-Worker.

WANTED—Experienced man with Three to Five Thousand Dollars to take interest in and charge of a 20,000 per day capacity Fire Brick Plant. Address
6 1 c C. H. SMITH, Lisbon, O.

FOR SALE—Up to date Brick Plant, dry press and stiff mud machines, steam dry house, ball-bearing cars up-and-down draft kilns, etc. A chance in a thousand. Address,
CHAS. ORCHARDSON,
6 1 d 77 South Clark Street, Chicago, Ill.

WANTED—Position as superintendent by a practical tile and brickmaker; also understand the handling of down-draft kilns and all kinds of brick and tile machinery, boilers and engines. Have had fourteen years' experience. Address
6 1 c DEKALB, Care Clay-Worker.

WANTED—Situation as superintendent, foreman, or charge of setting, burning, repair and erection of kilns, either dry clay, stiff clay or vitrified street paver works. Can superintend erection of works. Practical in every branch. Also a kiln builder. Good references. Address, SUCCESS,
6 t f, 75 p Care Clay-Worker.

FOR SALE—80 acres of land on which is located 30 to 40 acres of clay suitable for making tile, jugs, jars; also any kind of soap, laundry, toilet and shaving soap. Half interest will be sold at nominal figures to experienced and successful clay manipulator. Correspondence invited.
LOGAN WALKER,
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FOR SALE—Second-hand clay working machinery in good order: One Cuyahoga Falls steam sewer pipe press, with dies; Centennial improved tile machine, with dies; set of double rolls and tracer mills, with steam drying system of pipes. One or all sold at a bargain. Address
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The Safety Dryer,

Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and "**solid**" brick as eight of other dryers.

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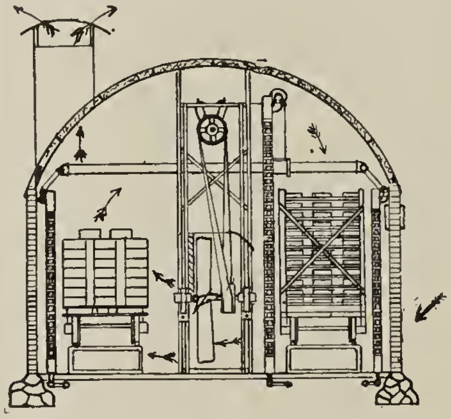

The INSIDE FAN DRYER.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No. 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
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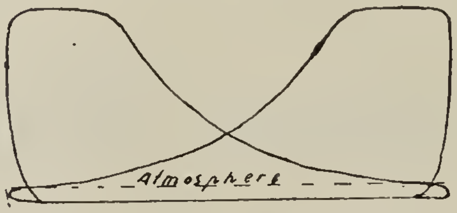

SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.
WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

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S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our ——

You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

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MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.

MR. S. G. PHILLIPS, Woodbridge, N. J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

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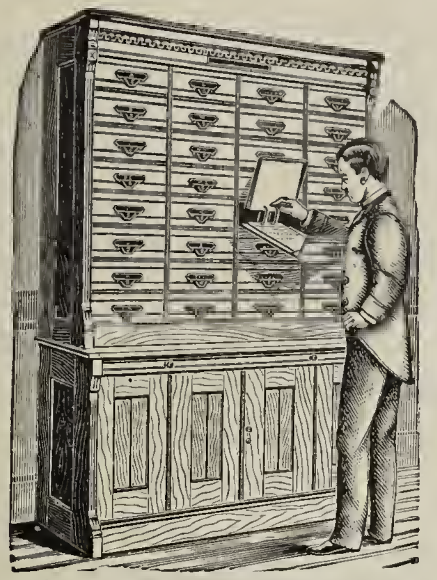

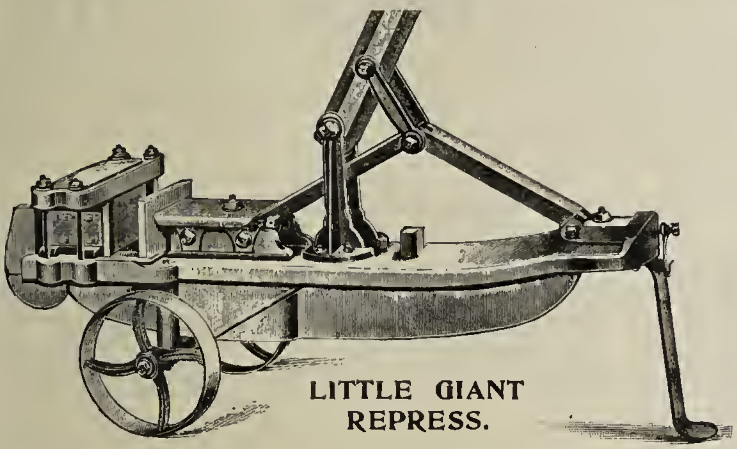

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THE **No. 1 A and No. 2 B Machines** furnished with Square Hopper in place of Upright Pug Mill if desired.

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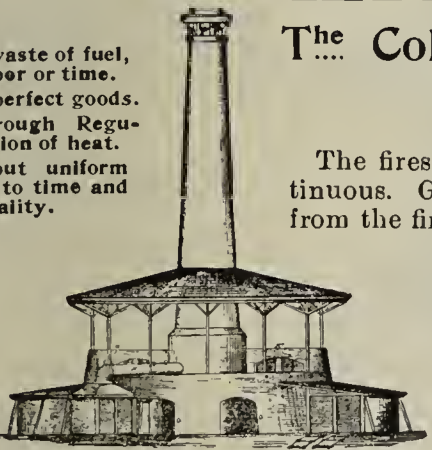

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Two steam pumps, 3-inch suction.
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A lot of similar machines.
One 6-inch plunger, steam doctor.
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WANTED—Who has a good second-hand power brick press for sale? Send description, etc., to E. W. FACE & SON,
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FOR SALE—At $450 on board cars, one Chisholm, Boyd & White Co. dry pan, seven feet in diameter, repaired by us and in good order.
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WANTED—To serve somebody who is in need of a vigorous man, capable of assuming full control of soft or stiff-mud brick plant. Drilled in every department. Twelve years' experience. Best of references as to character and ability. Address,
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BRICK WORKS WITH CLAY DEPOSIT.

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Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address,
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Alkalies	.27
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Total	100.12

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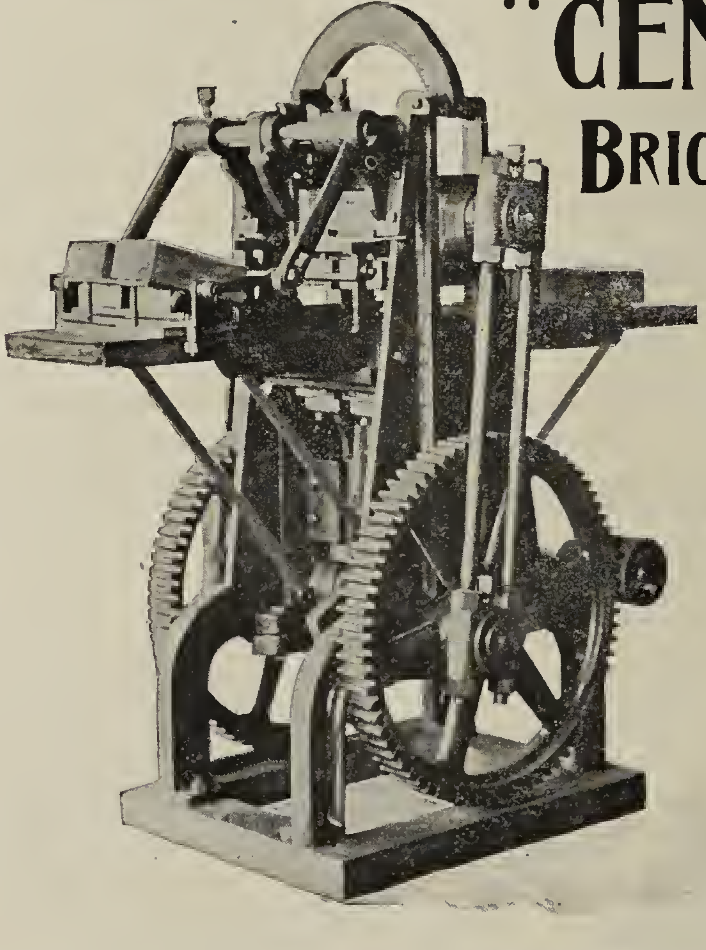

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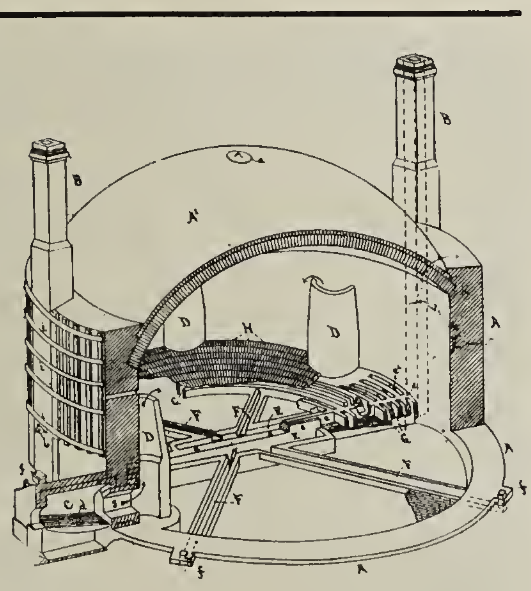

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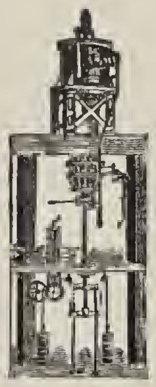

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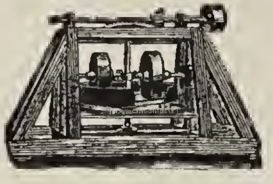

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For handling
CLAY,
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PACKAGES.

Also Furnish
RUBBER,
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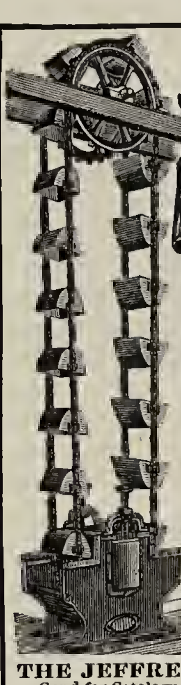

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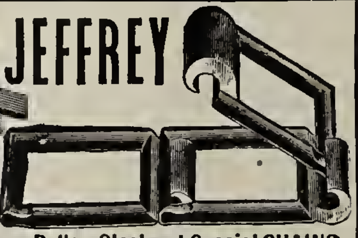

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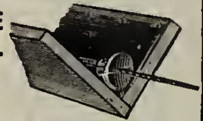
For long and short distance conveying.



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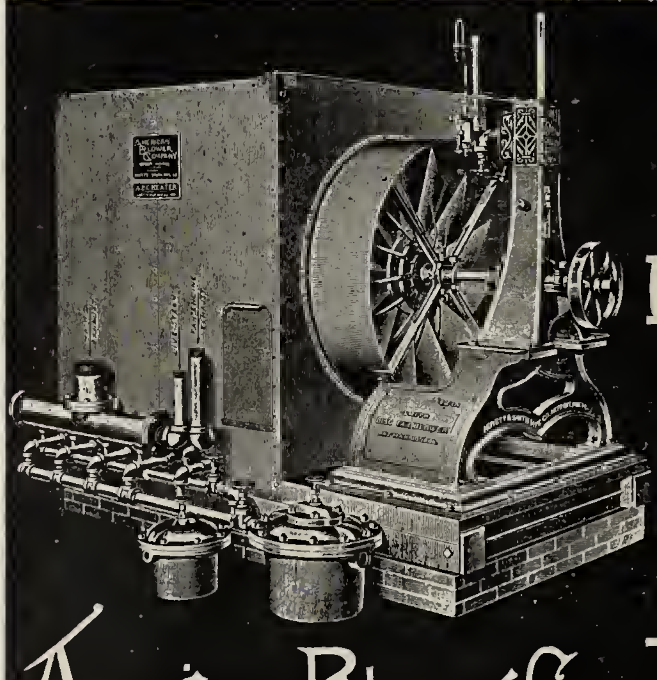

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FOR DRYING BRICK TILE AND TERRA COTTA

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CHAMPION Brick Mould SANDING MACHINES.

This cut represents the latest improved Champion. No belts, apron or gearing. Simple, strong, and Serviceable.

A. H. NEWTON,
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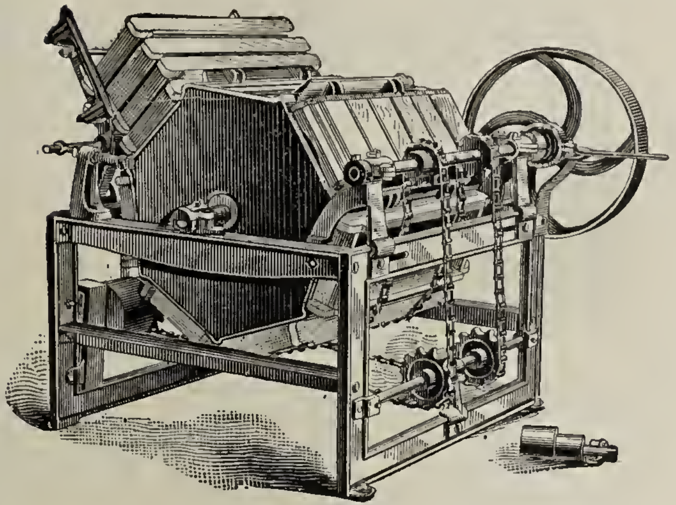
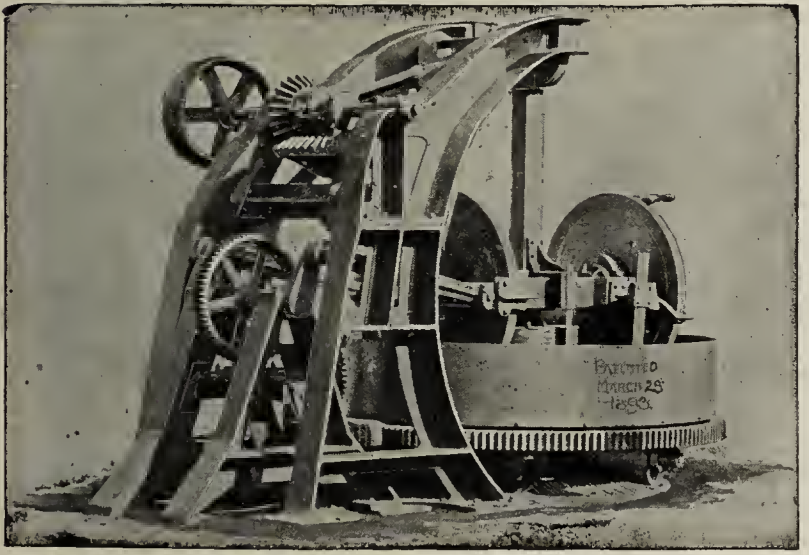


THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

Something New. Look it Up.



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4000 TO 5500
(Gallons of Water per hour.)
BY HAND-POWER.

Pumps, Hand-power Pumps,

(LOUD'S PATENT.)

These Pumps are simple, durable and low-priced.

A large capacity and easy working pump for **Brick Yards, Water Works, Sewer Contractors, Foundation Builders, Miners, Quarries** or wherever it is desired to raise a *large quantity* of water by *Hand-power.* The pump has large valves (*accessible by hand*) and will pump water containing *sand, gravel, mud, sewage matter, etc.*, without *choking* or any *perceptible wear.*

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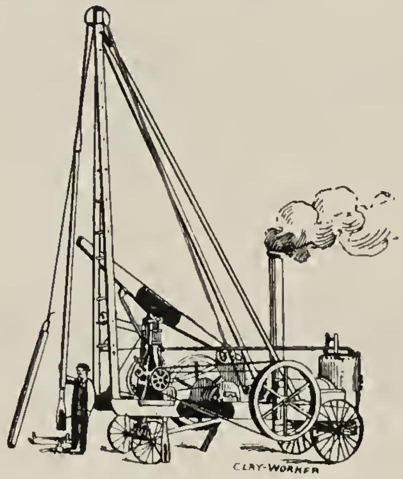

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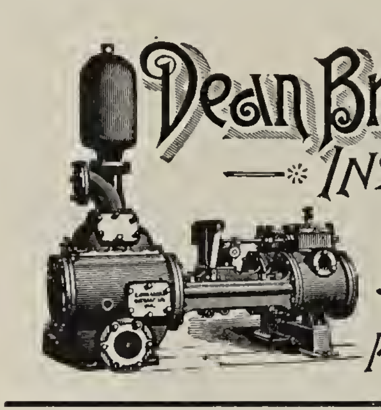

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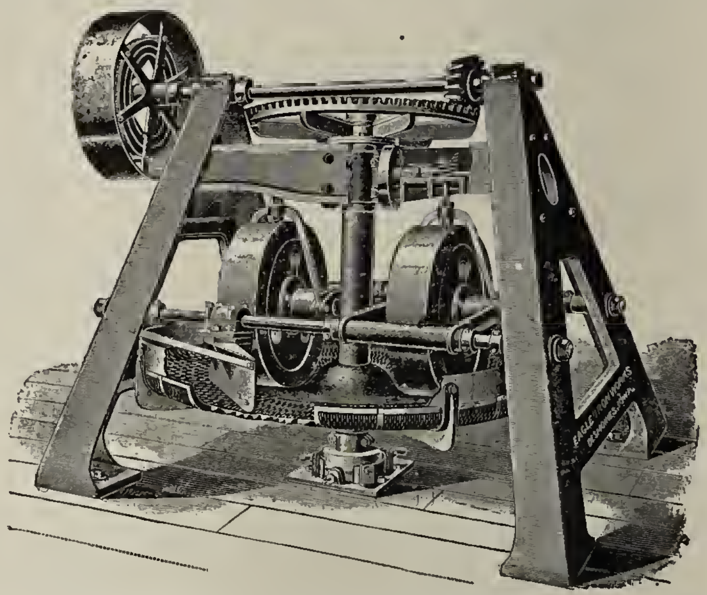

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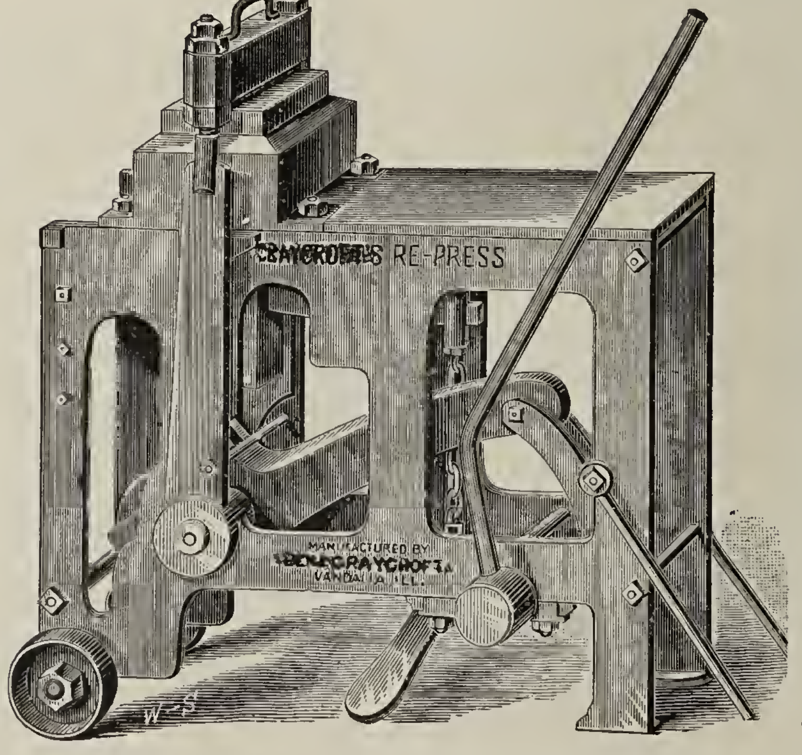

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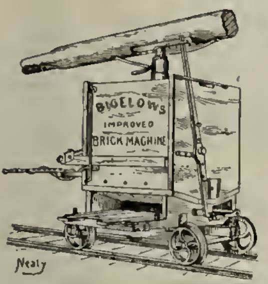

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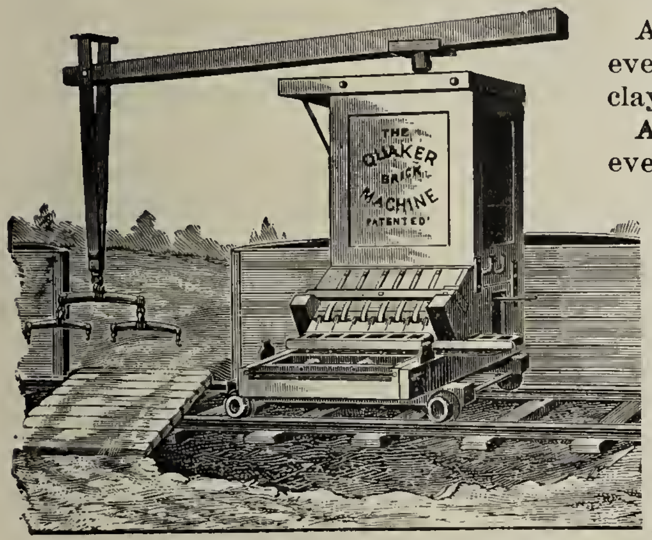

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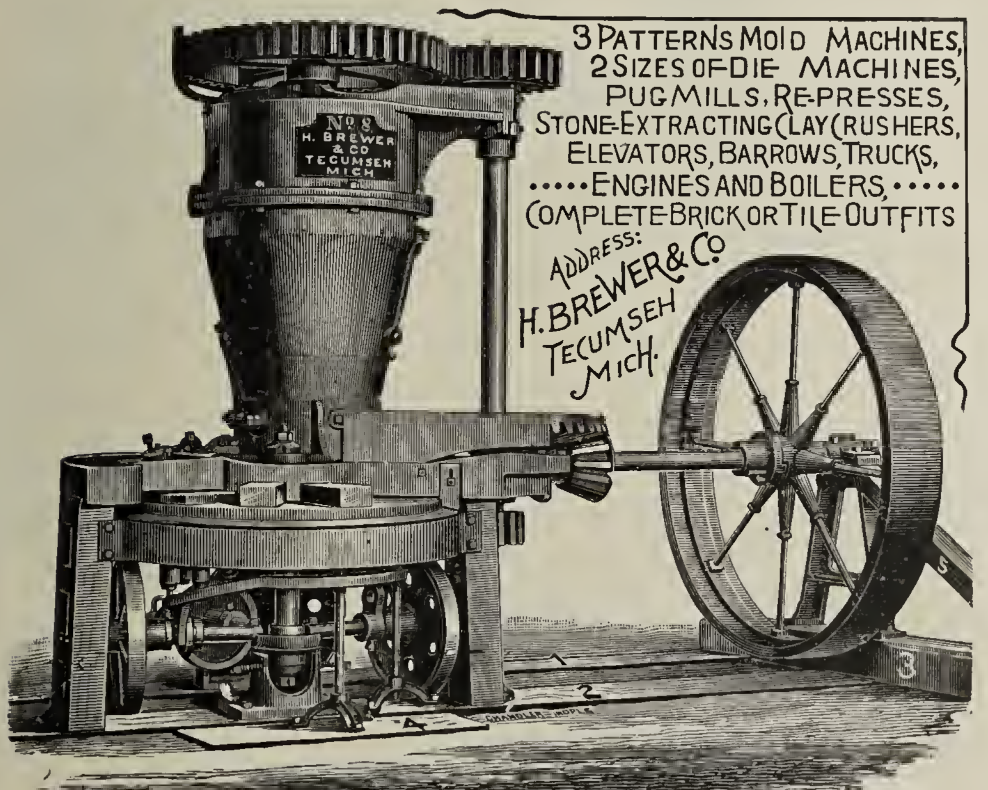

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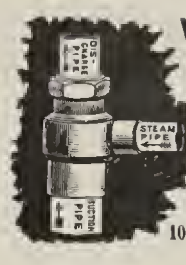

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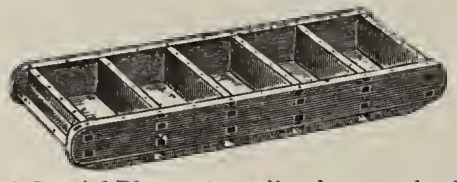

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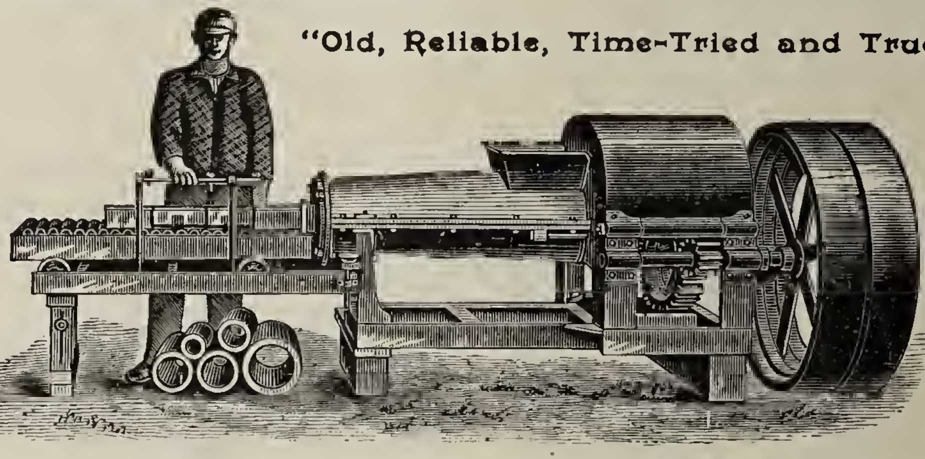

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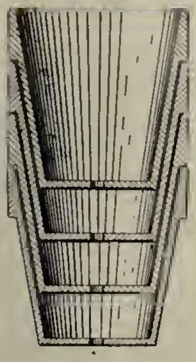

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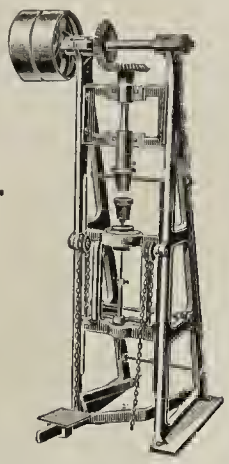

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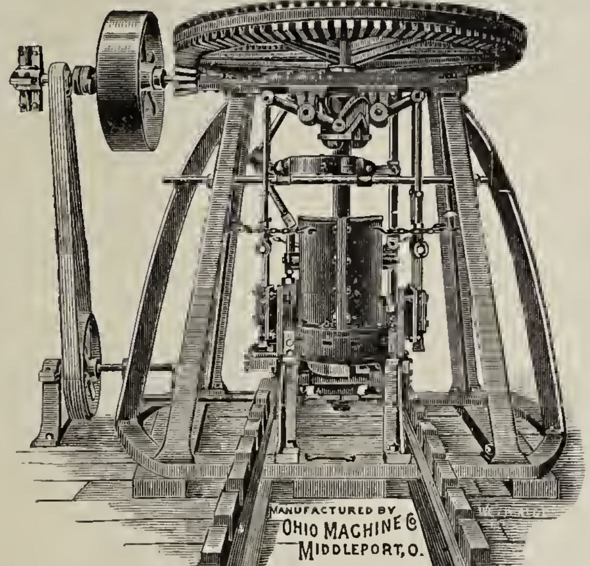

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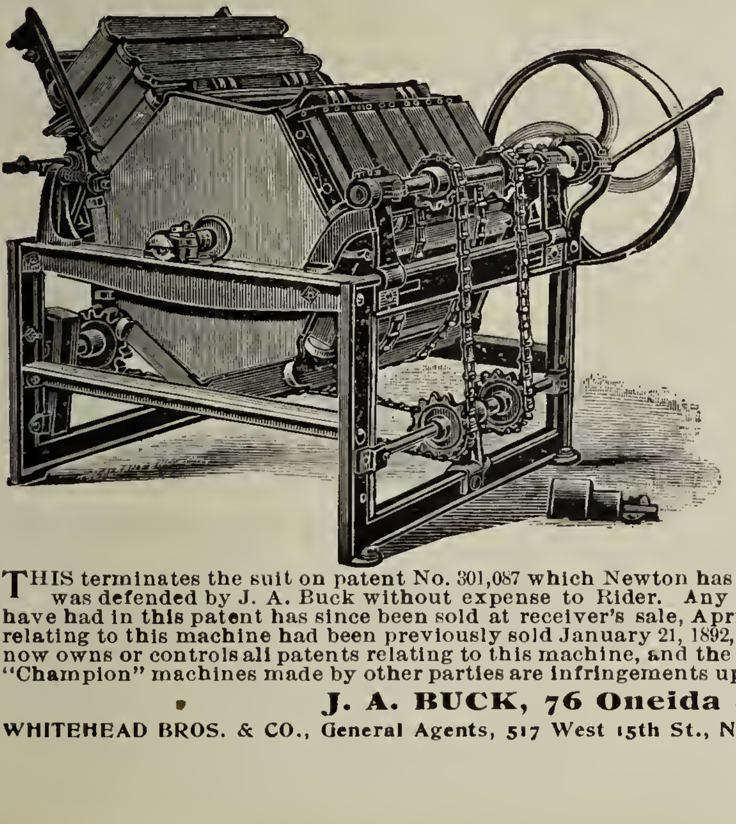

Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

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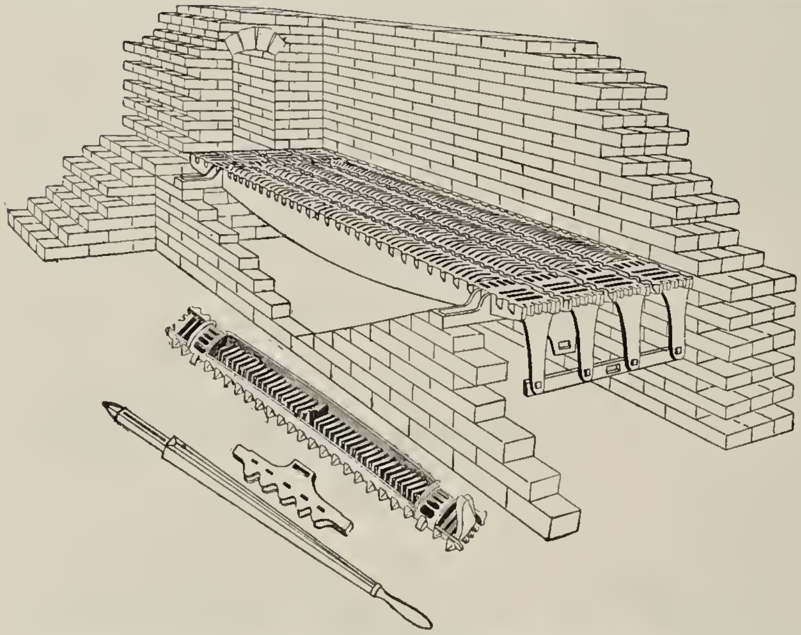

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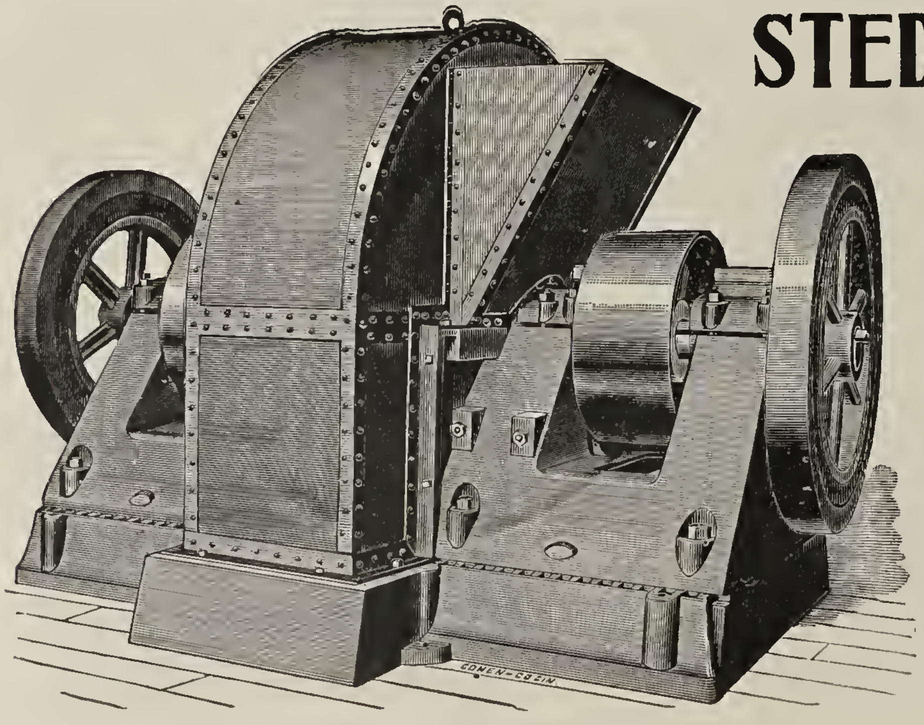

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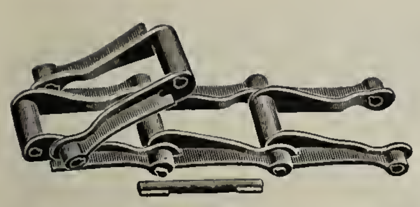

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Approved Appliances for

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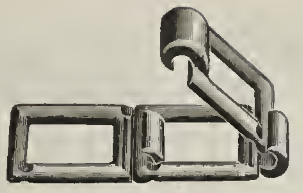

THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker.

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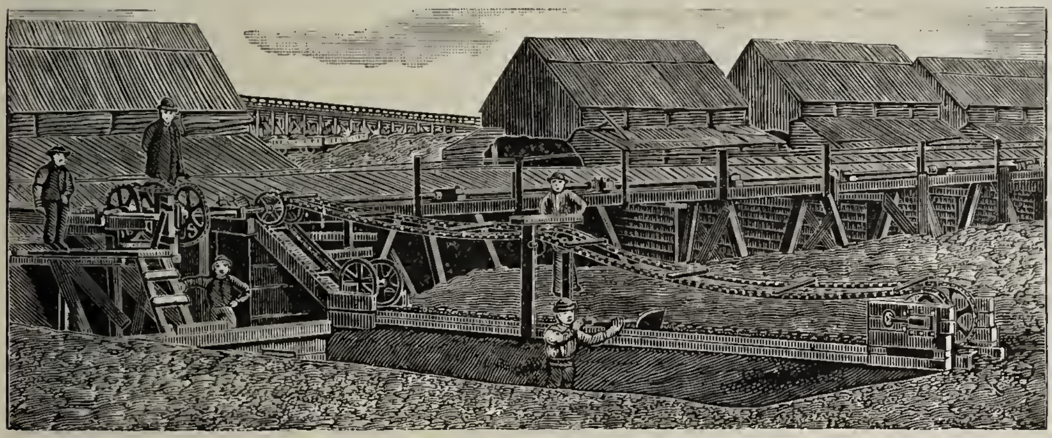

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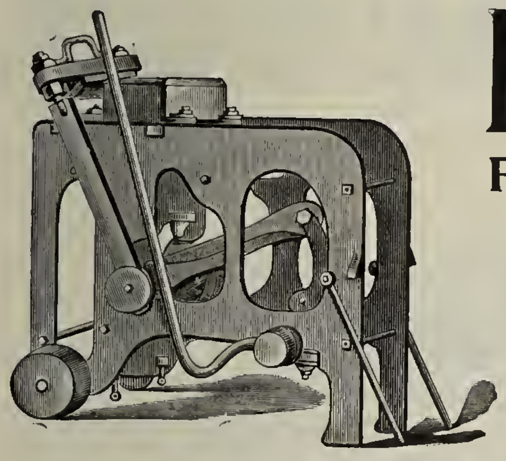
Fire and Red Brick Presses all sizes.

....Machinists and Engineers.



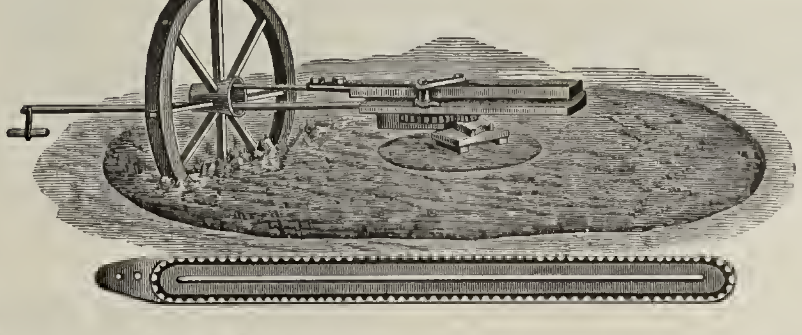
RED BRICK PRESS.

GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

Send for Circular and Price-List.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.



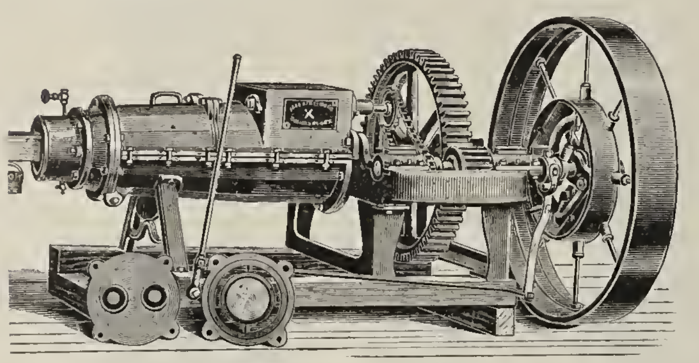
These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.

The New South Brick Machinery

Southern Clay Eaters. *Veni, Vidi, Vici.*

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion** or **constipation.** No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.


Our X Brick and Tile Machine.

• • • •

SIDNEY, IOWA, November 4th, 1895.

J. C. STEELE & SON, Statesville, N. C.

GENTLEMEN:—I thought I would let you know that I am well pleased with the New South X Machine. It is the cheapest, runs the lightest and makes the nicest brick of any machine in southwest Iowa. We have a 12 H. P. engine and can make 20,000 bricks in ten hours, and there is not a hand-cutting table in this part of the country that can compete with yours for cutting square on the ends. I consider it the most complete outfit that a man can buy for the money. It surprises old brickmakers. They say your truck is a Yankee trick. We have a club-footed boy, 16 years old, who trucks 15,000 to 18,000 per day with one of them. We wish you success with your enterprise.

Yours, etc.,
S. O. CARTER.

• • • •

Strictly modern machinery at the lowest price.
We have just completed a new machine "X-tra."

Send for catalogue.

J. C. STEELE & SON, Statesville, N. C.

---

15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

• • •

12 Second Hand Machines.

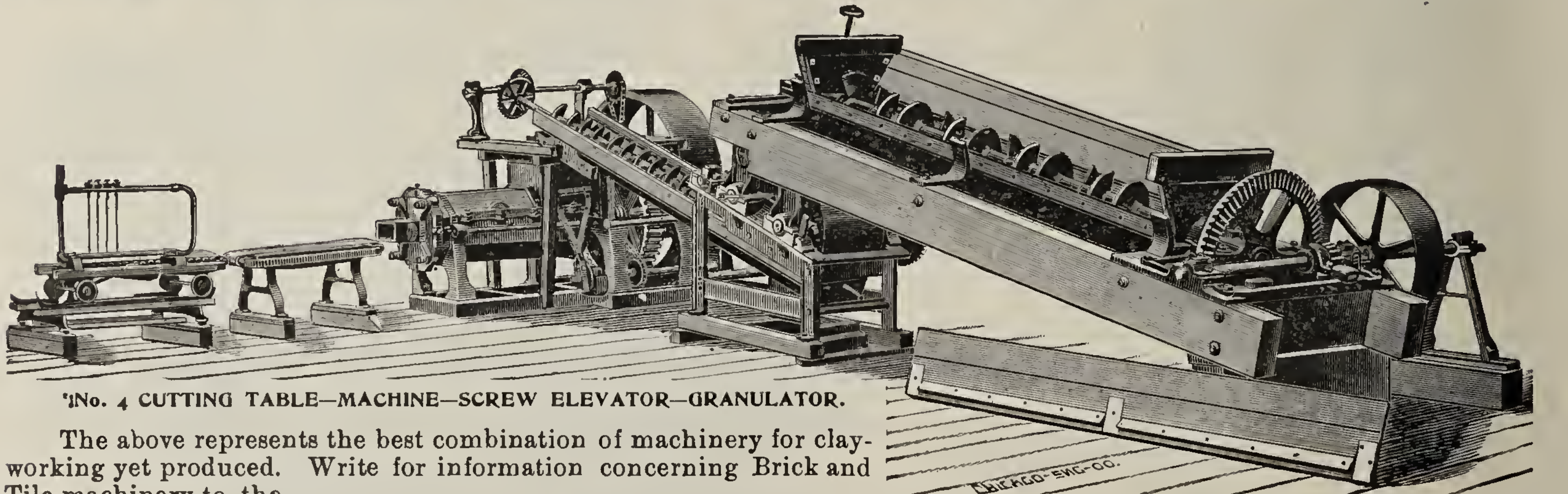
Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER MANUFACTURING Co

DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.

SEND FOR PRINTED MATTER.

ADRIAN BRICK AND TILE MACHINE CO.

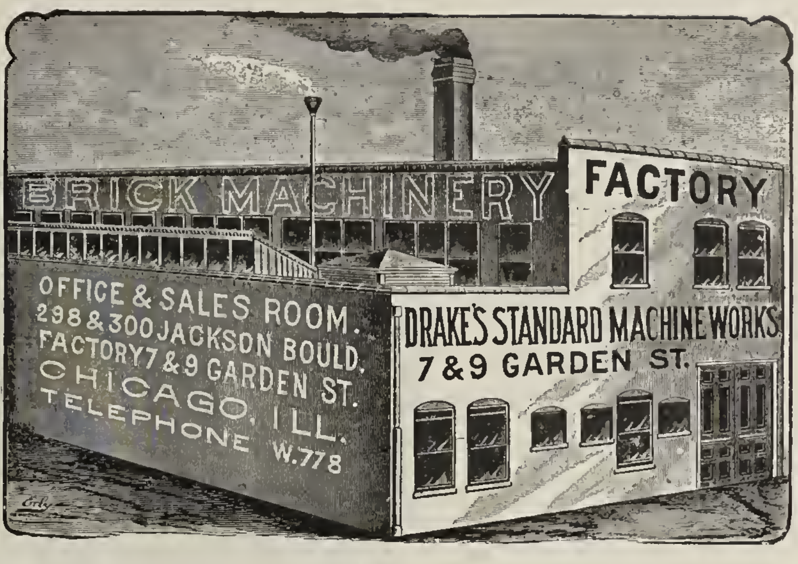

CHICAGO-ENG-CO.

No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

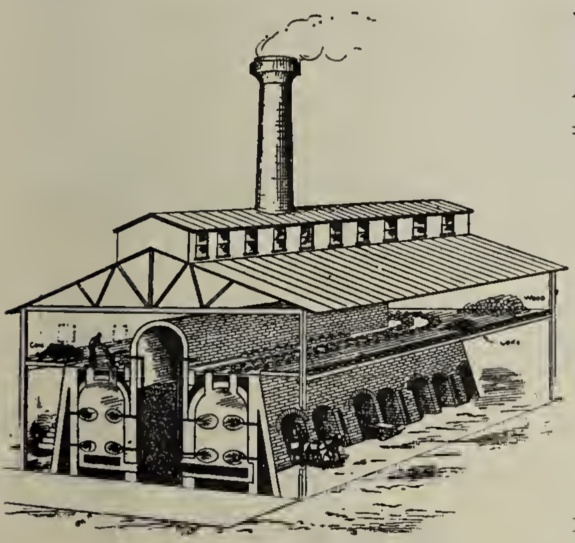
The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

C.T. DRAKE
BRICK MACHINERY.
OFFICE & SALES ROOM.
298 & 300 JACKSON BOULD.
FACTORY 7 & 9 GARDEN ST.
TELEPHONE W. 778
CHICAGO, ILL.
SALES ROOM
DRAKE'S STANDARD MACHINE WORKS
C. T. DRAKE, PROP.


BRICK MACHINERY
FACTORY
OFFICE & SALES ROOM.
298 & 300 JACKSON BOULD.
FACTORY 7 & 9 GARDEN ST.
CHICAGO, ILL.
TELEPHONE W. 778
DRAKE'S STANDARD MACHINE WORKS
7 & 9 GARDEN ST.

OUR NEW PERCUSSION SCREEN **Is the Latest and Best Device for Screen Clay, Lime, Cement, Etc.**



Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

LEVIATHAN BELT.

"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

ZANESVILLE, OHIO, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. BURTON, Secretary and Treasurer.

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

248 Randolph St., CHICAGO, ILL.

PHILADELPHIA:
1219 Carpenter Street.

BOSTON:
120 Pearl Street.

Would You Buy

A BRICK MACHINE
..... A DRY PAN
.... A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

The Woolley Pug Mill,

All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
... AND ...
SLIP PRESSES

For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

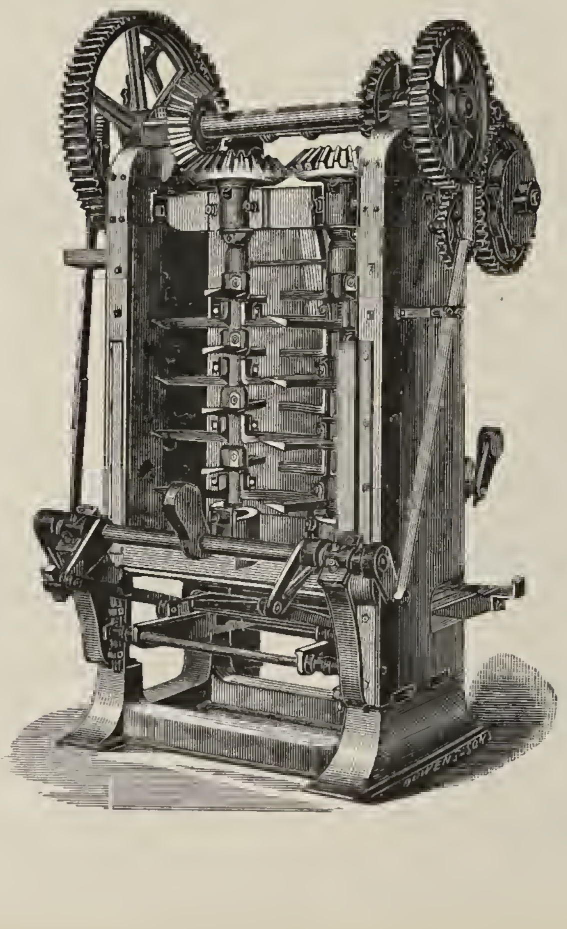
Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

THE DUPLEX

Is the Standard of All Soft Clay Brick Machines.



It is made entirely of iron and steel, thus being very Strong and Durable, Simple in Construction, and makes a much stiffer brick than can be made with any other soft clay machine.

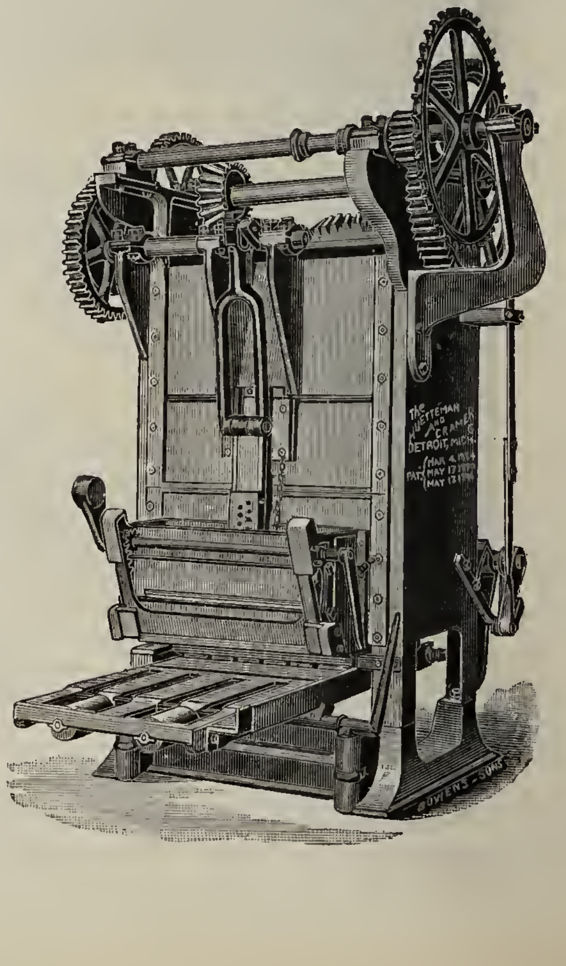
Write for Catalogue . . .
. . . and Prices to

The Huetteman & Cramer Co.,

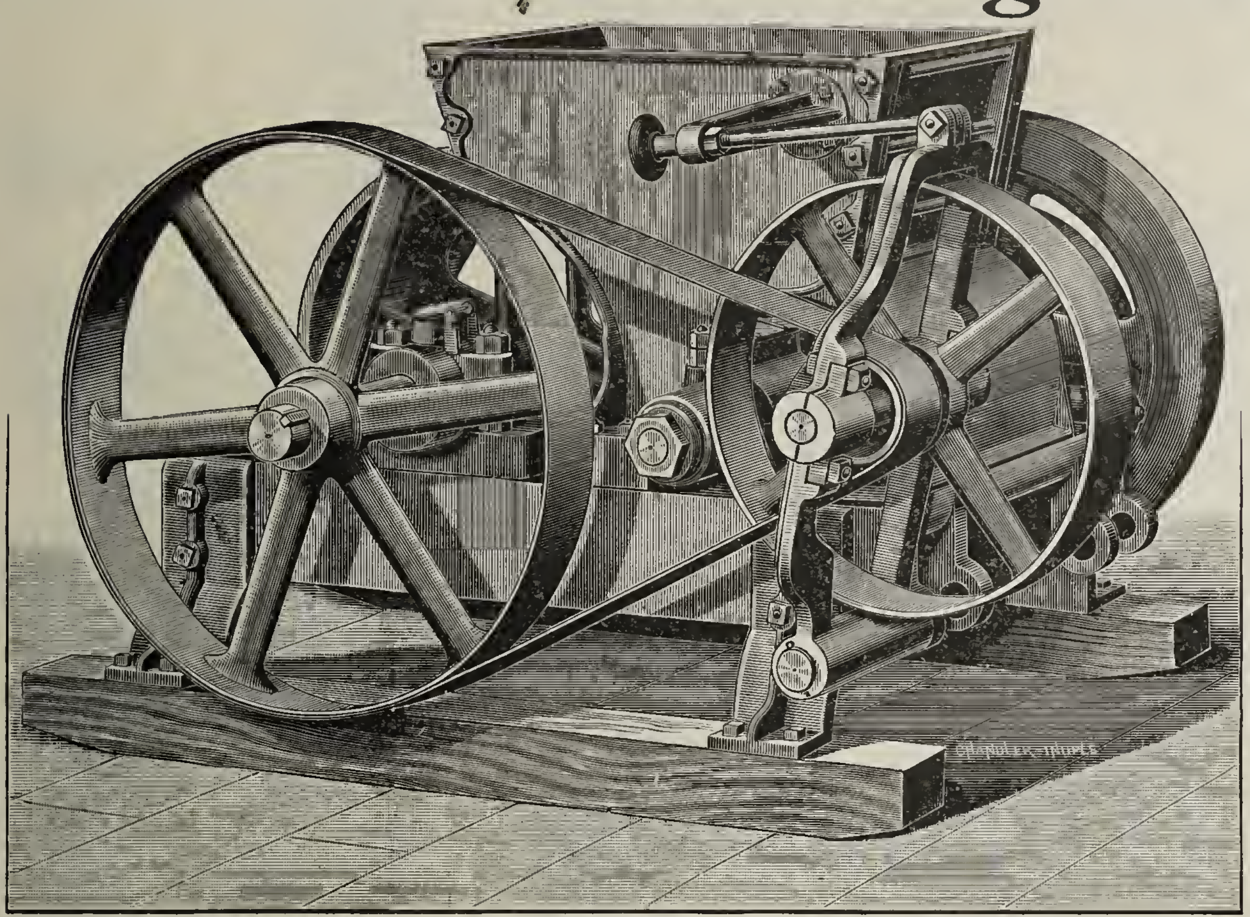
Manufacturers of the Duplex Brick Machine and general outfit for brickyards,

12, 14 & 16 Sherman St.,

DETROIT, -- MICH.



The Potts Disintegrators



PATENTED.

WORK WET or DRY CLAYS.

• • •

Separate or grind the stones. Simple in

CONSTRUCTION,
STRONG and
DURABLE.
CHILLED ROLLS.

You take no chance of Patent Litigation by purchasing this machine.
Twelve sizes and styles. Capacity from 15 M to 150 M brick per day.

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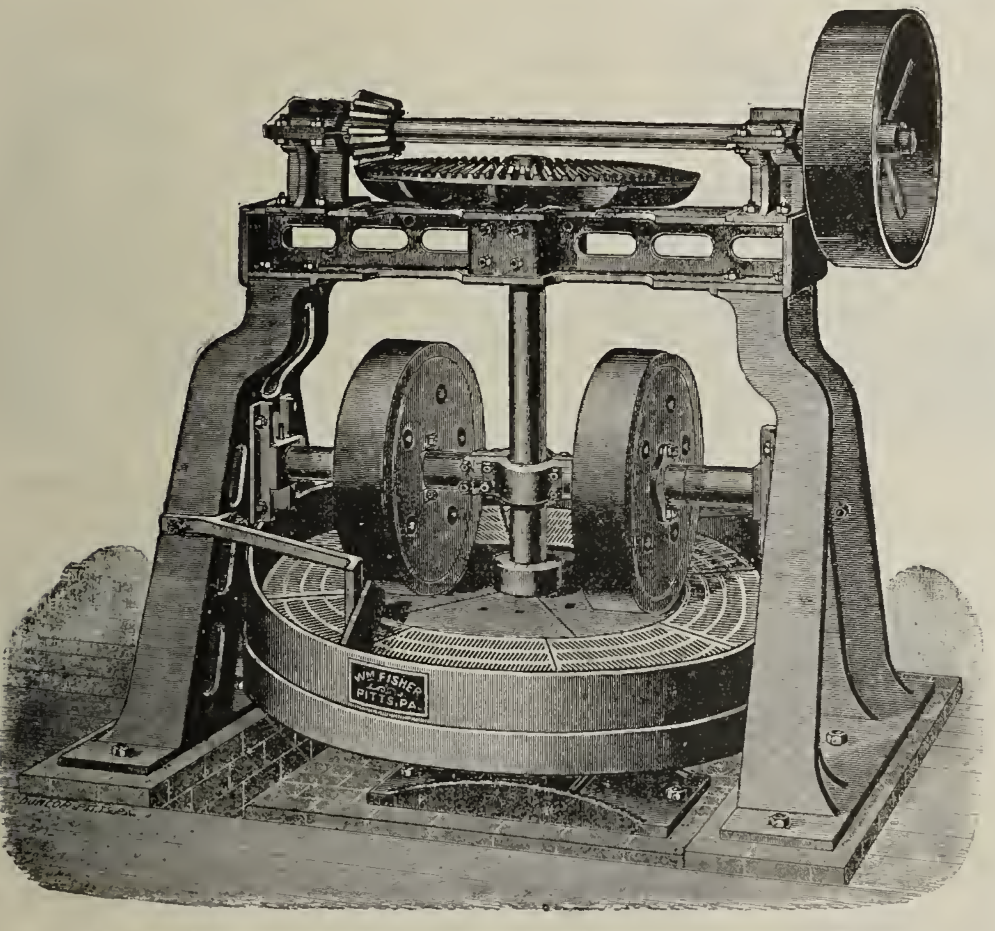
C. & A. POTTS & CO., - Indianapolis, Ind.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.


WM FISHER & Co. PITTS. PA.

Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

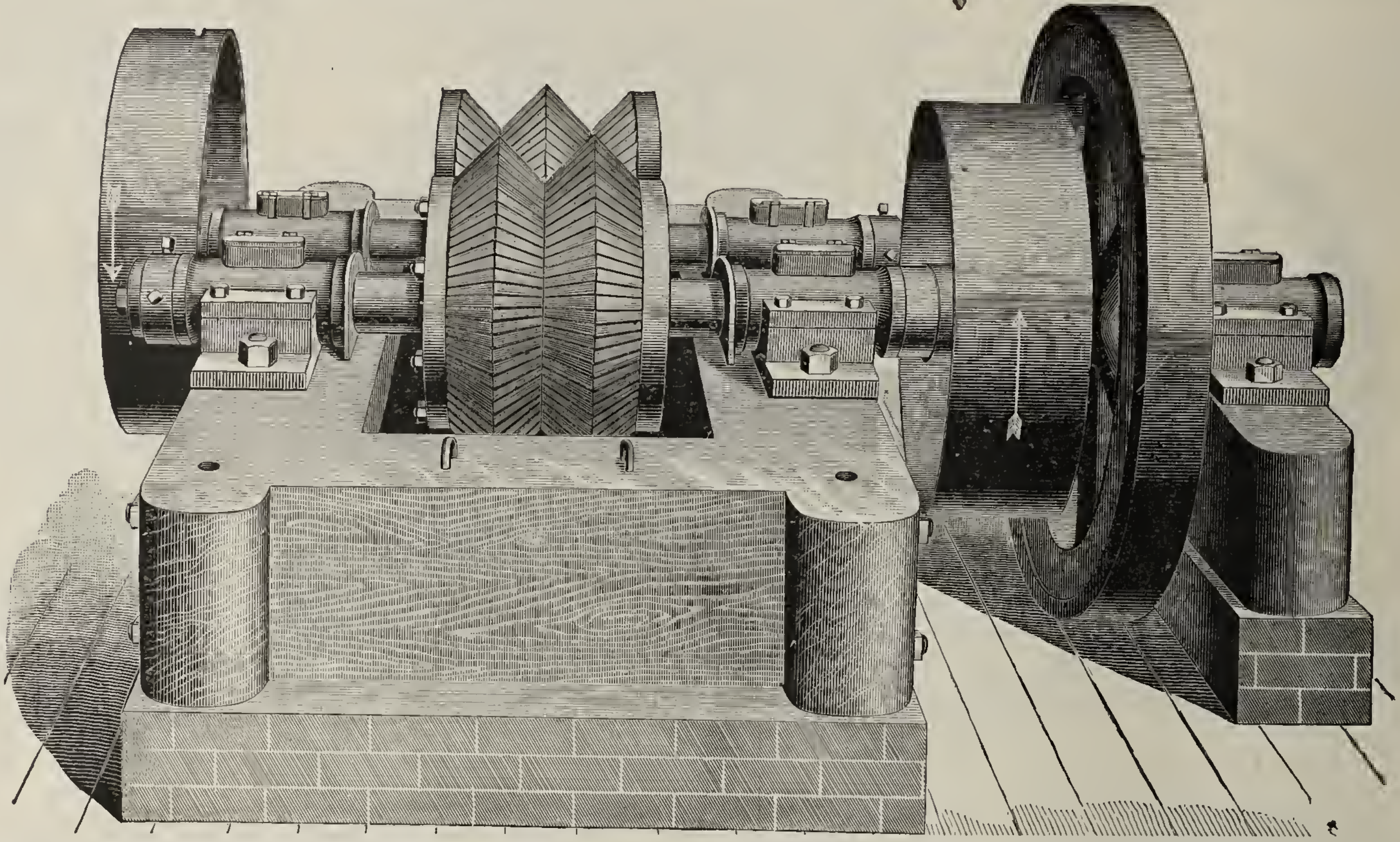
We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

NEWELL IMPROVED CLAY PULVERIZER

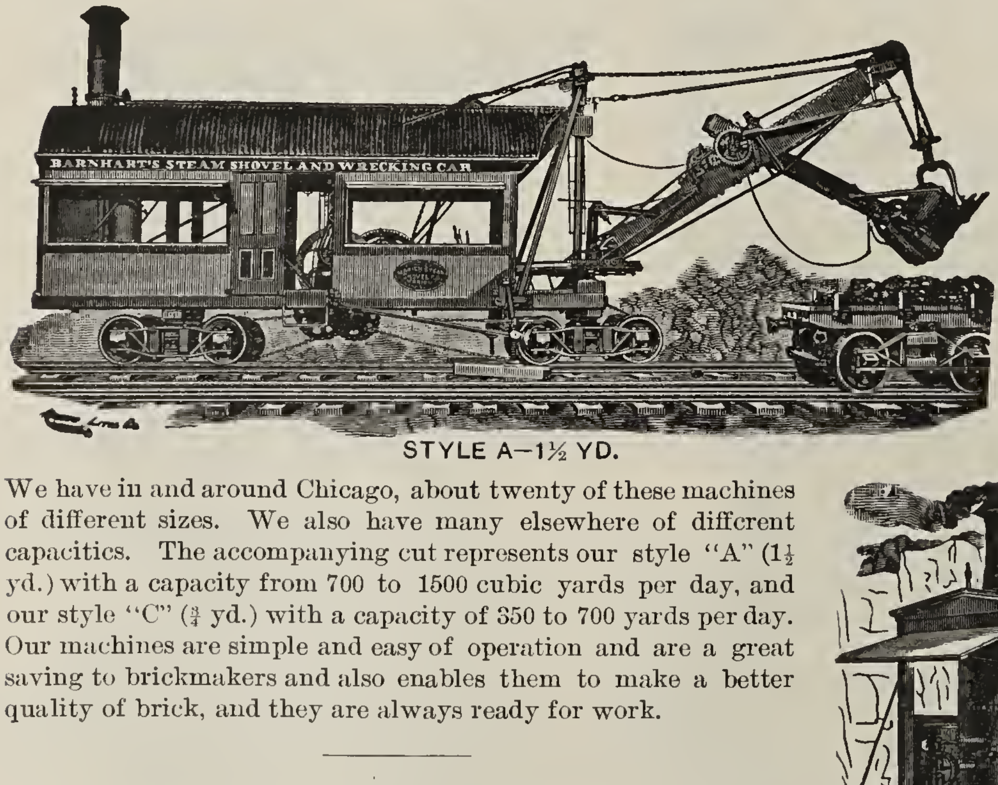
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
26 Cortland and 21 Dey Streets, **New York, U. S. A.**

Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

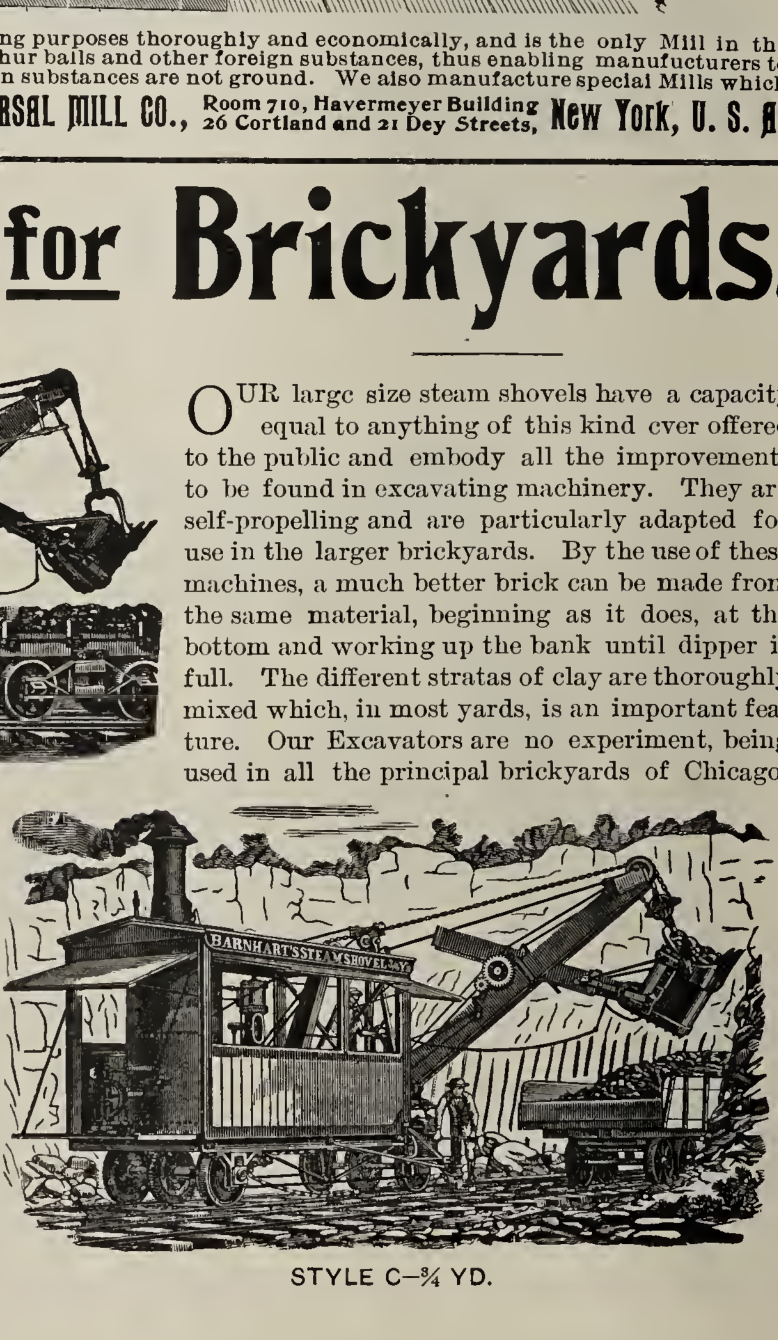
OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

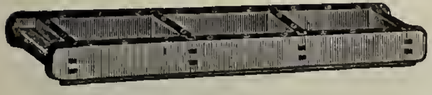
603 West Center Street, - **MARION, OHIO.**



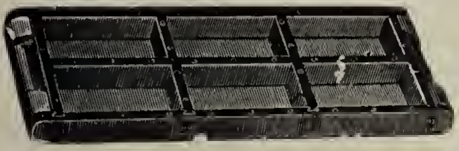
STYLE C—¾ YD.

ARNOLD'S BRICKYARD SUPPLIES.

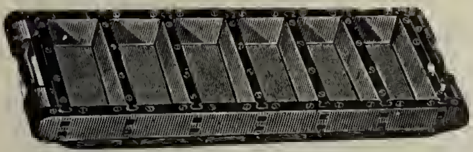
They are the BEST that are Made.



3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fil orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call *Specials*, that are better and cost more. If you get these you will know you have **the best.** Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

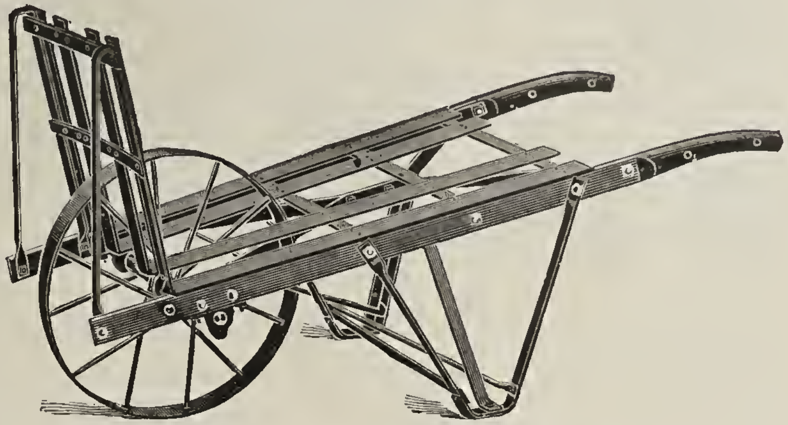
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

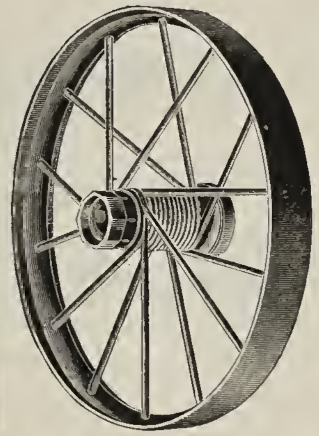
All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.





METAL WAGON WHEELS

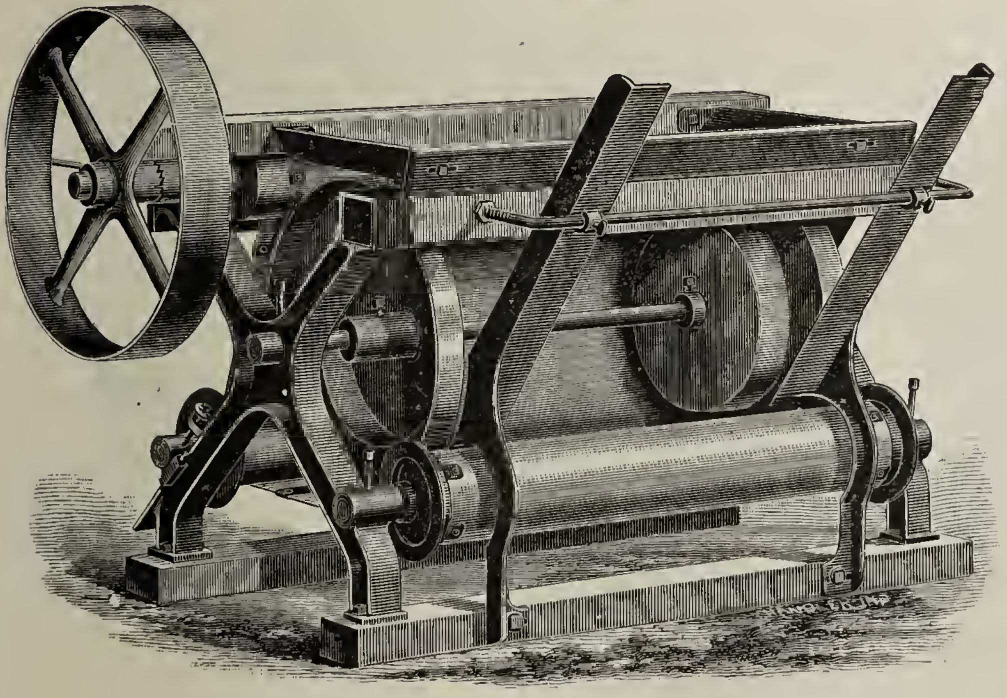
MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The *strongest* wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced.

Circular and prices sent on application. Address

The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

The Potts Mould Sander

No Chains nor Gear to Wear or Break.



No place for moulds to catch and cause delays.

Simple in construction, strong and durable.

Sands mould better than can be done by any other means, easily and quickly changed to suit any size mould.

Write for prices.

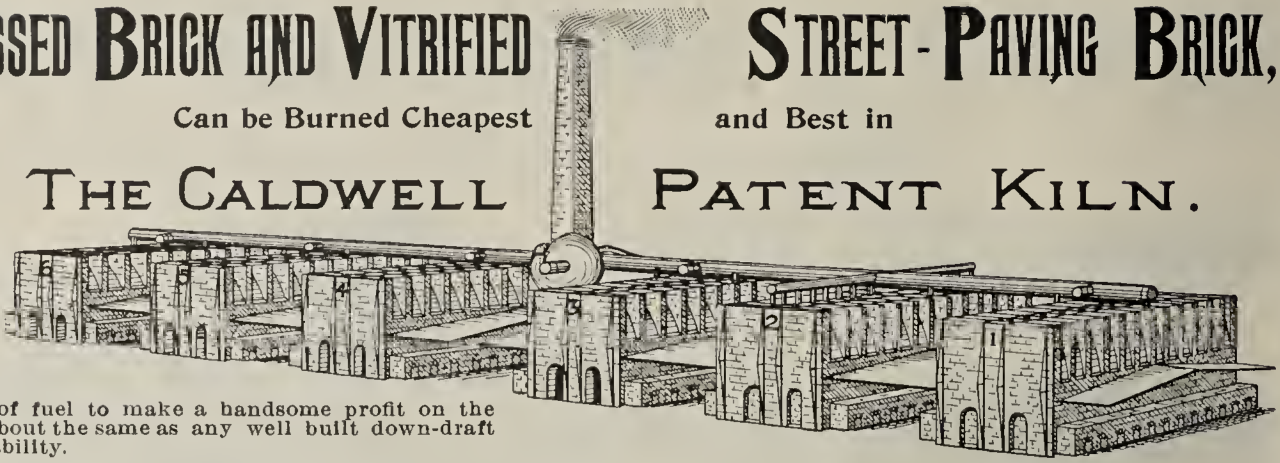
G. & A. POTTS & CO.,

420-428 West Washington Street, (See ad. on pages 395 and 409.) *INDIANAPOLIS, IND.*

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.



Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

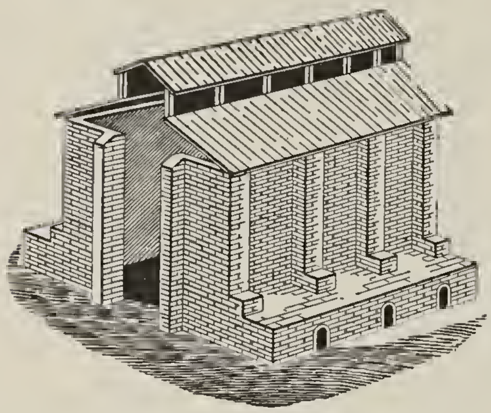
Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., ***Minneapolis, Minn.***

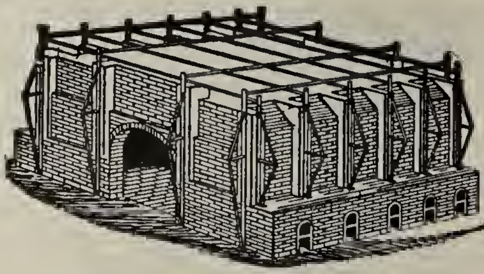
LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Up-Draft Kiln.



Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

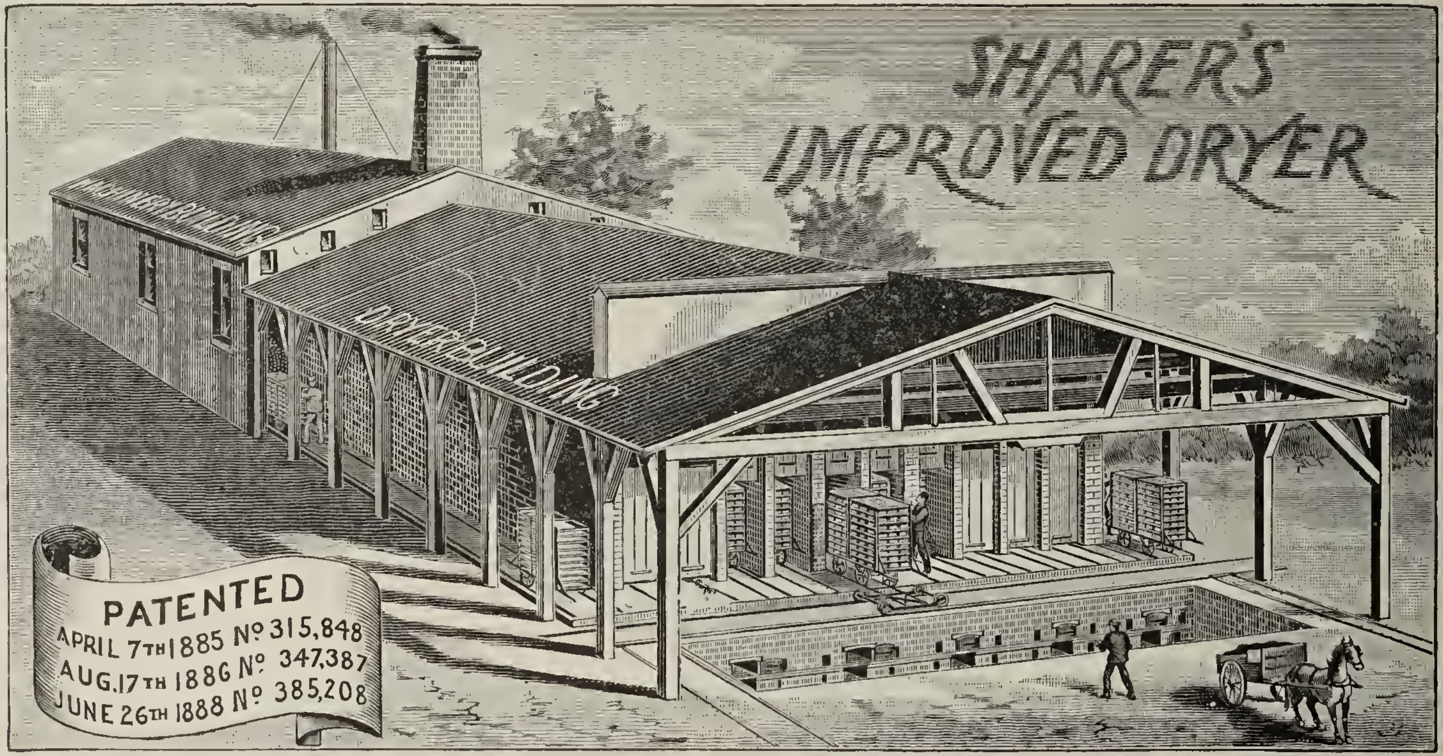
The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., ***Kansas City, Mo.***

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.



SHARER'S IMPROVED DRYER
DRYER BUILDING
PATENTED
APRIL 7TH 1885 No 315,848
AUG. 17TH 1886 No 347,387
JUNE 26TH 1888 No 385,208

COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address

GEO. W. SHARER, 2224 Tioga St., **Philadelphia, Pa.**

ALSIP'S LATEST IMPROVED Down and Up-draft Kiln.

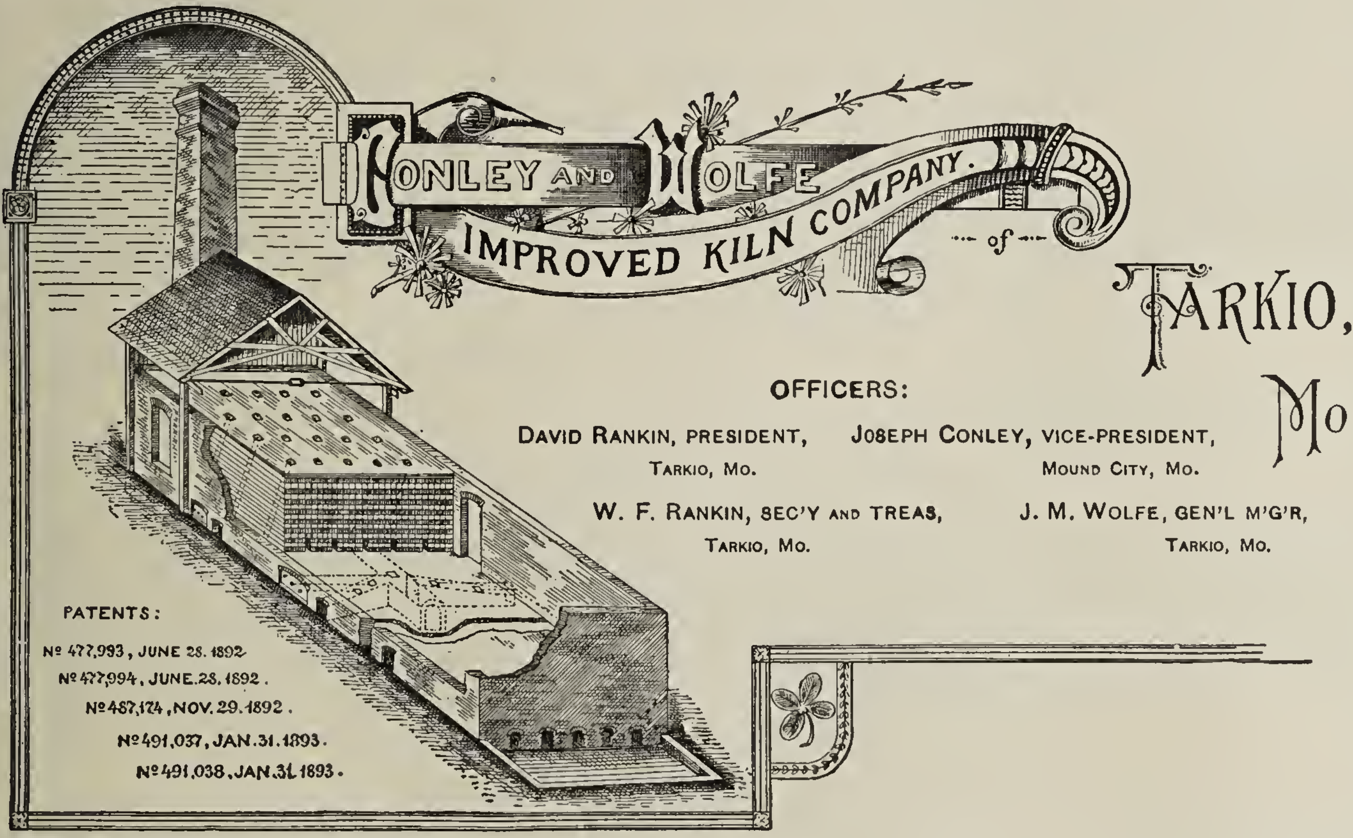
The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**



OFFICERS:

DAVID RANKIN, PRESIDENT, TARKIO, MO.
JOSEPH CONLEY, VICE-PRESIDENT, MOUND CITY, MO.
W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.
J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

PATENTS:
No 477,993, JUNE 28. 1892.
No 477,994, JUNE 28. 1892.
No 487,174, NOV. 29. 1892.
No 491,037, JAN. 31. 1893.
No 491,038, JAN. 31. 1893.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

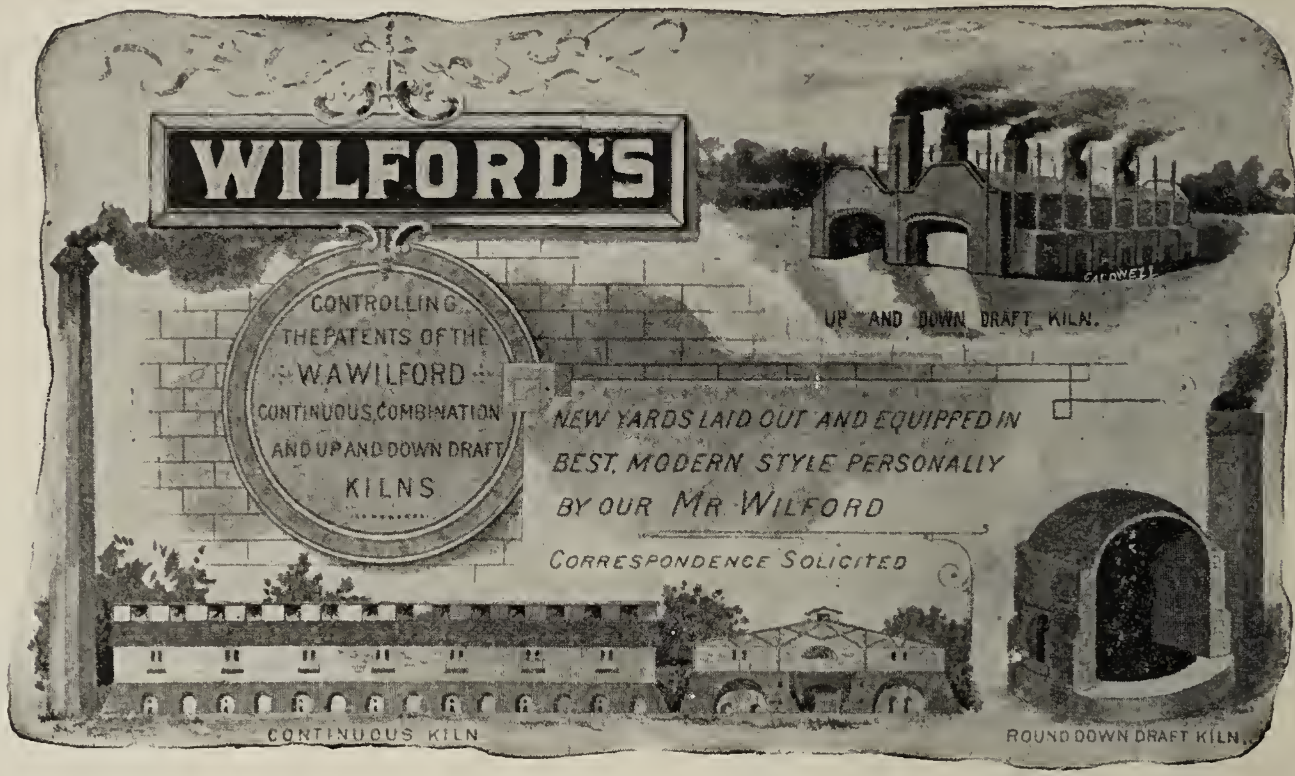
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST. MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

HON. A. DESJARDINS, President. JOS. BARSALON, Vice-Pres. HUBERT DESJARDIN, Man. Director. N. T GAGNON, Secretary.

MONTREAL TERRA COTTA LUMBER CO.
LIMITED.
Maisonneuve, P. Q.
Office, 86 *St. Peter Street, Montreal.*

MONTREAL, July 12th, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—In answer to yours of the 1st inst., we are thoroughly satisfied with the kiln you built for us. We find we have better burnt material than we ever had before. Your system of kilns we consider as near perfect as one can expect. Our ware is all burnt alike from top to bottom. We have burnt it many times round, and the more we use it the better we like it. Shall be glad to answer any enquiry from anyone interested in your kilns, as you deserve success. Your very truly,

N. T GAGNON, *Secretary.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety)

Wishing you the success in the future you have obtained in the past, we are Yours truly,

TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are, Yours truly,

TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying. Your well wishers,

J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and* 2 *Builders Exchange.*

WILFORD PATENT KILN CO. BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly, BRUSH BROS.

Let us give you full Particulars.

The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

Any Draft So Its Up-Draft.

* * *

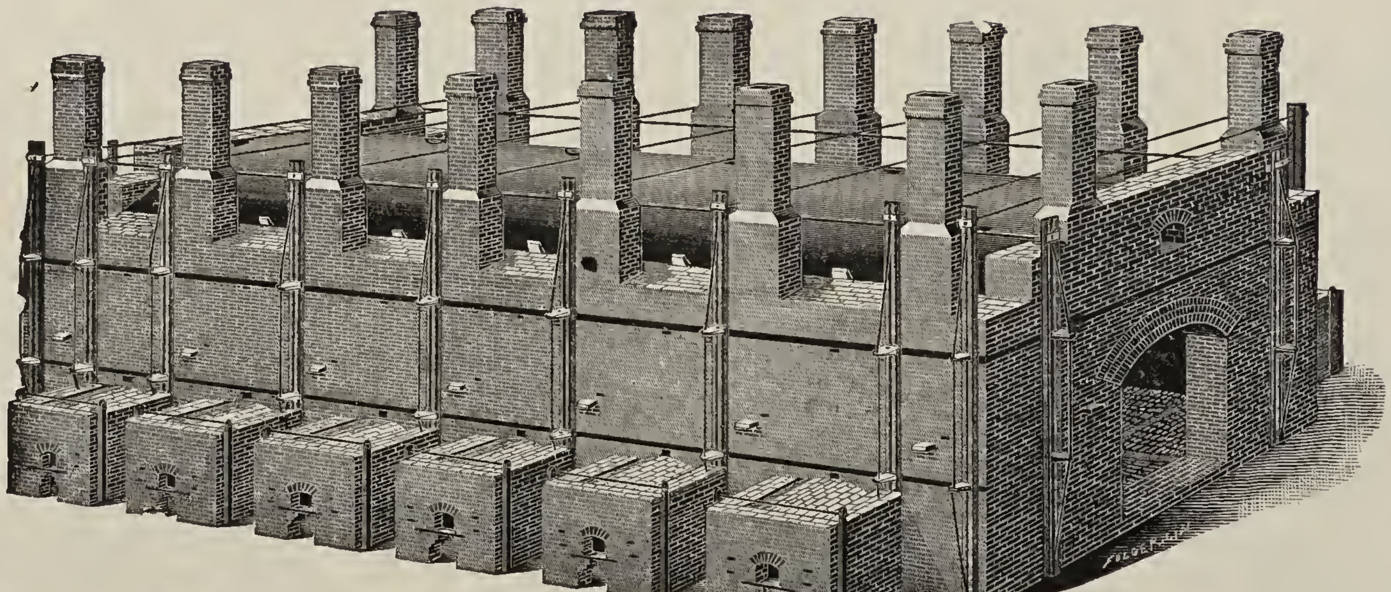
WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost.

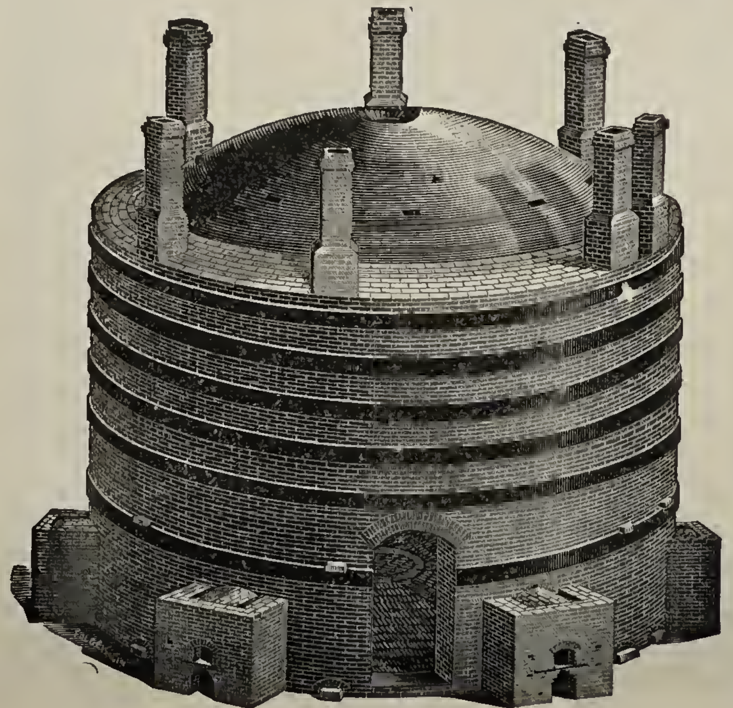
Manufacturers of Building Brick can get nothing better.

For all information desired address

R. B. MORRISON & CO.,
P. O. Box 335,
Rome, Ga., U. S. A.
PROPRIETORS
Morrison's Latest Improved Kilns.

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy** in **cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, Cincinnati, Ohio.

Price, $85.

Outing
BICYCLES.

Price, $85.

NONE BETTER AT ANY PRICE.

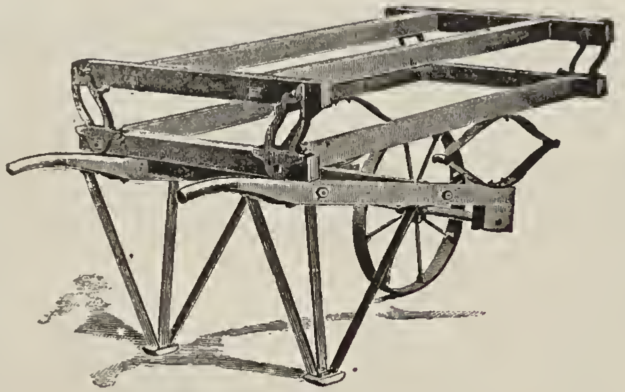
We refer by permission to the entire staff of the "CLAY-WORKER" they all ride Outing BICYCLES.

In elegance of finish and fine workmanship Outing BICYCLES easily distance all others.

Good Agents Wanted. Send for Catalogue.

HAY & WILLITS MF'G. CO.

76 North Pennsylvania St., - - - INDIANAPOLIS, IND.



Double Deck Truck.

PRICE and QUALITY

WILL TELL.

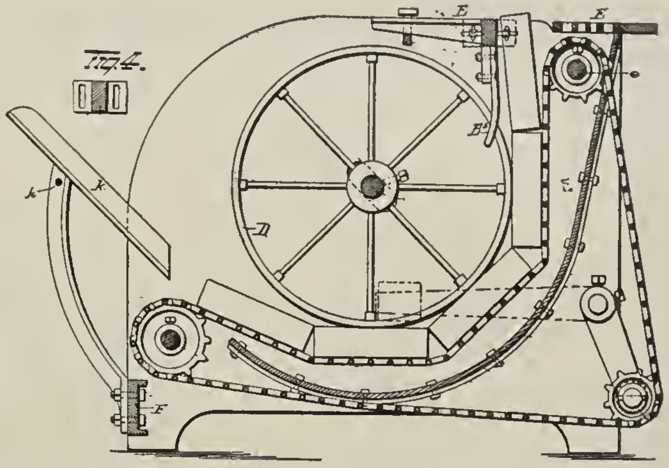
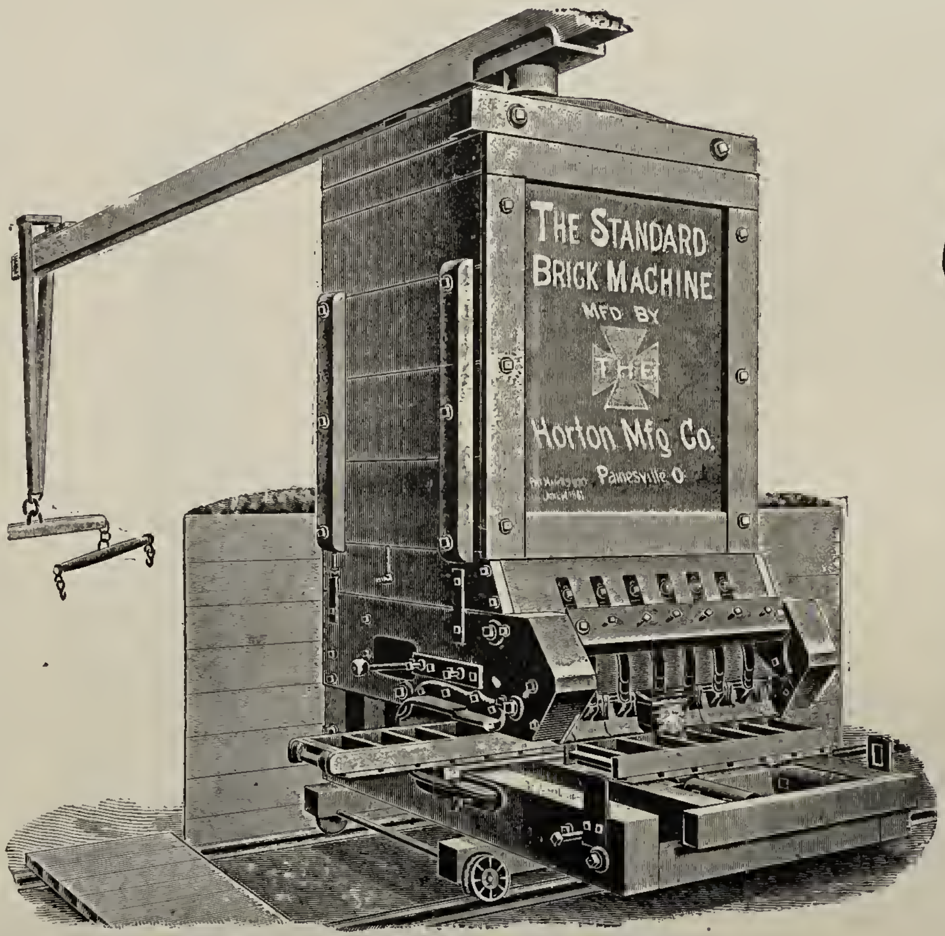
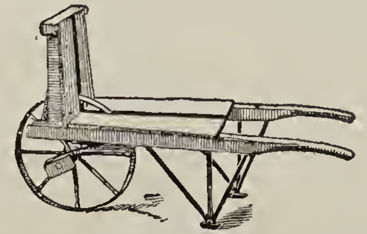


Fig. 4.

Cut Showing Position of Molds in Sander.
No Expensive Belts to Wear Out.



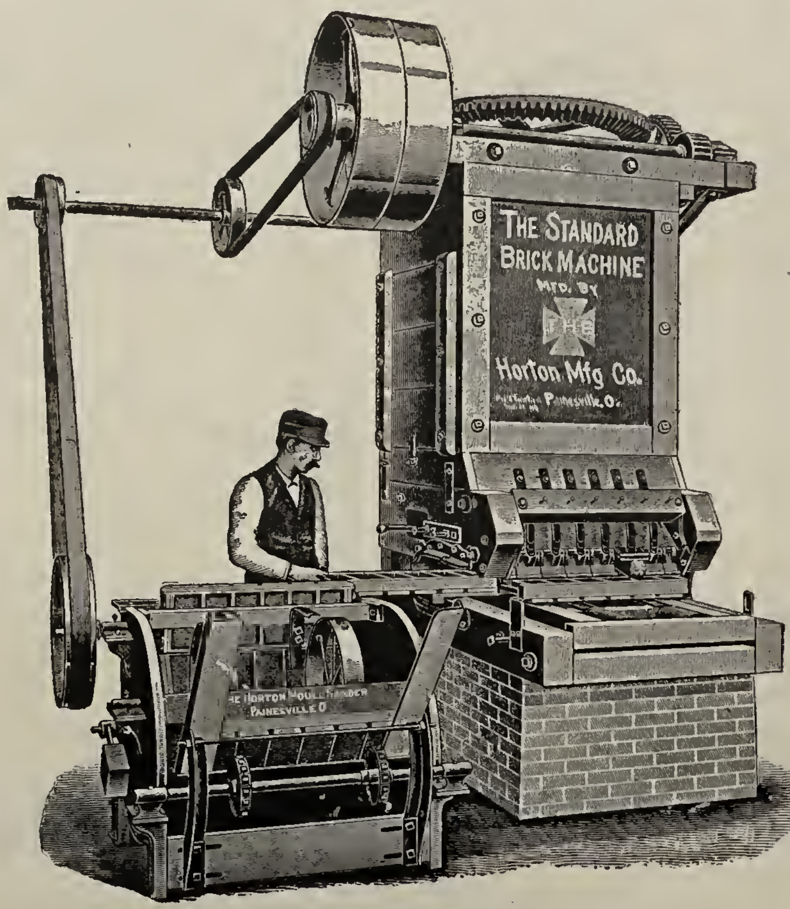
The Standard Brick Machine. (Horse Power.)



DISINTEGRATORS,
PUG MILLS,
REPRESSES,
CONVEYORS,
ENGINE and
BOILERS.

FOR SALE—CHEAP.

One 10 H. P. second-hand hoisting engine and boiler.
One 30 H. P. second-hand engine and boiler. This is in good shape.
3,000 Hacking pallets (second-hand).



The Standard Brick Machine. (Steam Power.)

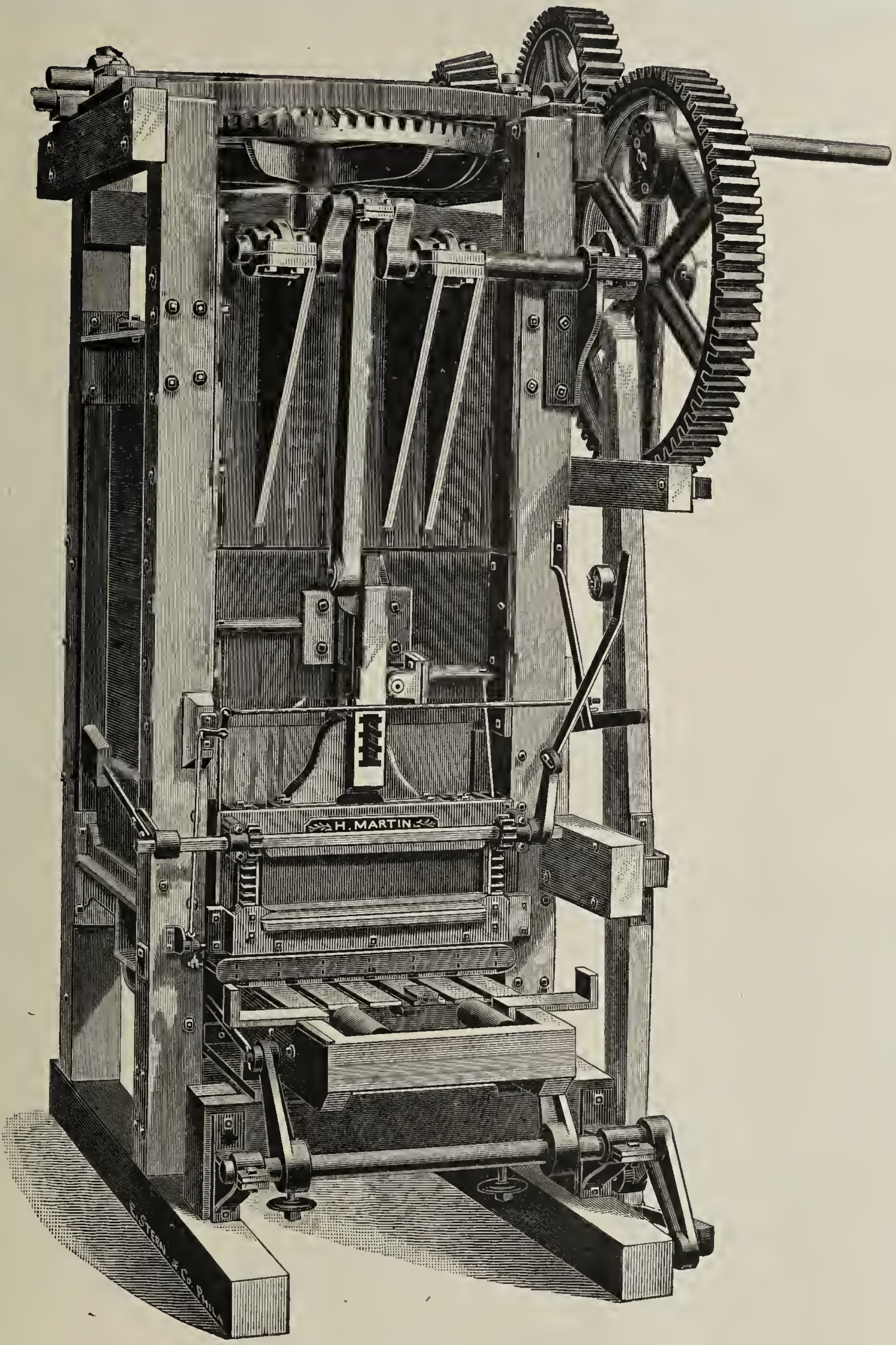
The HORTON MANUFACTURING CO., = Painesville, Ohio.

Inquire at the Largest and
Best Know Brick Plants using **The "Martin"**

And they Will Tell You Why

It Stands at the Head of Soft Mud Brick Machines.

ESTIMATES CHEERFULLY FURNISHED.



WE KEEP EVERYTHING REQUIRED ON A BRICKYARD.

MARTIN'S LETTER "A."

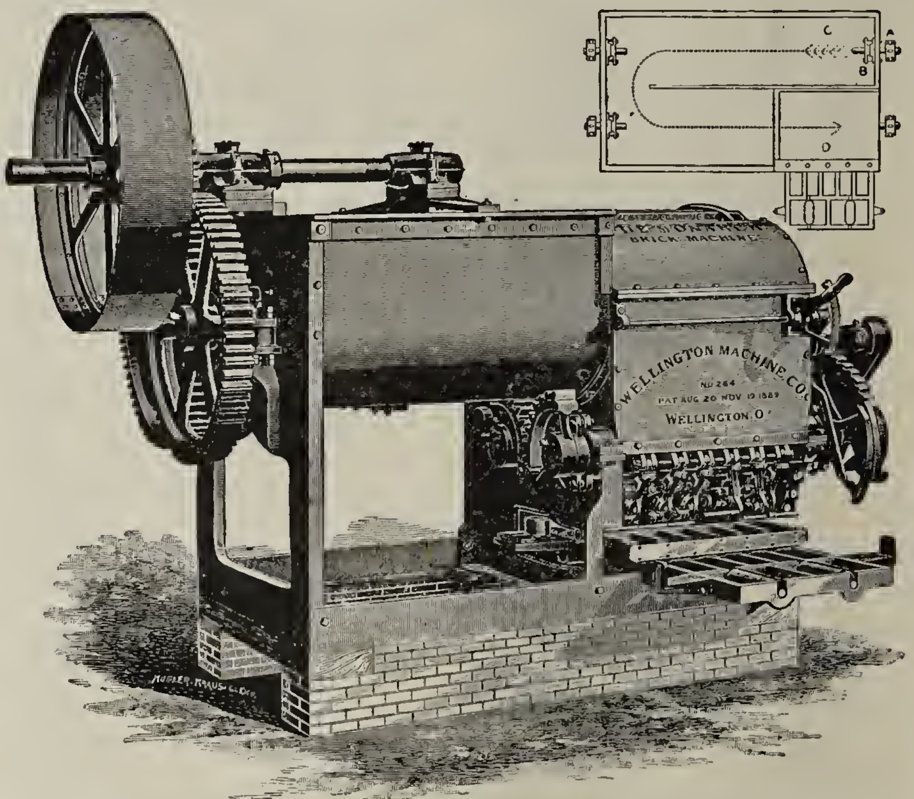
The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

LANCASTER, PENN.

It's Different,

The "Monarch" is

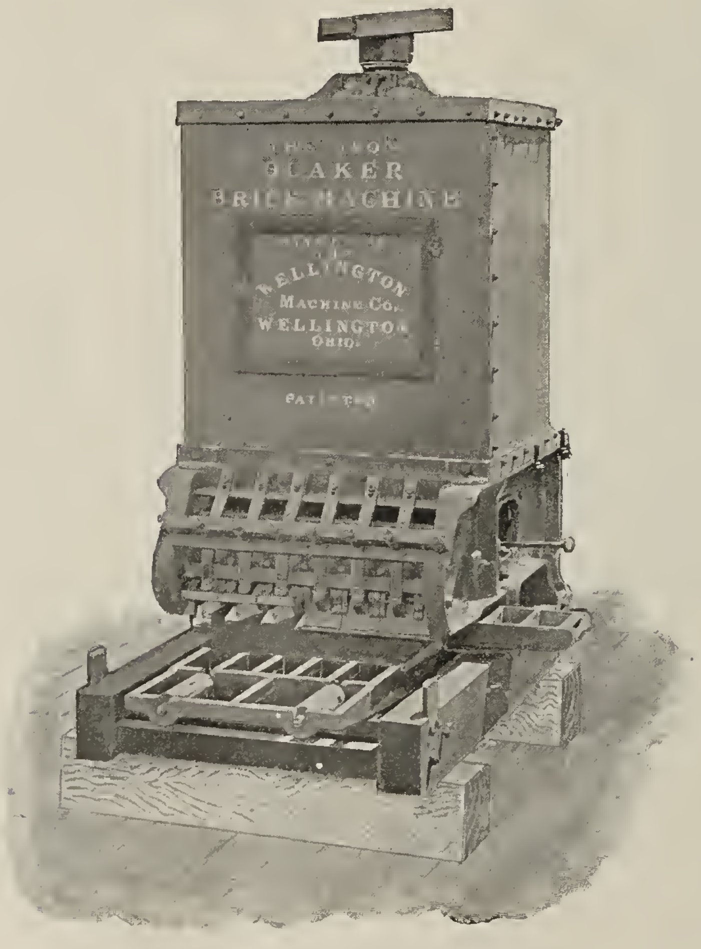


—From any other Brick Machine, and there are reasons for it. Sixty users (see last three months of the Clay-Worker) say they **are good Reasons.**

You don't want to buy a machine until you know all there is to be learned on the subject. So if you do not **Realize the Great Difference** between this machine and others, our circular gives full particulars.

* * *

THE DIFFERENCE IS NOT ONLY IN CONSTRUCTION, BUT IN RESULTS ALSO.



* * *

FOR SMALLER YARDS OUR

"Iron Quaker"

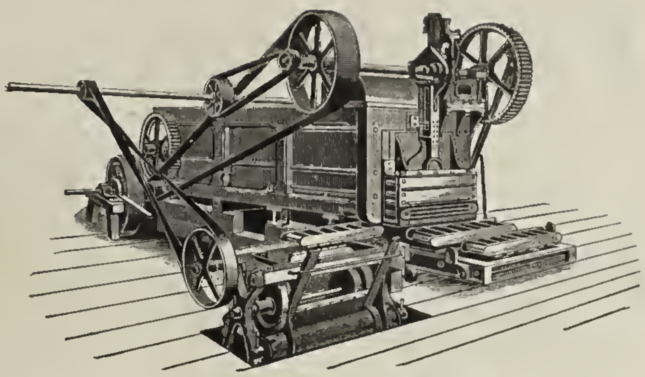
Is the Lowest Priced Good Machine.

In our circular you will find a partial list (several hundred in it at that) of places where our "**Quaker**" **Machines** are used.

The "**Iron Quaker**" is still an improvement over the other styles we have made.

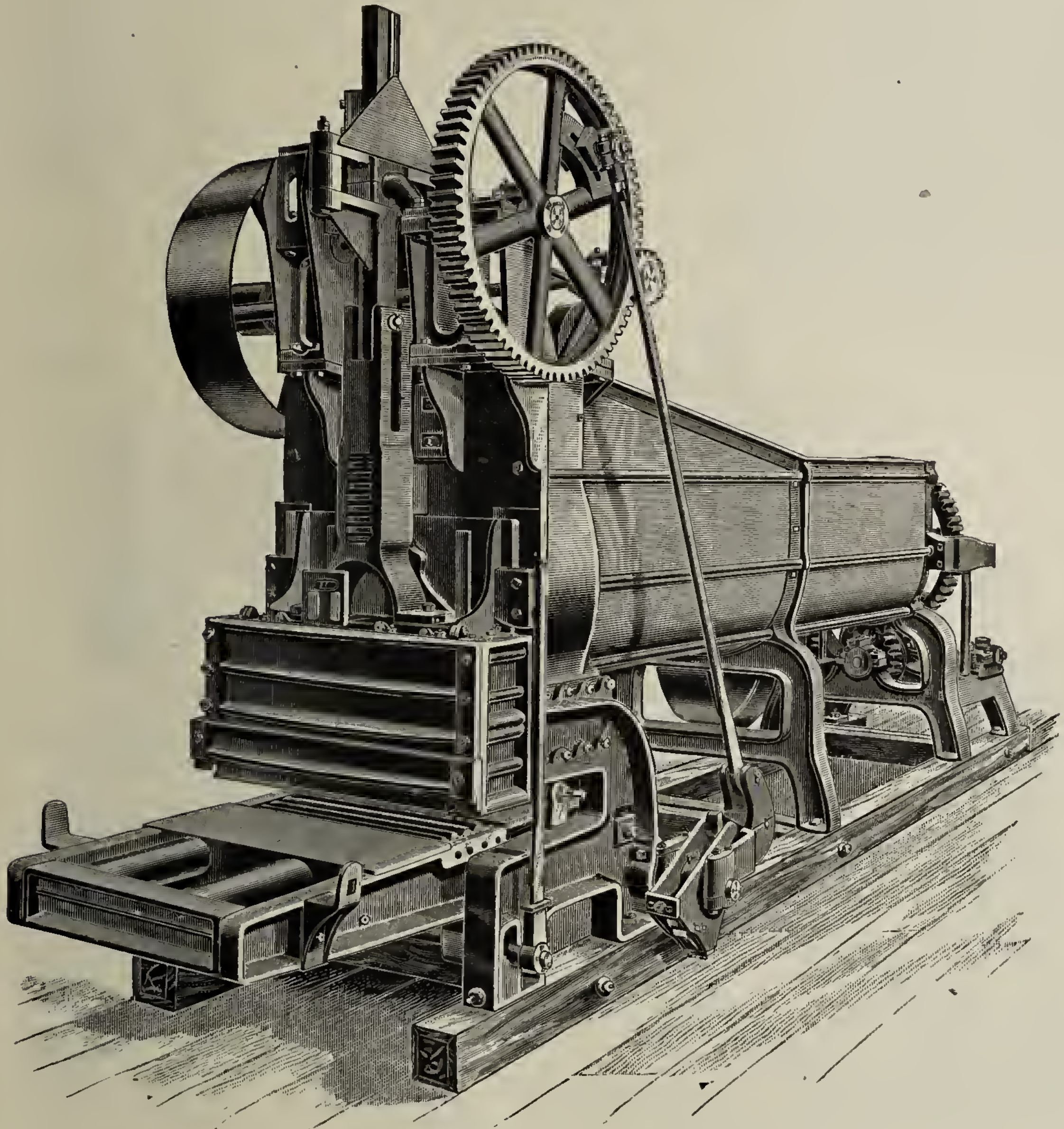
The Wellington
Machine Company,
WELLINGTON, OHIO.

THE POTTS



Horizontal Stock Brick Machines

ARE RECORD BREAKERS.



Simple in

CONSTRUCTION,
STRONG and
DURABLE.

For quantity and quality of Brick made they have no equal.

• • •

Made in two styles, either all Iron, or Wood Pug Mills.

They are the cheapest, all things taken in consideration.

We manufacture everything used on the brickyard. **Moulds, Trucks, Barrows, Kiln Castings, Elevators, Pulleys and Shafting.** Write for prices. You will find them low.

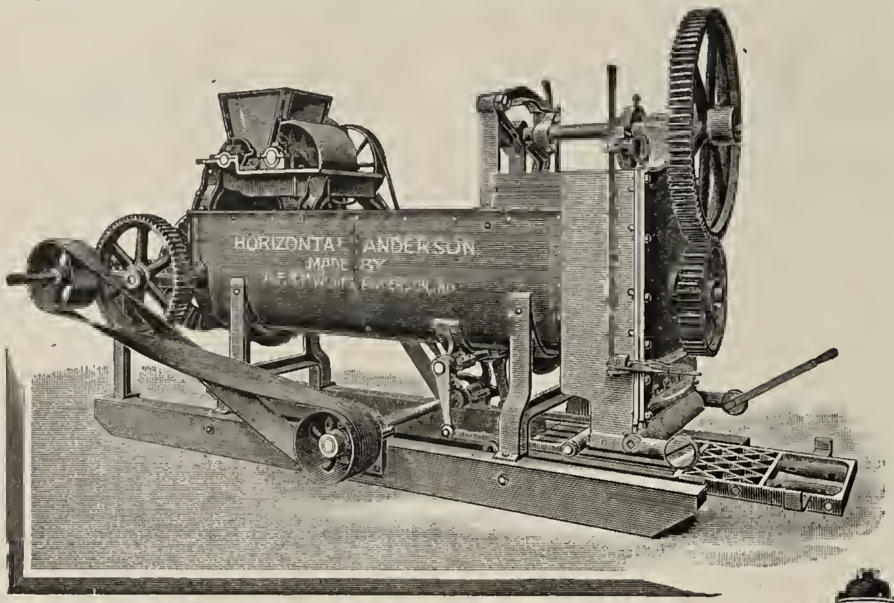
C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND

A New Departure in Brick Machinery

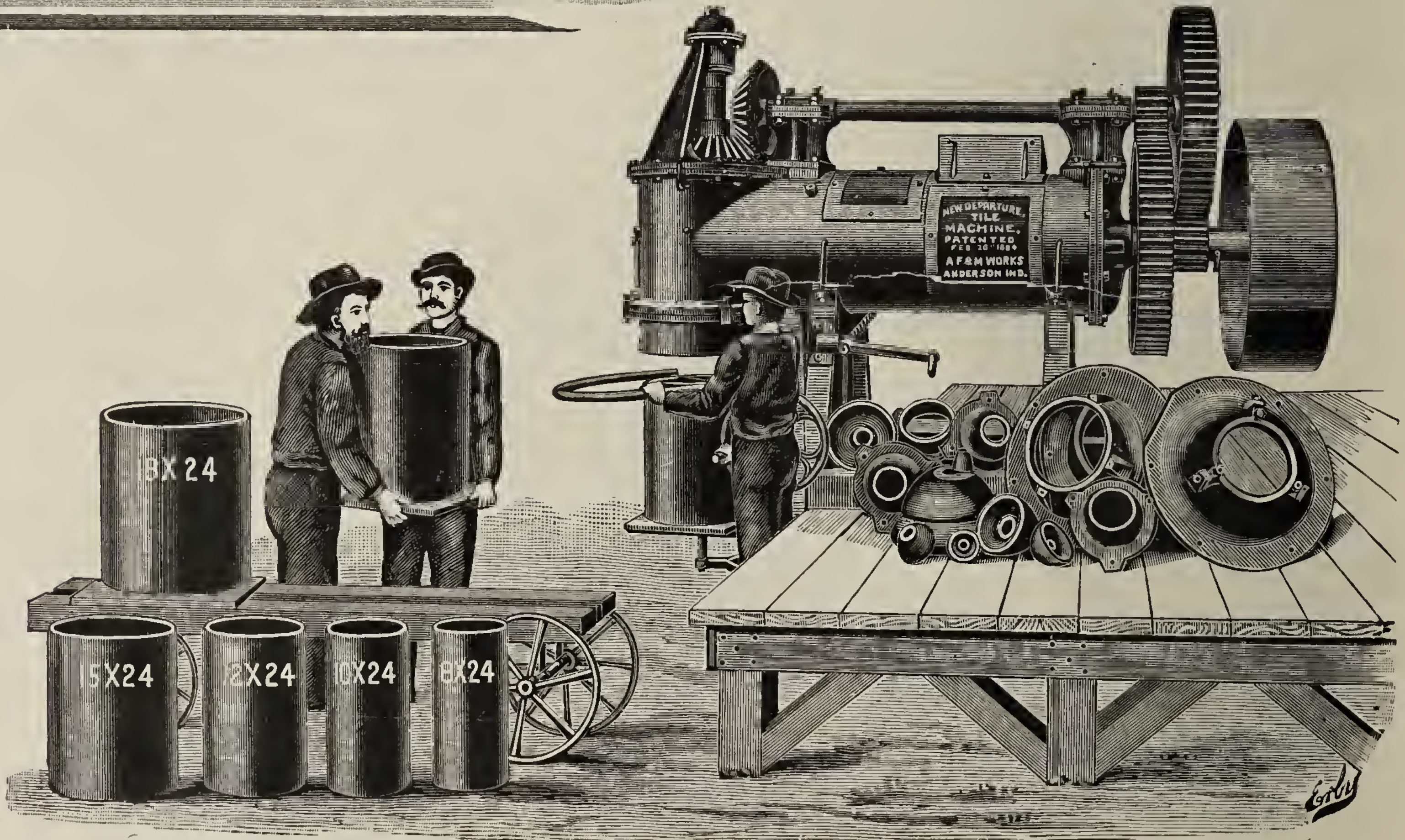
THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.



This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.

* * *


NEW DEPARTURE TILE MACHINE. PATENTED FEB 20 1894 A F&M WORKS ANDERSON IND.
18X24
15X24
12X24
10X24
8X24

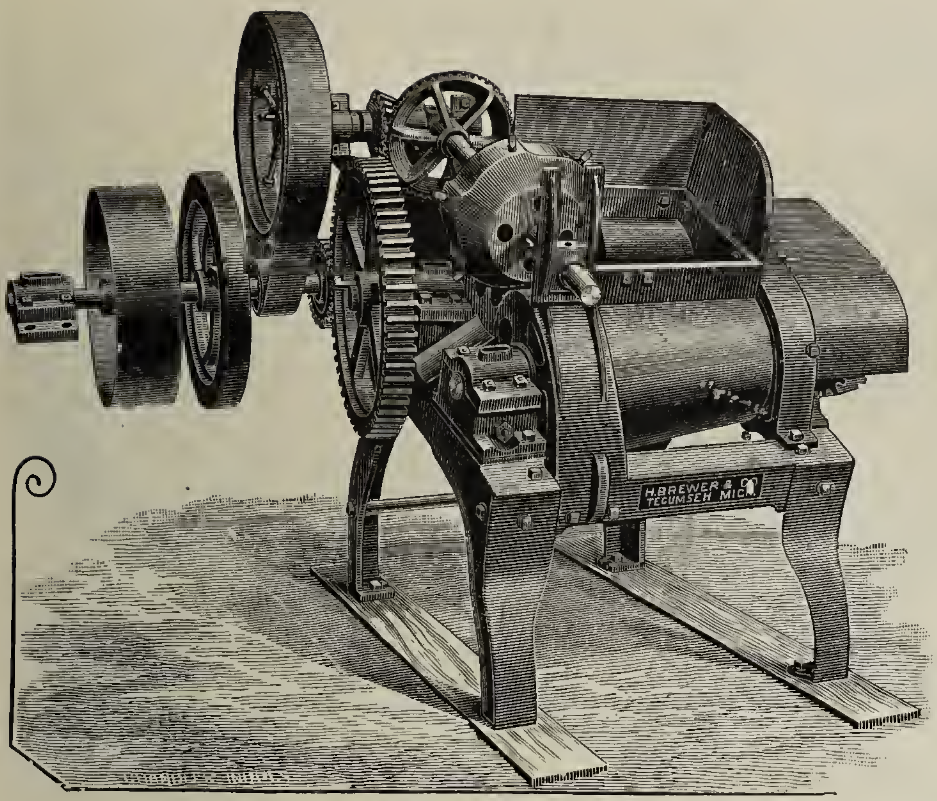
THE GREATEST ON EARTH.

We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.

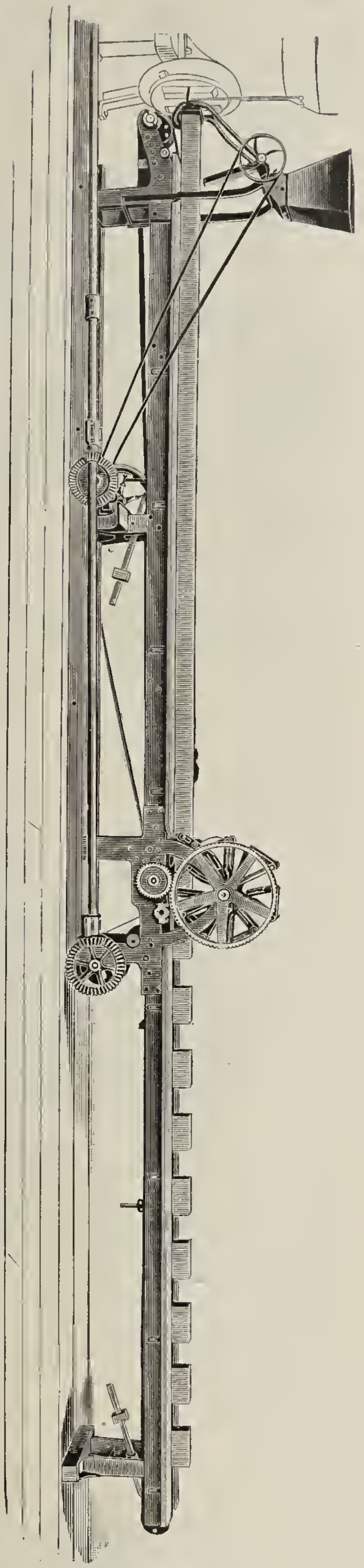
DOWN DELIVERY FOR LARGE TILE.

SIDE DELIVERY FOR SMALL TILE.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.



STONE EXTRACTING CLAY CRUSHER.

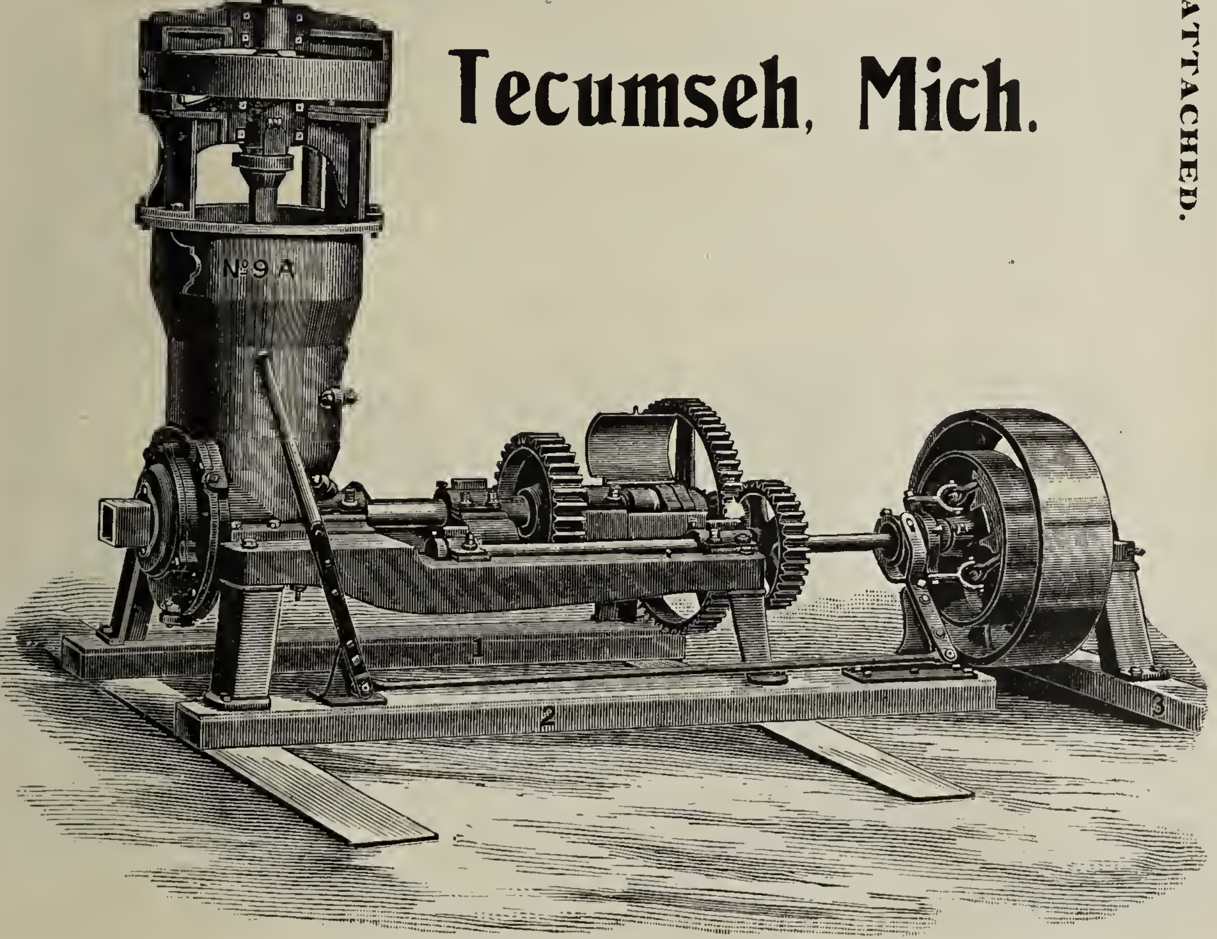


AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

Manufactured by

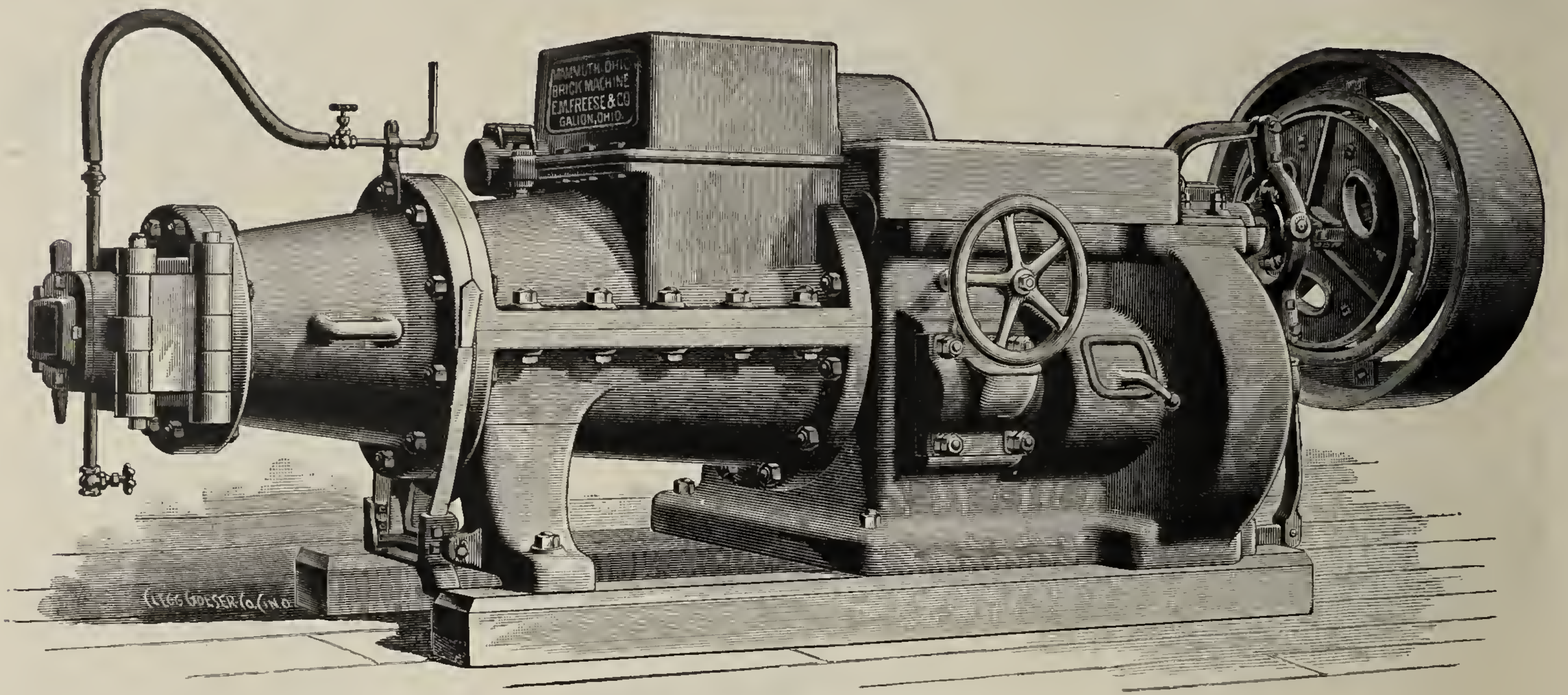
H. Brewer & Co.,

Tecumseh, Mich.

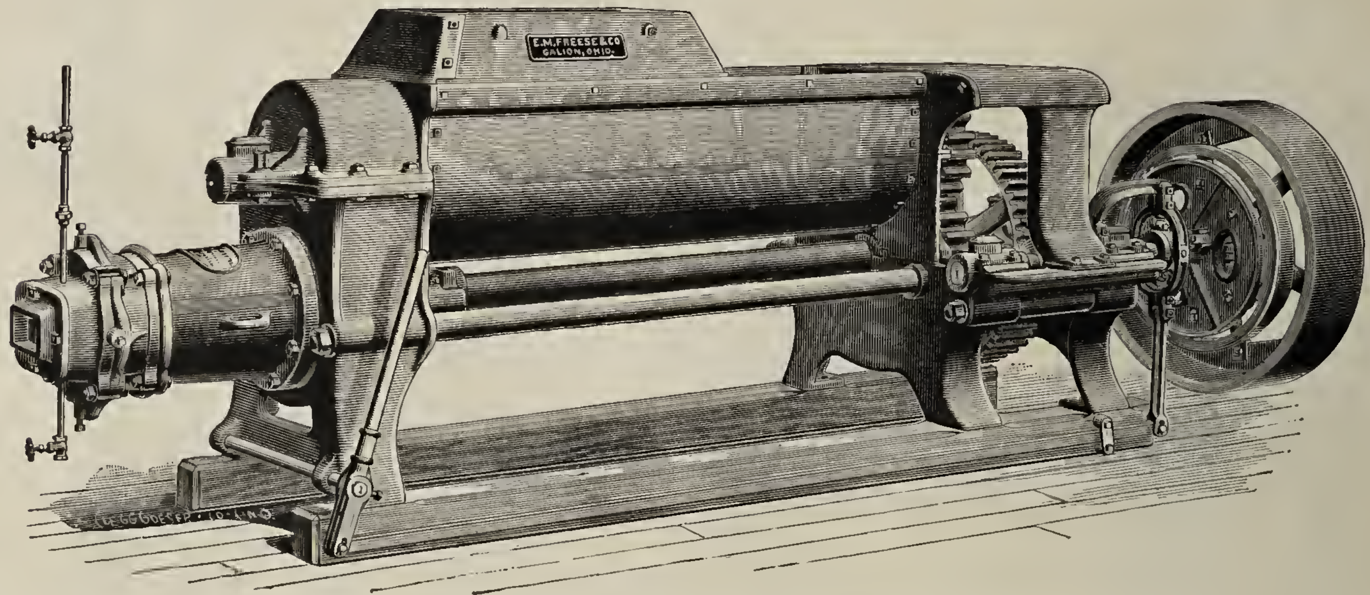


No. 9 "A" BRICK MACHINE.

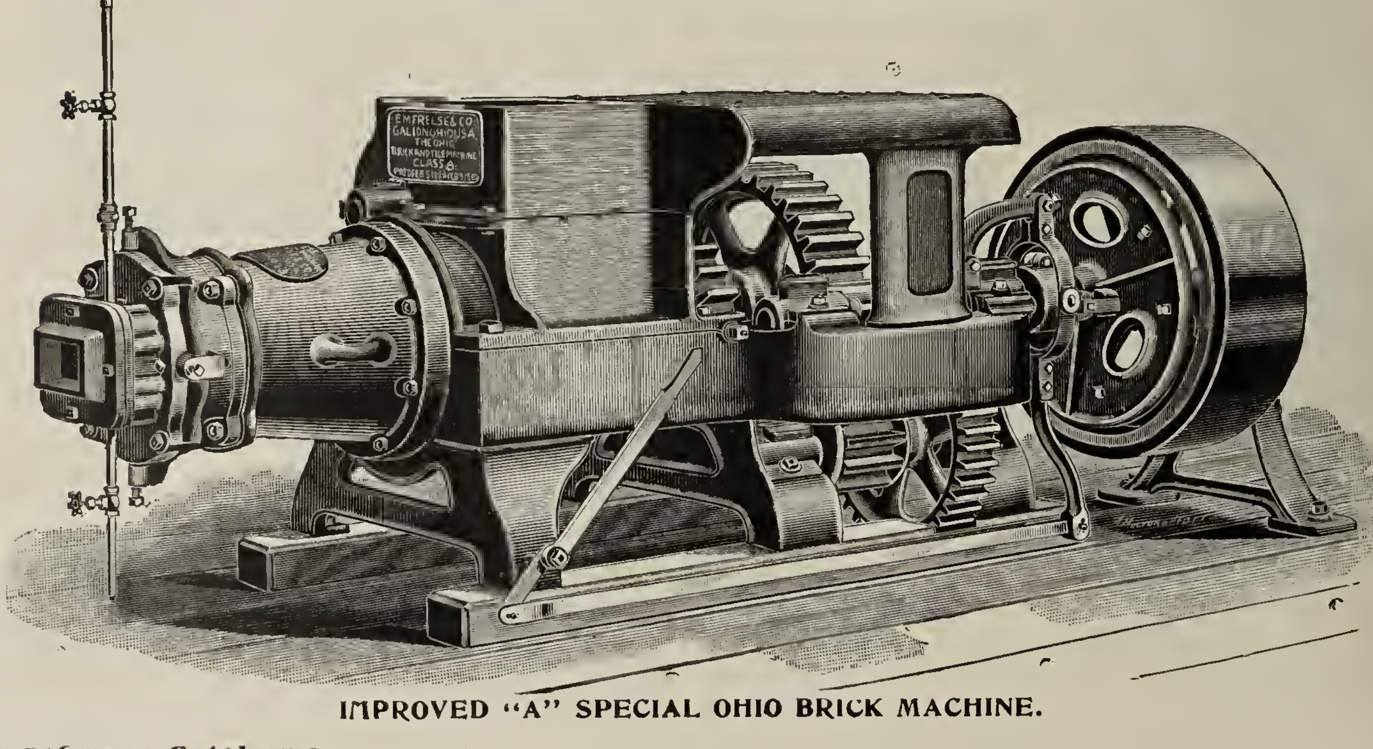
E. M. FREESE & CO., GALION, OHIO.


MAMMOTH OHIO BRICK MACHINE E.M.FREESE & CO GALION, OHIO.
CLEGG GOESER Co. Cin O.

MAMMOTH BRICK MACHINE.


E.M.FREESE & CO GALION, OHIO.
CLEGG GOESER Co. Cin O.

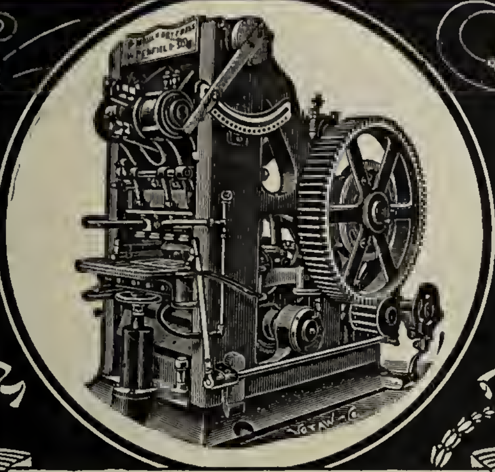
No. 1 COMBINED PUG MILL and AUGER MACHINE.


E.M.FREESE & CO. GALION OHIO U.S.A. THE OHIO BRICK AND TILE MACHINE CLASS A

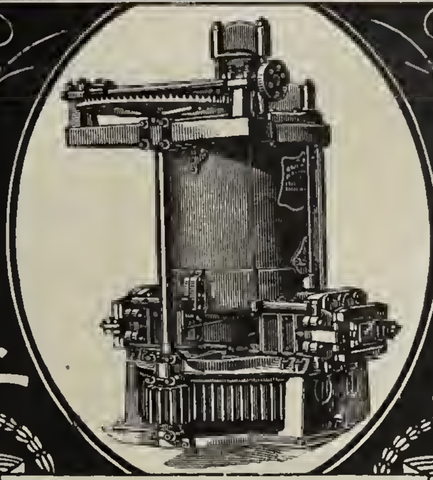
IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.

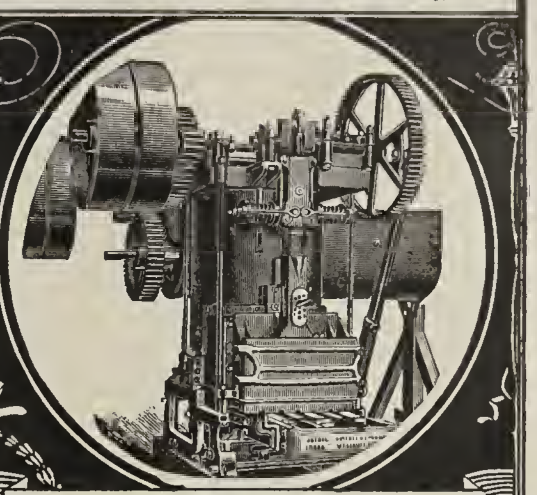
CLAY-WORKING MACHINERY



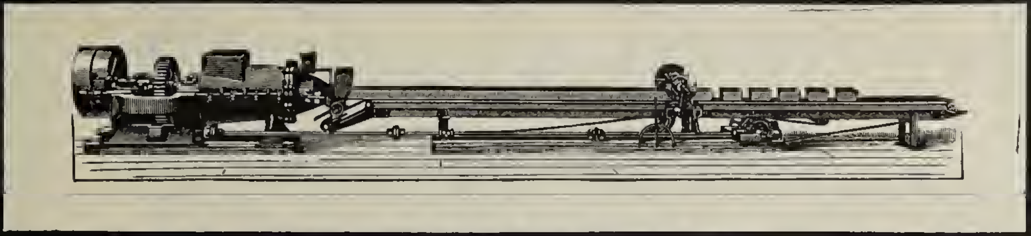
DRY PRESS BRICK MACHINES



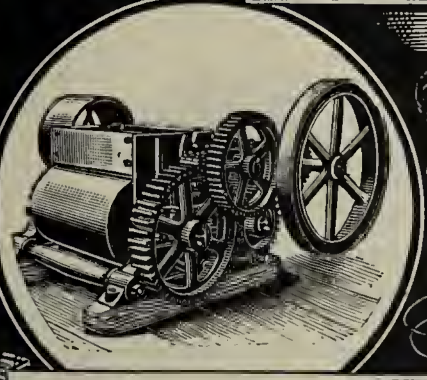
PLUNGER BRICK MACHINES



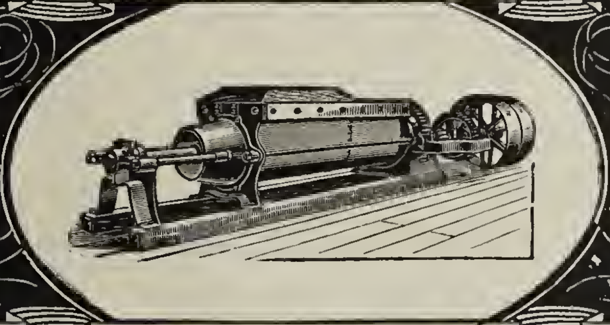
SAND-MOLDING BRICK MACHINES



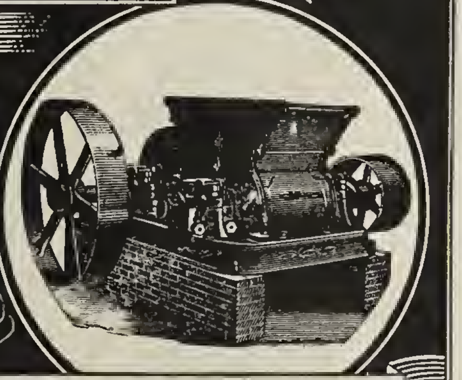
AUGER BRICK MACHINES



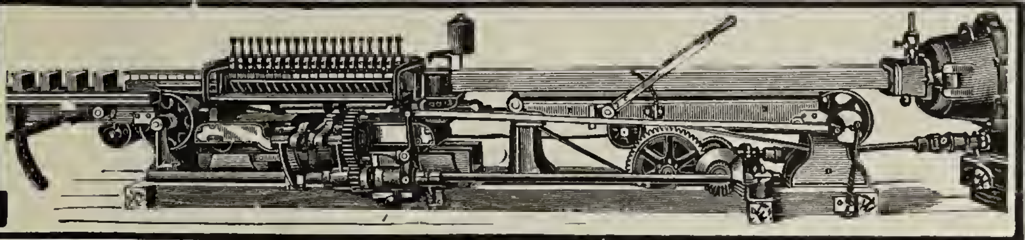
CLAY CRUSHERS



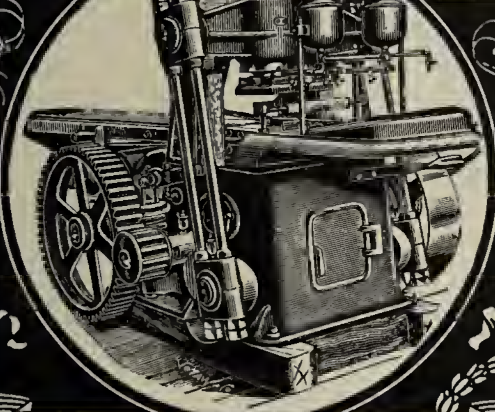
PUG MILLS



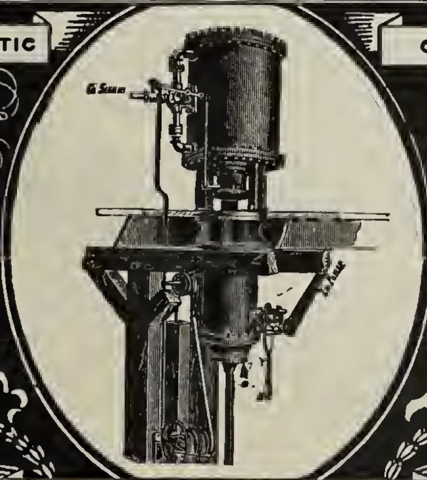
DISINTEGRATORS



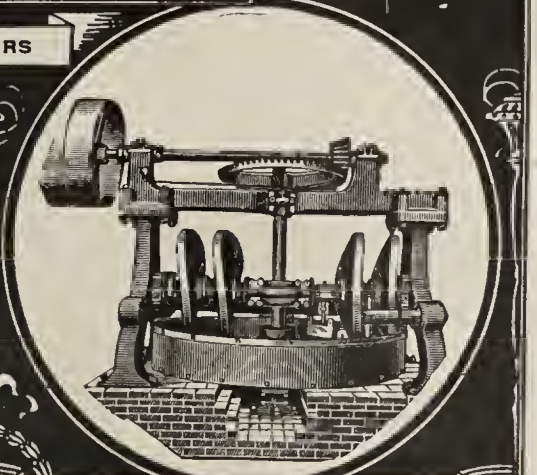
AUTOMATIC CUTTERS



BRICK REPRESSES



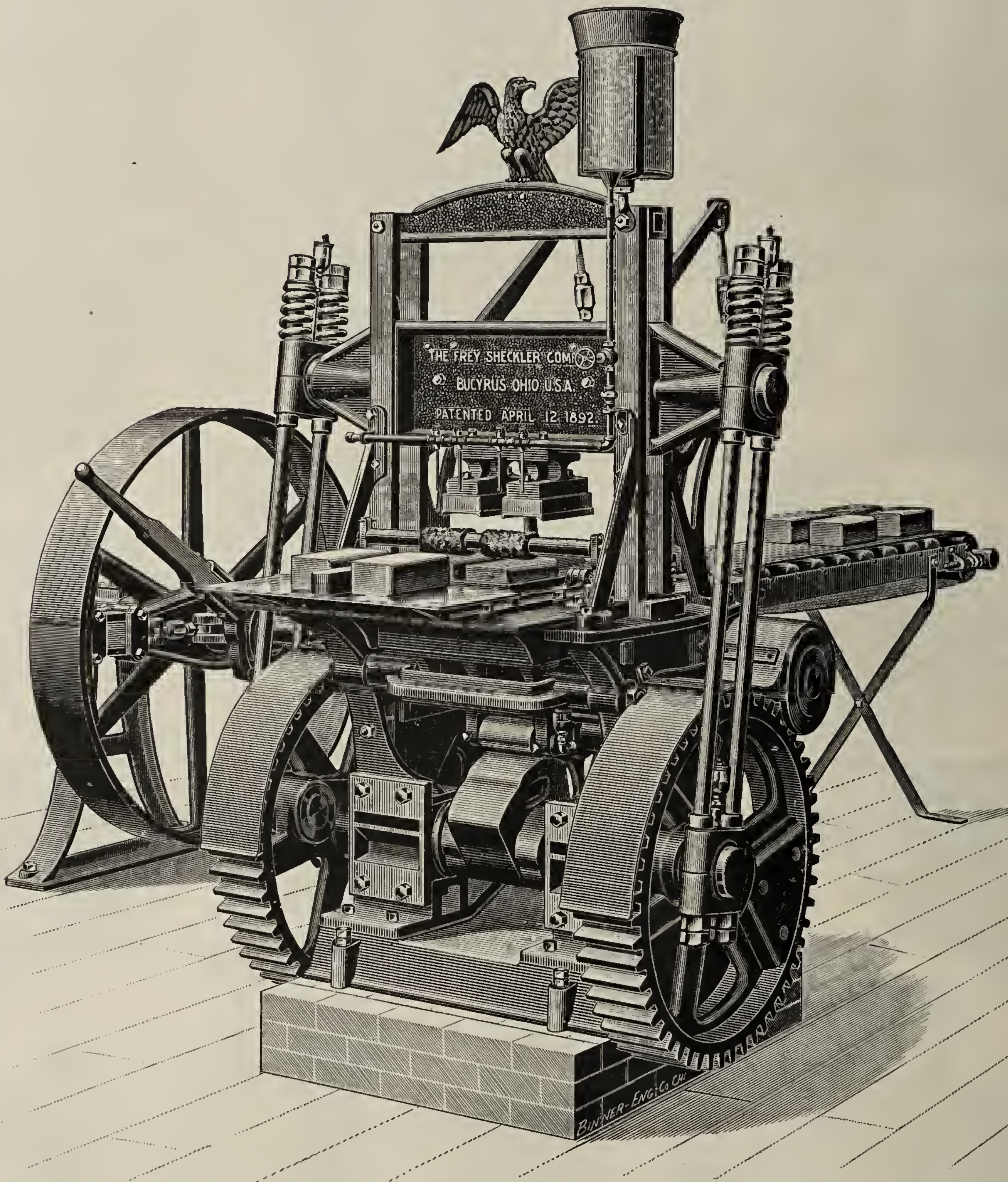
SEWER PIPE PRESSES



DRY PANS, WET PANS, ETC.

J.W. PENFIELD & SON, WILLOUGHBY, O. U·S·A·

Purington HAS TRIED AND APPROVED The Eagle Repress.


THE FREY SHECKLER COM'Y
BUCYRUS OHIO U.S.A.
PATENTED APRIL 12 1892.
BINNER-ENG-CO. CHI

At Galesburg, Ill , The Purington Paving Brick Company worked the **EAGLE REPRESS** side by side with a Repress built by one of our neighbors. After constant trial for more than three months, please listen to what Mr. Purington says concerning it:

> "We are very much pleased with the Press, and have never as yet spent one cent on it since it was put in. Please ship the three Represses ordered from you."

Such encouraging words of approbation from one of the largest, most reputable and capable brick manufacturers in the world is a prize worth working for, and proves the standard quality of our Repress.

It will last four times as long as any other Repress, and will not cost one-tenth as much for repairs.

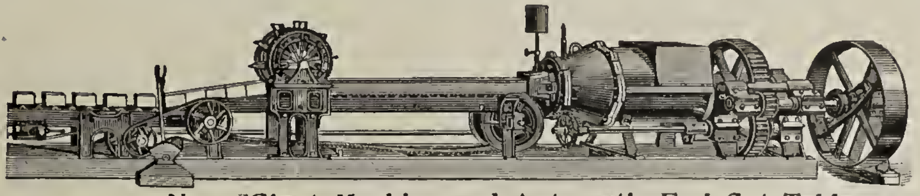
THE FREY=SHECKLER CO., - Bucyrus, Ohio, U. S. A.

Manufacturers of Clayworking Machinery, and Builders of the Bucyrus Steam Tunnel Dryer.

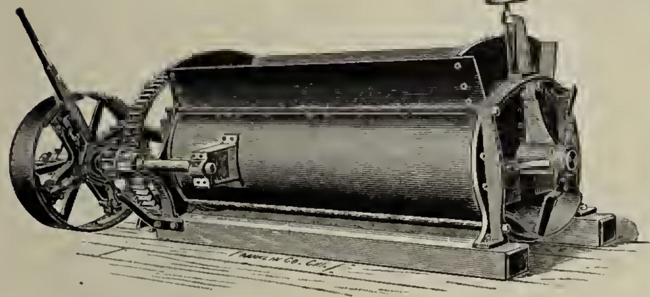
BRICK MACHINERY FOR 1896.

Write for Catalogue.

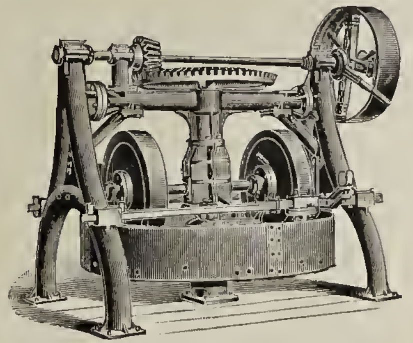
Before Buying
Write for our Prices.



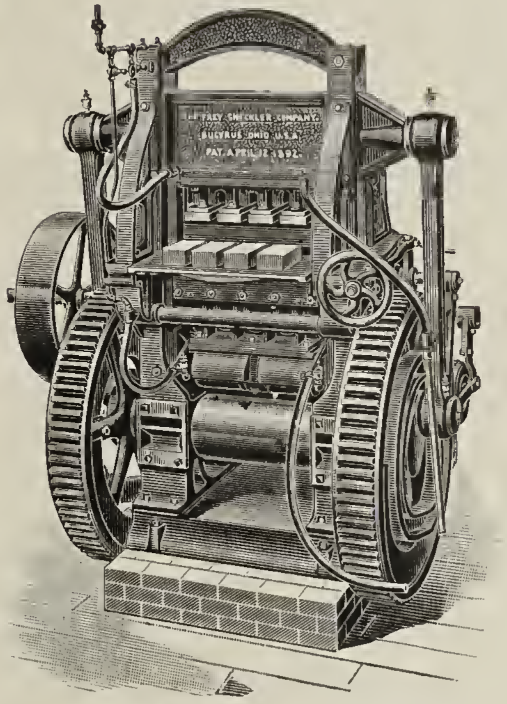
No. 1 Giant Machine and Automatic End Cut Table.



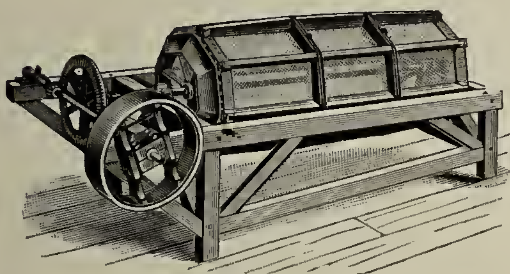
Pug Mills and Granulators.



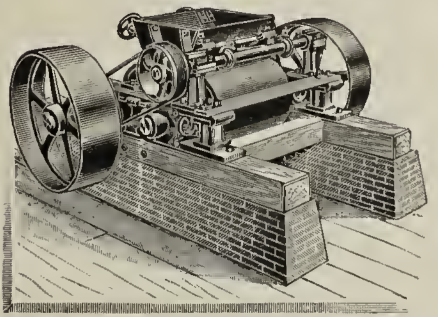
Dry and Wet Pans.


THE FREY-SHECKLER COMPANY
BUCYRUS, OHIO, U.S.A.
PAT. APRIL 12 1892.

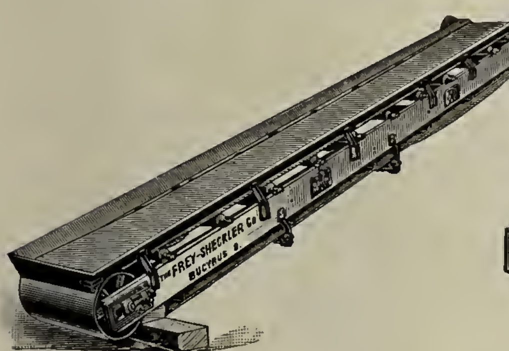
4-Mould Semi-Plastic Brick Press.



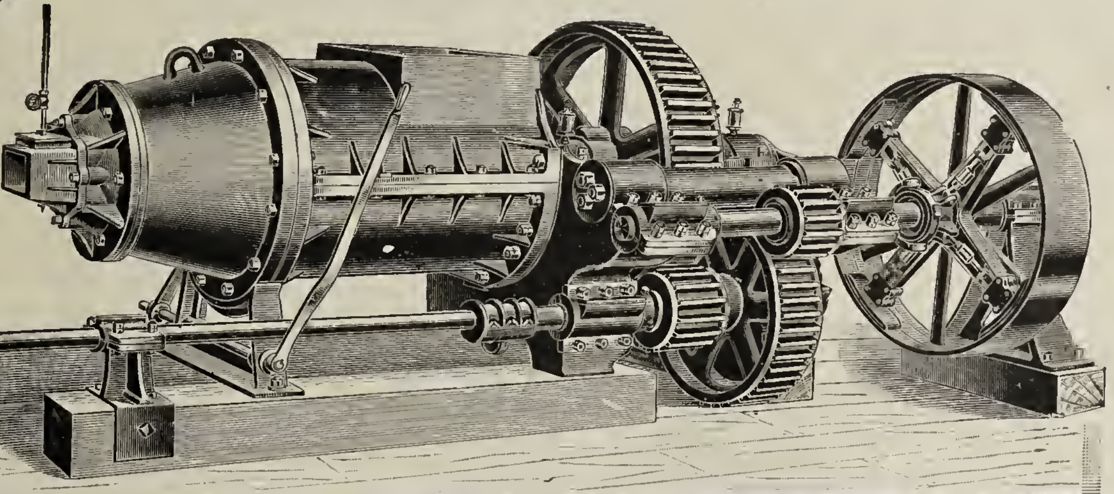
Clay Screens.



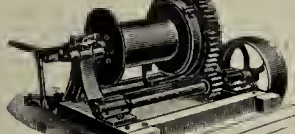
Crushers.



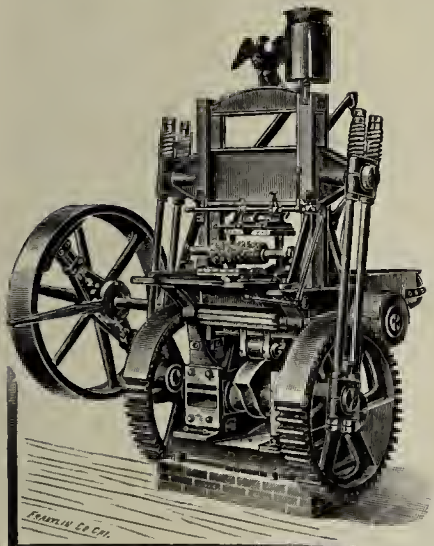
Clay Conveyors.



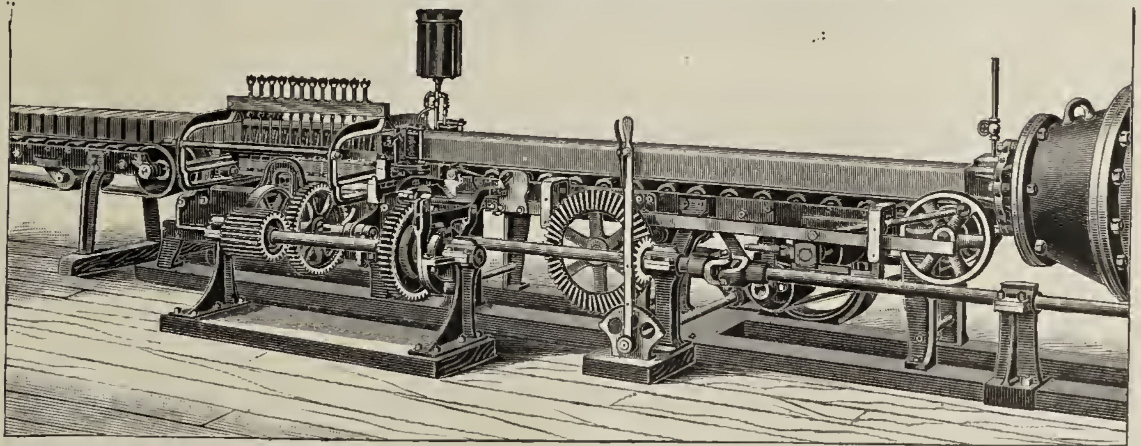
Special Bucyrus Giant Brick Machine.



Winding Drums.



Brick Re-Press.

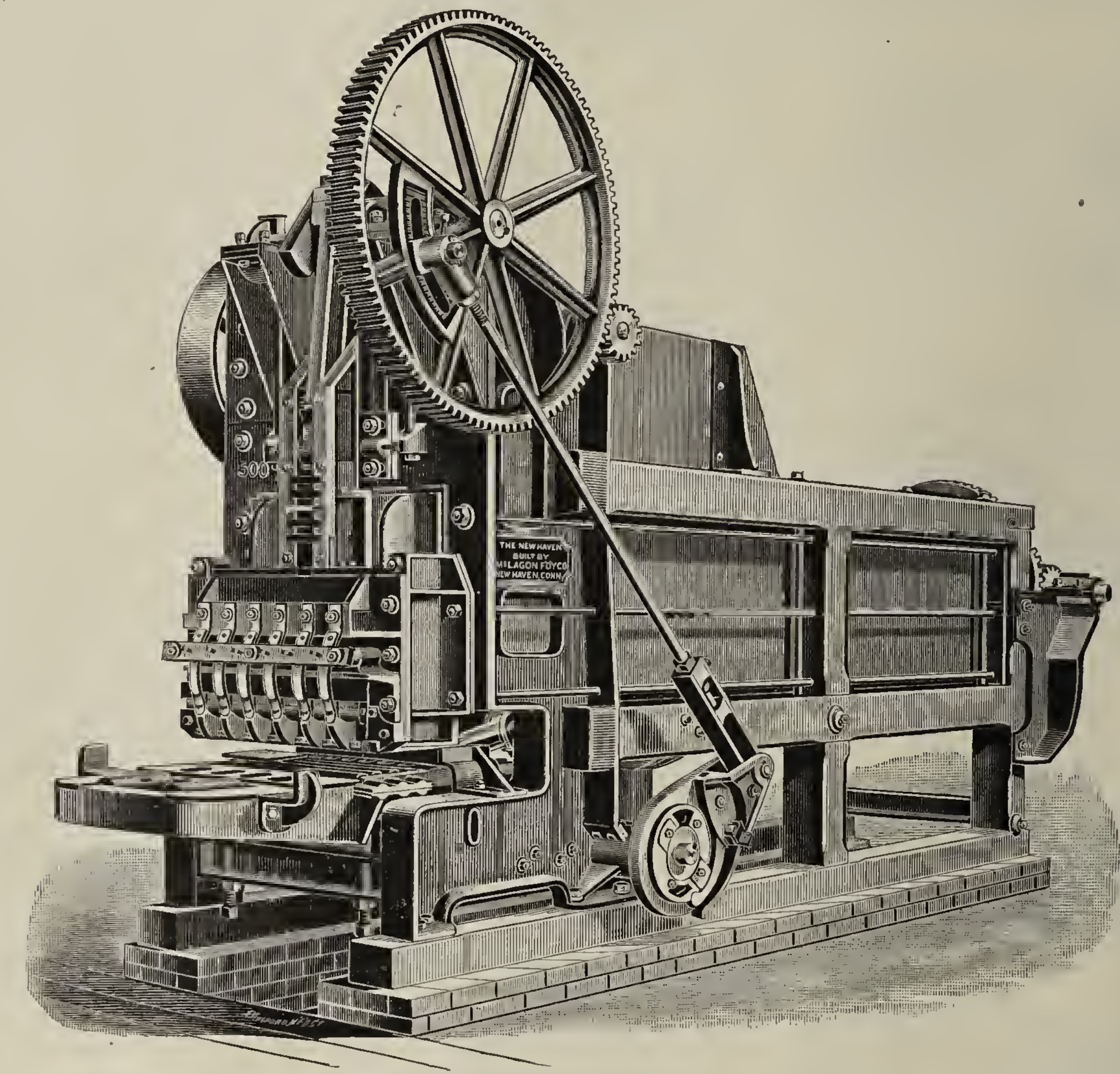


Bucyrus Automatic Table for Side Cut Brick.

The Frey-Sheckler Co., BUCYRUS, OHIO, U. S. A.

More "New Haven" Brick Machines

In use in New England than any other kind. This shows the approval of our Home Trade.



We have sold more **"New Haven" Machinery** this spring than in any previous season both at home and abroad.

For information about our machinery, address

The Eastern Machinery Co.,

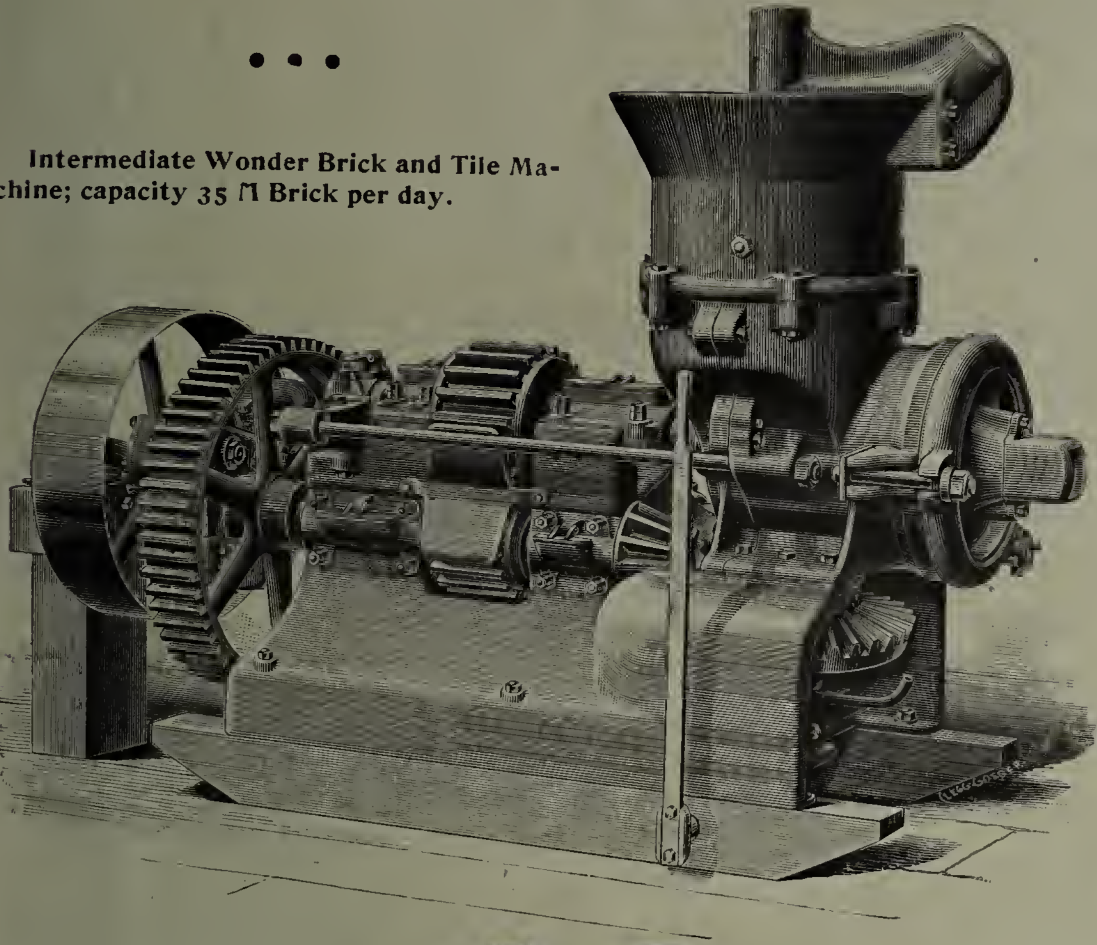
NEW HAVEN, CONN.

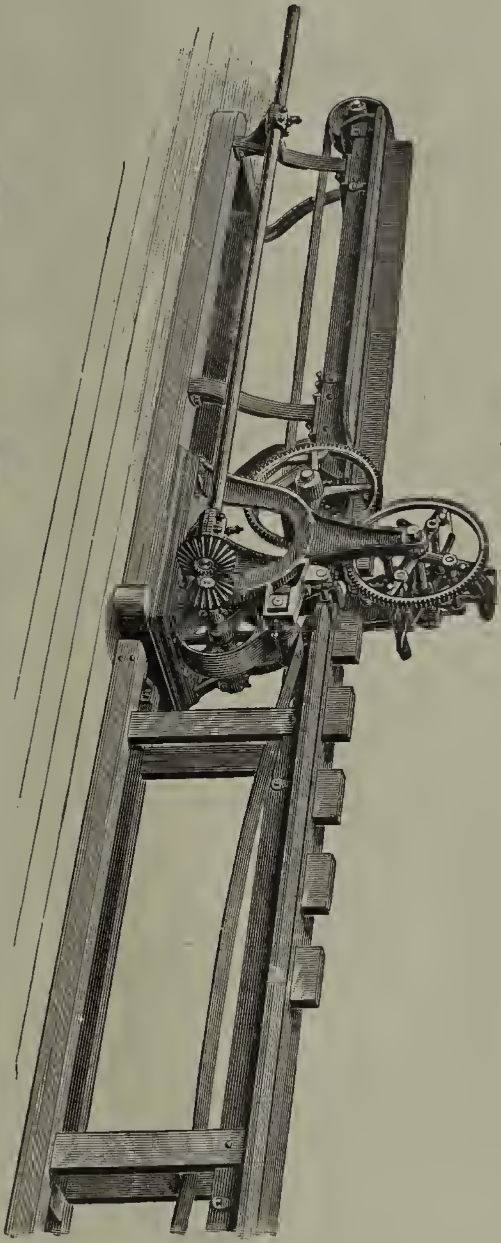
WONDER MACHINERY,

For Brick and Tile.

• • •

Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



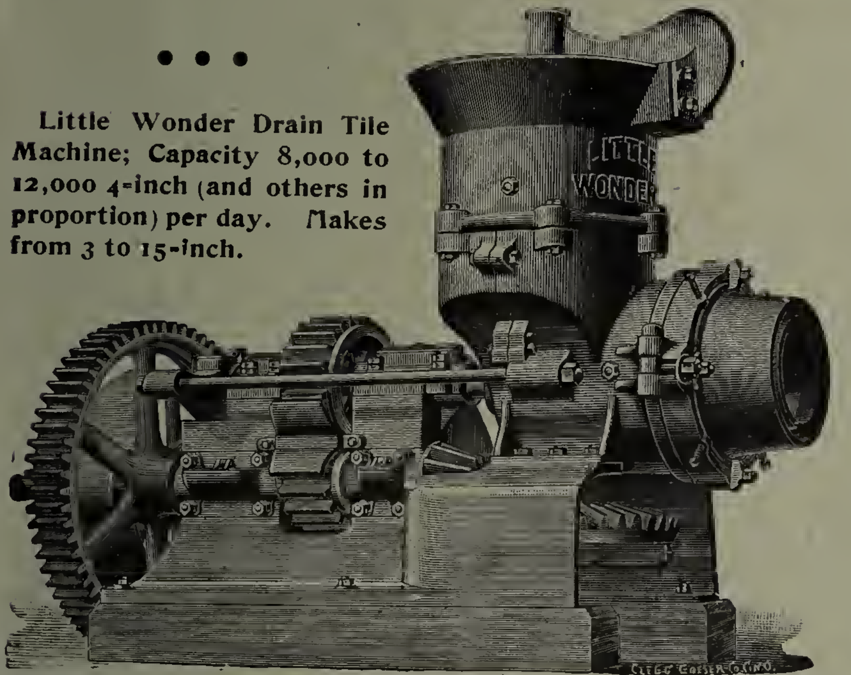


Cunningham's Single Stream Automatic End Cut Brick Cutter.

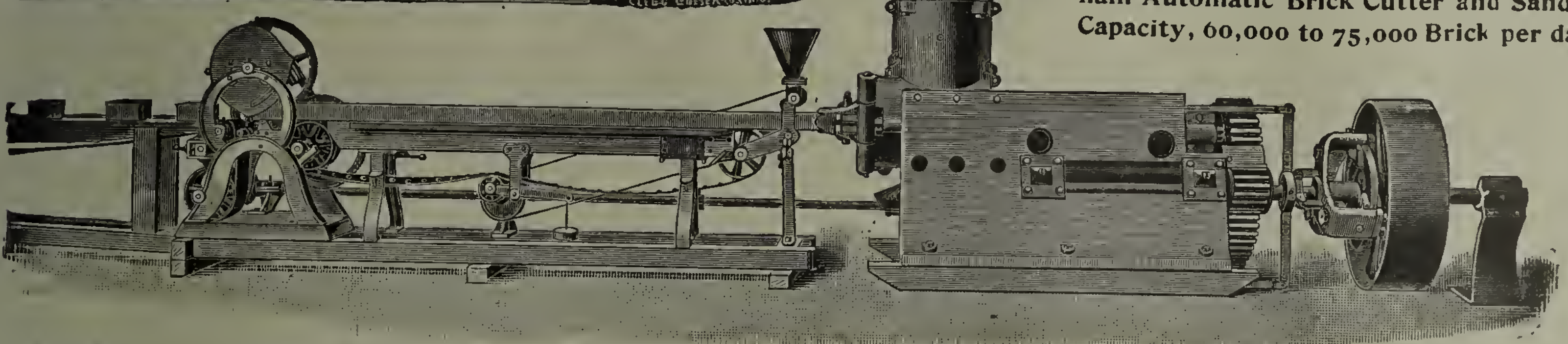
• • •

• • •

Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.



AS MANUFACTURED BY

The Wallace Manufacturing Co.,

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DRY YOUR

Pressed Brick in the Iron Clad Dryer

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MANUFACTURERS OF

HIGH GRADE, PLAIN and ORNAMENTAL **Red, Buff AND Granite Pressed Brick.**

Office and Showrooms:
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WORKS:
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MARION, IND., May 30, 1896.

The WOLFF DRYER Co., Chicago, Ill.

GENTLEMEN:——Replying to your favor of the 27th inst., as to how the dryer recently erected by you at our plant is working, we take great pleasure in answering as follows:

While the dryer has not been in operation more than a month we have thoroughly tested it drying our pressed brick, and the results accomplished have been so gratifying, that we have no hesitancy in recommending it to the brickmaking craft, as the most perfect system of brick drying. We can dry readily from 25,000 to 30,000 every twenty-fours, ours being a one tunnel, three track dryer, your guarantee for this size dryer being but 20,000 however. It not only makes the brick in the finest possible condition for setting, as they come from the dryer perfectly dry and free from any checks or warp, but is a time saver in burning, as we feel confident that we can save from seven to eight days in burning a kiln, it doing away with the greater part of that tedious water smoking period.

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In justice to yourselves and Mr. Johnson, whom you sent to erect the dryer, we would say, that the work was all done in a first-class workmanship manner, and fully up to your guarantee, and satisfactory in every respect.

Your dryer fully merits the reputation it has, and deserves the patronage of brickmakers in general. Hoping you increased success in the introduction of dryers.

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E. B. GOODWIN, Sec and Treas.

Write for prices and illustrated catalogue to

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358 Dearborn St., Room 303, CHICAGO, ILL.

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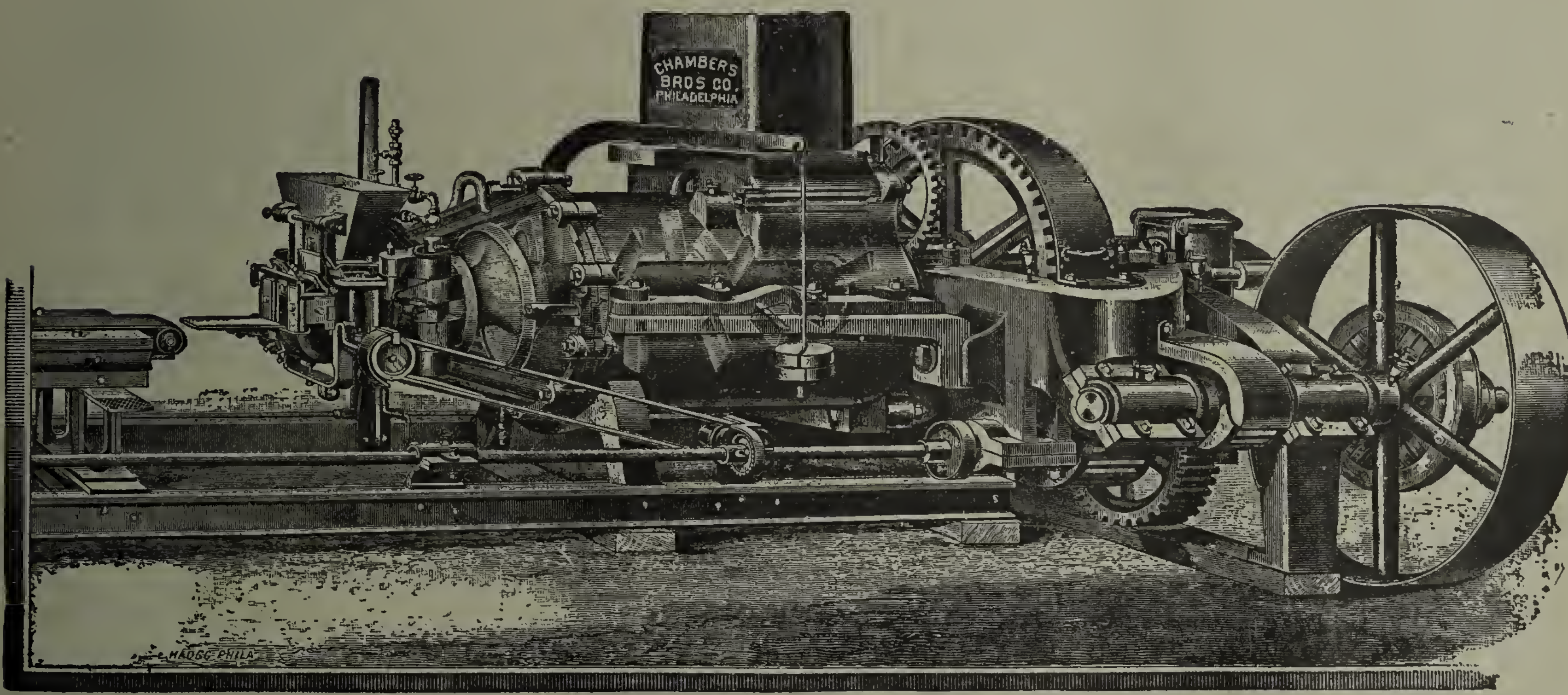
THE CLAY WORKER
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA-COTTA SEWER PIPE POTTERY ETC.
T. A. RANDALL & CO., PUBLISHERS.

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXVI. No. 1. INDIANAPOLIS, IND., JULY, 1896. $2.00 a Year in Advance.

Brick Making Machinery.



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PHILADELPHIA, PA.

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Dries all of the Brick all of the Time.

Read the testimonial from the Royal Brick Co., Canton, Ohio,—it is 'short and sweet.'

* * *

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It saves us 10 car loads of coal per month over the steam dryers we had, and causes no trouble whatever. We make paving blocks, size 9 1-2" x 4" x 4 5-8"; green weight, 13 lbs. 6 oz.; dry, 11 lbs.

We evaporate daily 78,000 pounds of water, and have nice dry blocks.

We have only 10 tracks; had 15 before, and were not able to dry brick as well as we can now dry them.

We can conscientiously recommend your dryer, and we will cheerfully give you any further details for which you may ask.

Yours truly,
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THE ROYAL BRICK COMPANY.

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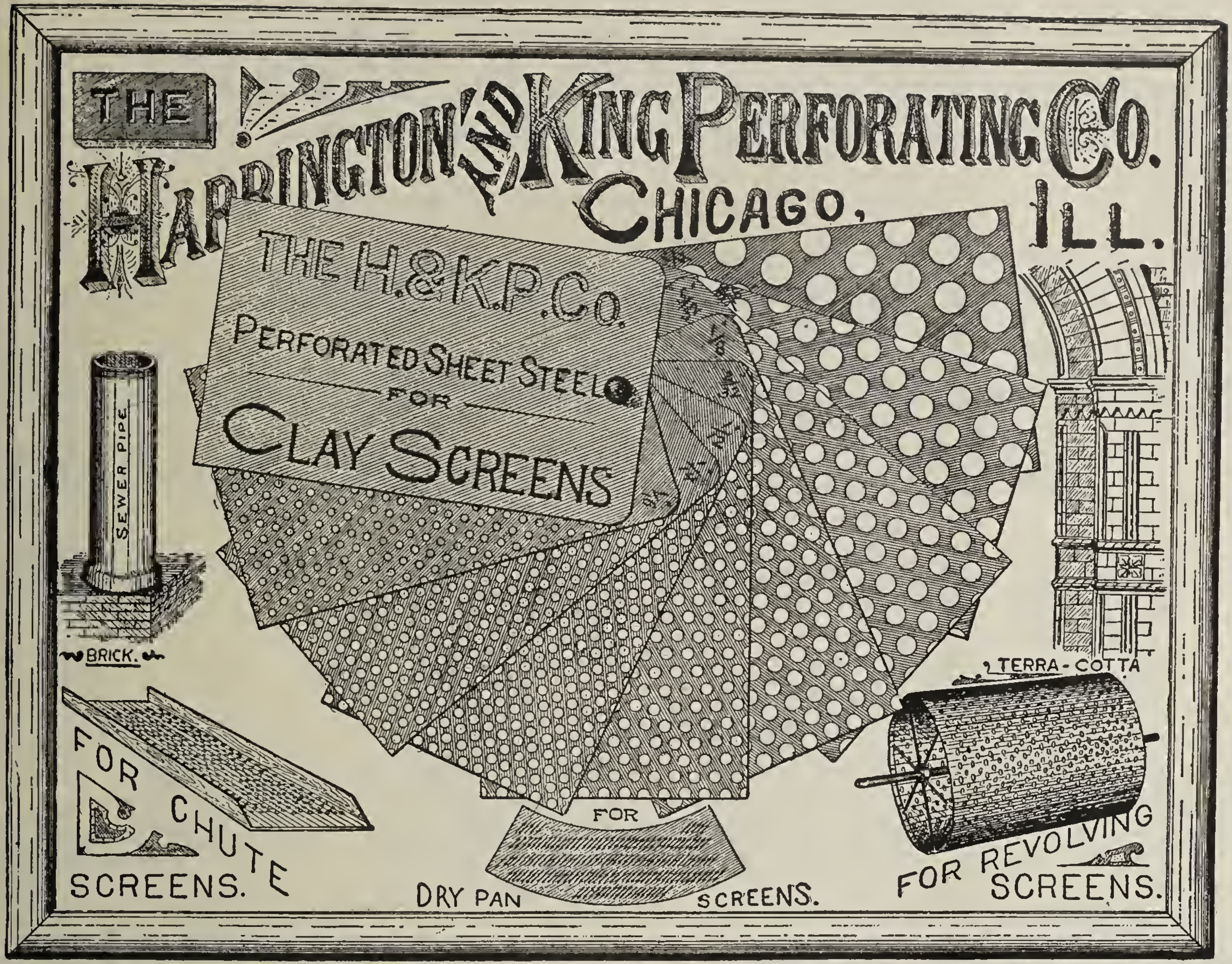

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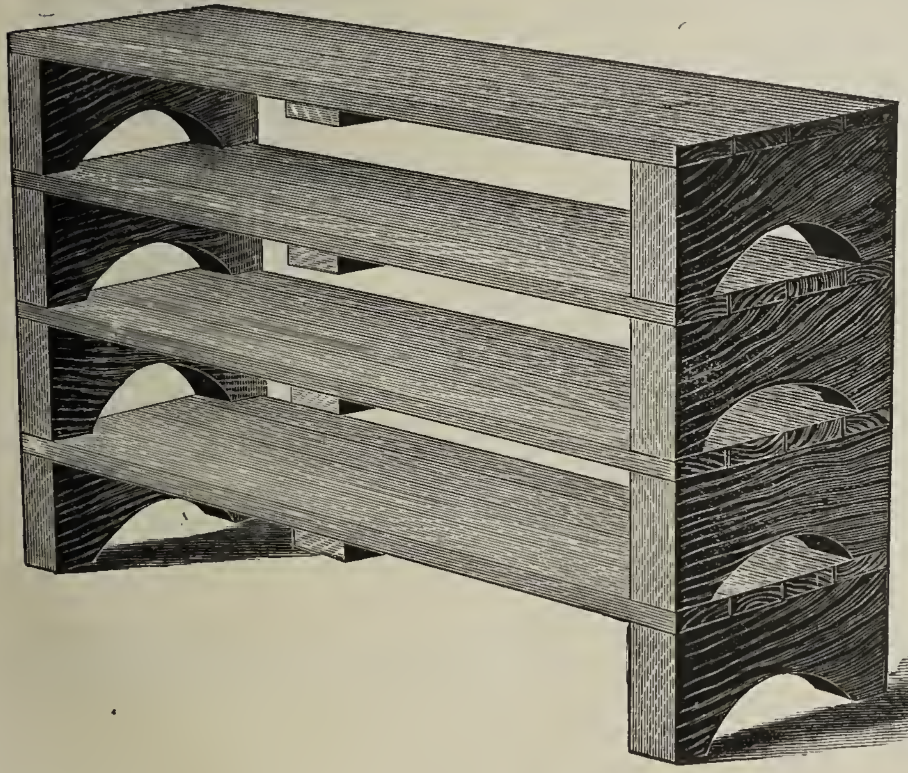

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Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

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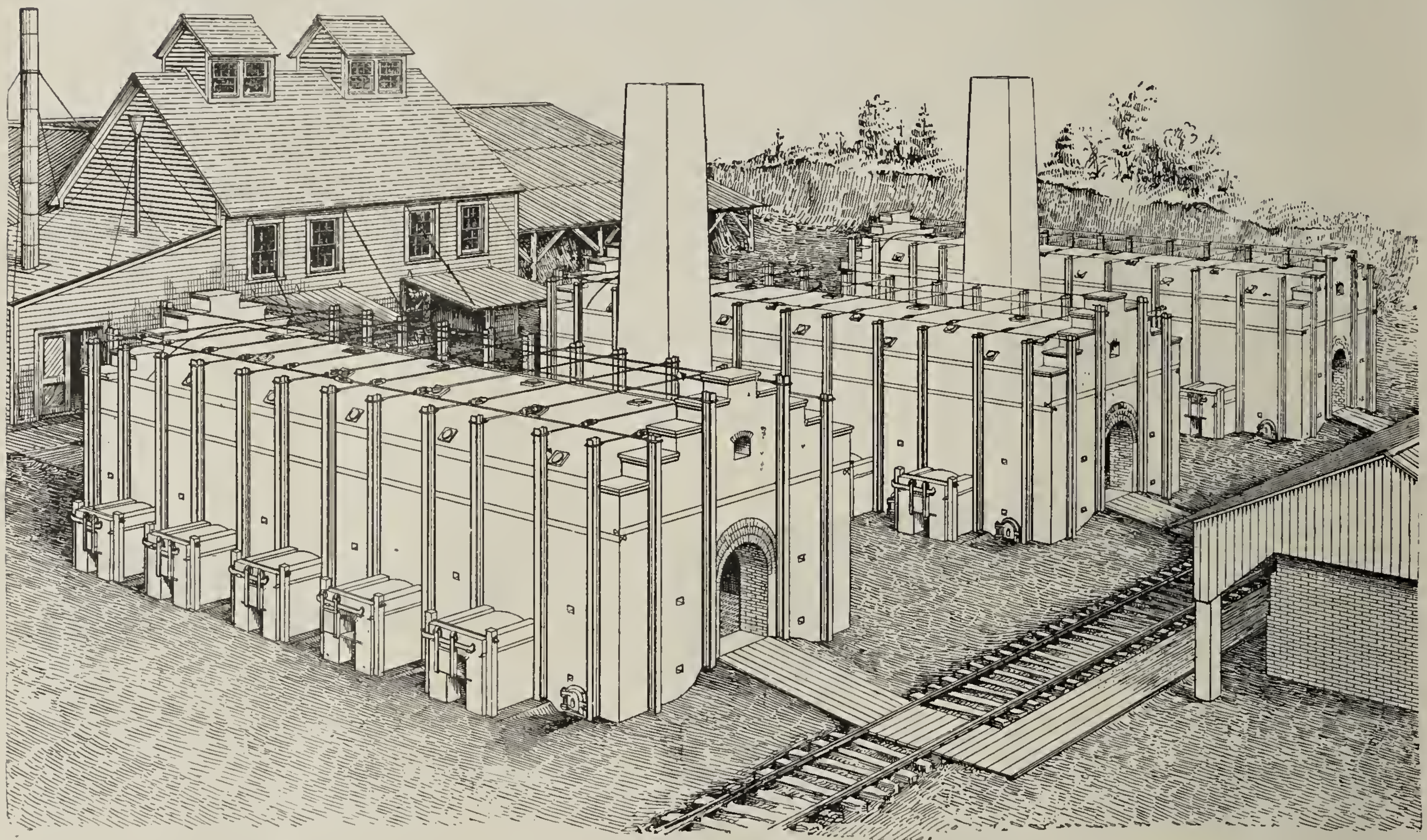
A Modern Brick Plant

As Arranged and Equipped by us with

The Boyd Brick Press,
The Flood Kiln and
Up-to-Date Clay Preparing Machinery,

WILL MAKE 95 PER CENT. HIGH GRADE BRICK IN REGULAR EVERY DAY WORK.



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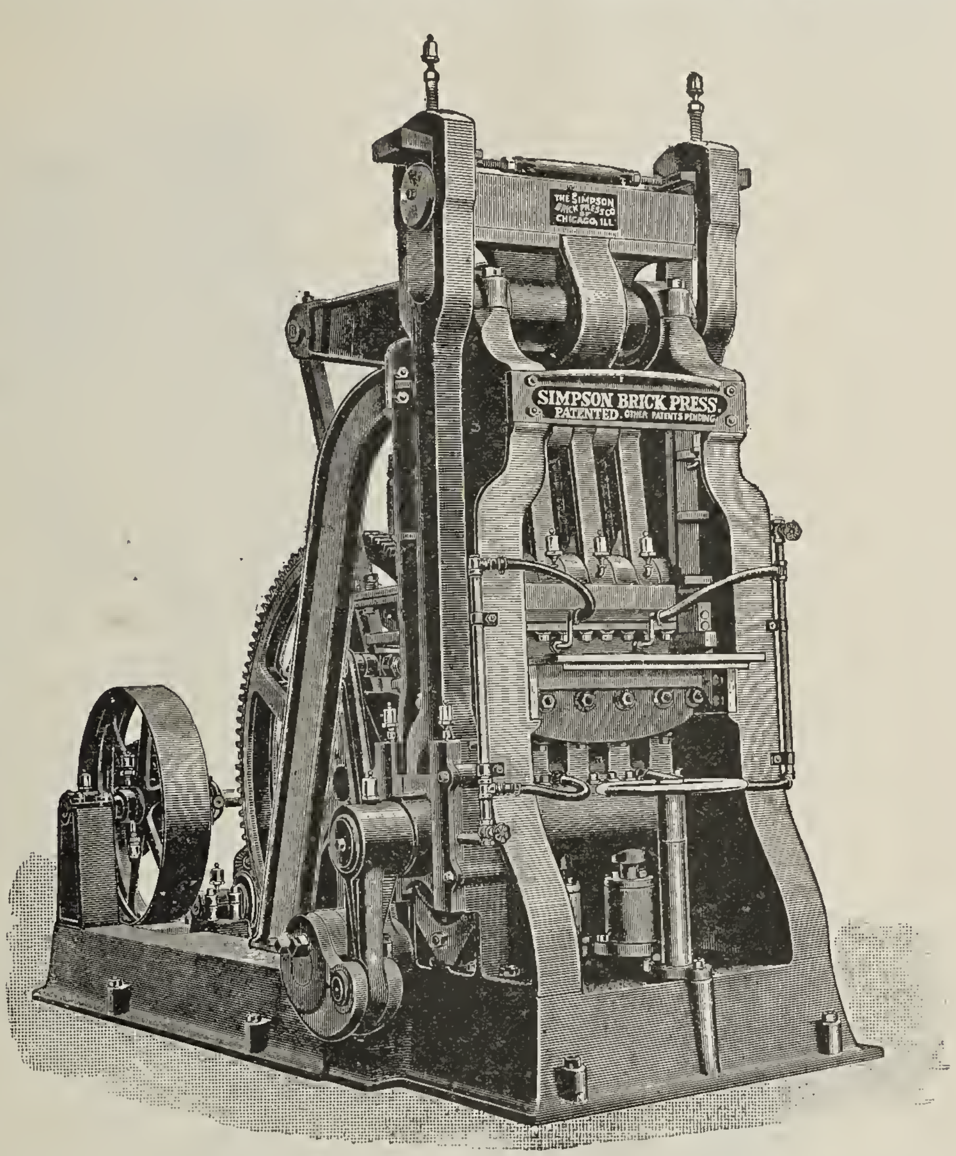
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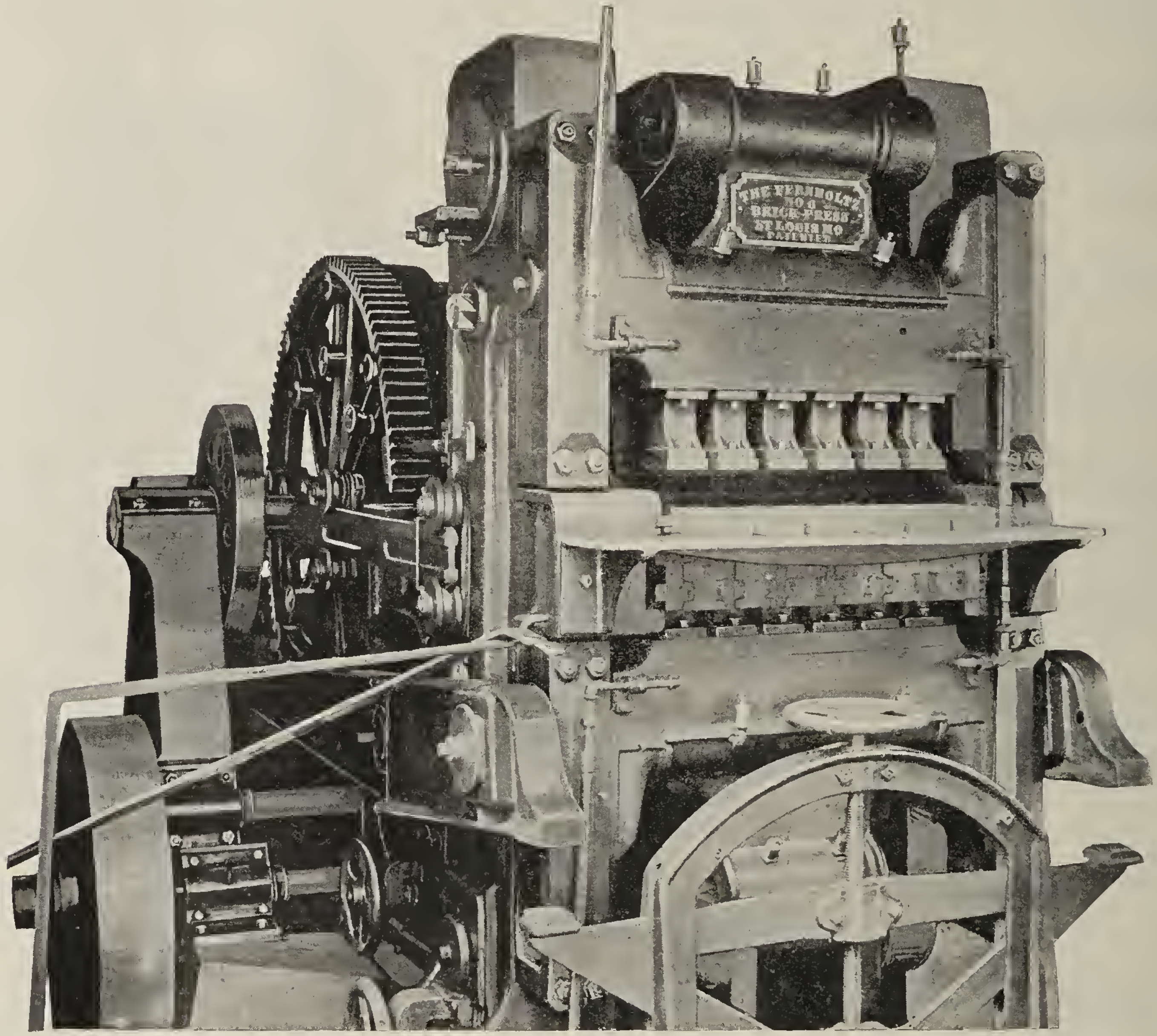
A Combination that Comprises the Essen-

THIS press is the result of fifteen years of practical experience as a successful press brick and press brick machine maker, backed by inventive and mechanical talents of a high order. It is unequaled for strength and easy running, requiring only 6 to 7 horse power to operate the largest 6 mold press. All the parts subject to strain are made of the best bessemer steel and every part can be seen and got at easily. The thickness of the brick can be changed or regulated without stopping the press, and every press is fitted with the Fernholtz mould which is generally admitted to be the best mold in use. For fine pressed and ornamental brick this machine is unequalled, the pressure on and movement of the clay in the mold being such as to prevent granulation and insures the most perfect product possible.



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We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

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Myers Balanced Up and Down-Draft Kiln

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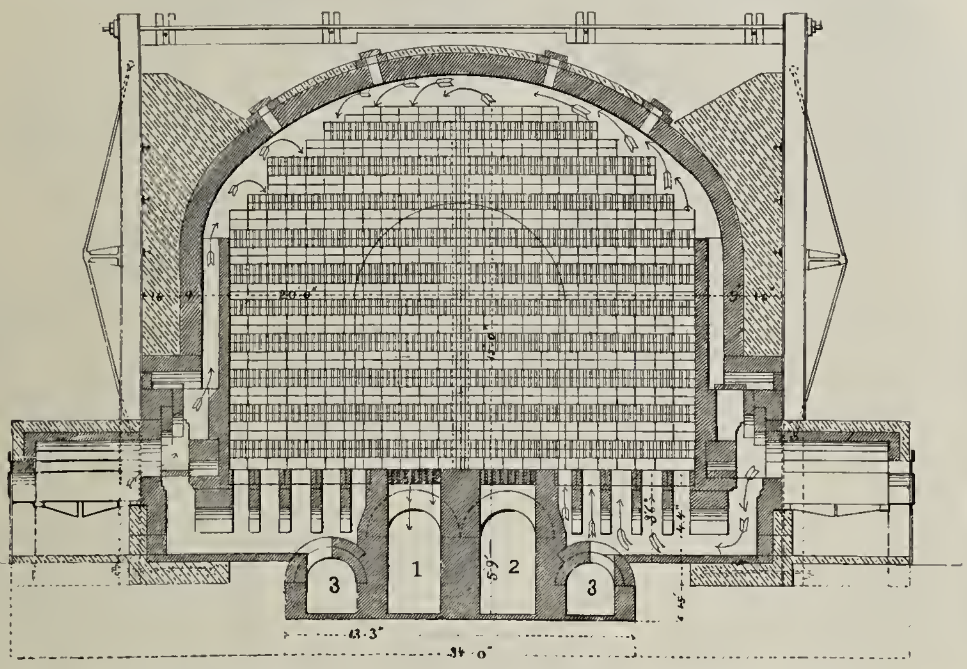
AFTER pressed brick are made, be they never so fine, they must be well and thoroughly burned or the material, time and labor involved in their production is wasted. How best to burn pressed brick is therefore a vital question. We answer it confidently and offer the trade the **Myers Balanced Up and Down=Draft Kiln** which embodies the surest, best and most economical method of burning yet developed. By a system peculiar to this kiln the draft is under complete control at all times, and a large part of the heat goes through the brick to be burned twice and there is consequently a great saving in fuel and a larger per cent. of first quality brick produced than is possible in other kilns. By our system, the escaping heat from a cooling kiln can be utllized to dry off and partially burn a green kiln. The brick may be dried off or watersmoked with an Up-Draft and finished with a Down-Draft. Thus the top brick are not over-burned in getting the bottom brick hard, as is usually the case with down-draft kilns. And vice versa, the bottom brick need not be overburned or melted to get the top brick hard as with up-draft kilns. In no other kiln can the burner controll the heat at will as in the Myers kiln, in which the fires can be reversed as often as desired during the burning of a kiln. We are prepared to prove in a thoroughly practical and satisfactory way that our method of burning pressed brick is at once **the best and cheapest.**



No. 1 Damper to Stack Open. No. 2 Damper to Stack Closed.
No 3 Hot Air Flues leading to next Kiln closed whilst burning.

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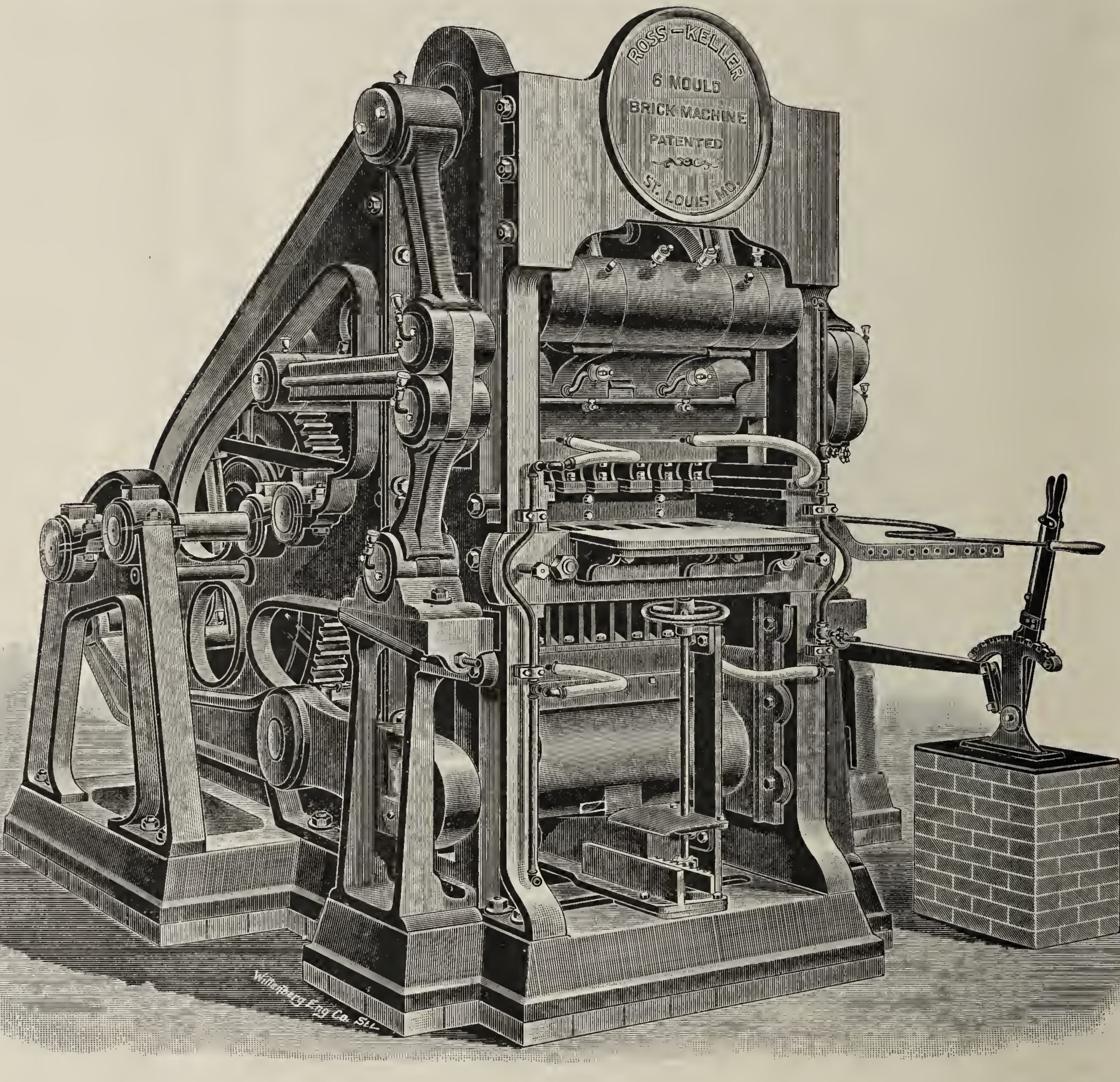
Manufactured in four and six-mould sizes. Weight of four-mould machine 58,000 pounds; capacity 24,000 brick per day. Weight of six-mould machine 75,000 pounds, capacity 36,000 brick per day.

BRICK SET IN KILN DIRECT FROM MACHINE.



The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

If you want the best come and see us, or write for price and full particulars, address

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All working parts are made of Steel.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

The pressure is absolutely equal on top and bottom of brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

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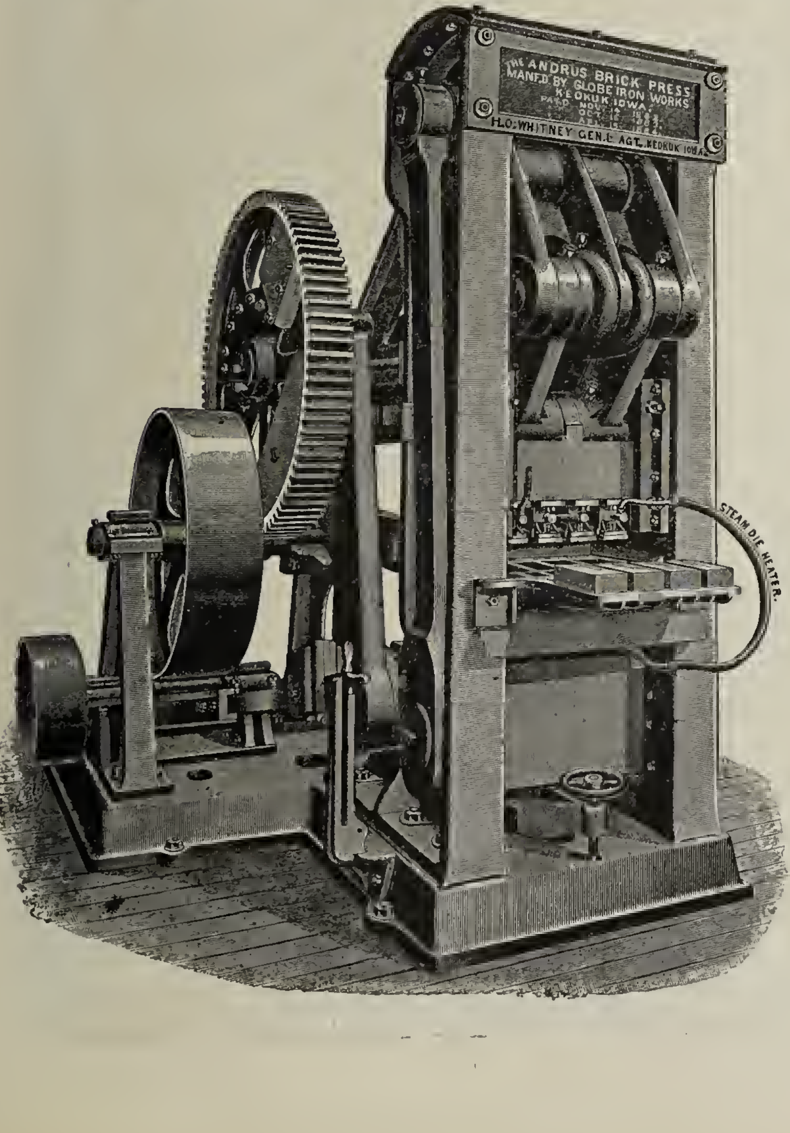

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They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . .

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A Good Investment!

That's how Mr. Florey regards his purchase, as a perusal of his letter below will show, and he but voices the sentiment of **all users** of

The Standard Improved Brick and Tile Drier.

Downingtown, Pa., October 25, 1895.

THE STANDARD DRY KILN CO., Indianapolis, Ind.

Gentlemen:—I have been operating one of your improved Natural Draft Driers about two months now and have given it a very thorough test. After getting the temperature and drafts regulated to suit my clay, it hasn't given me a particle of trouble; in fact, has been running along nicely ever since. My clay checks and cracks very easily, but I have no difficulty in drying my brick perfectly in your Drier.

I use the Chambers Stiff Mud Machine and make 35,000 brick every day. The Drier takes care of them nicely, and I have never had to set a wet brick.

I look upon the purchase of your Drier as one of the best investments I ever made, and cheerfully recommend it as the least complicated, and in every way the most practical device of the kind I know of. It is costing me 25 cents per thousand for coal to run the machinery and dry my brick.

Yours truly,

JAMES FLOREY.

Its adaptability to the drying of all kinds of clay and all varieties of clay products and the further fact that it is **no experiment,** but a **proven success,** makes it the **popular Drier** of to-day. If you have this subject under consideration, our 110 page catalog will surely interest you.

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The STANDARD DRY KILN CO.,

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THE CLAY-WORKER

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXVI. INDIANAPOLIS, IND., JULY, 1896. No. 1.

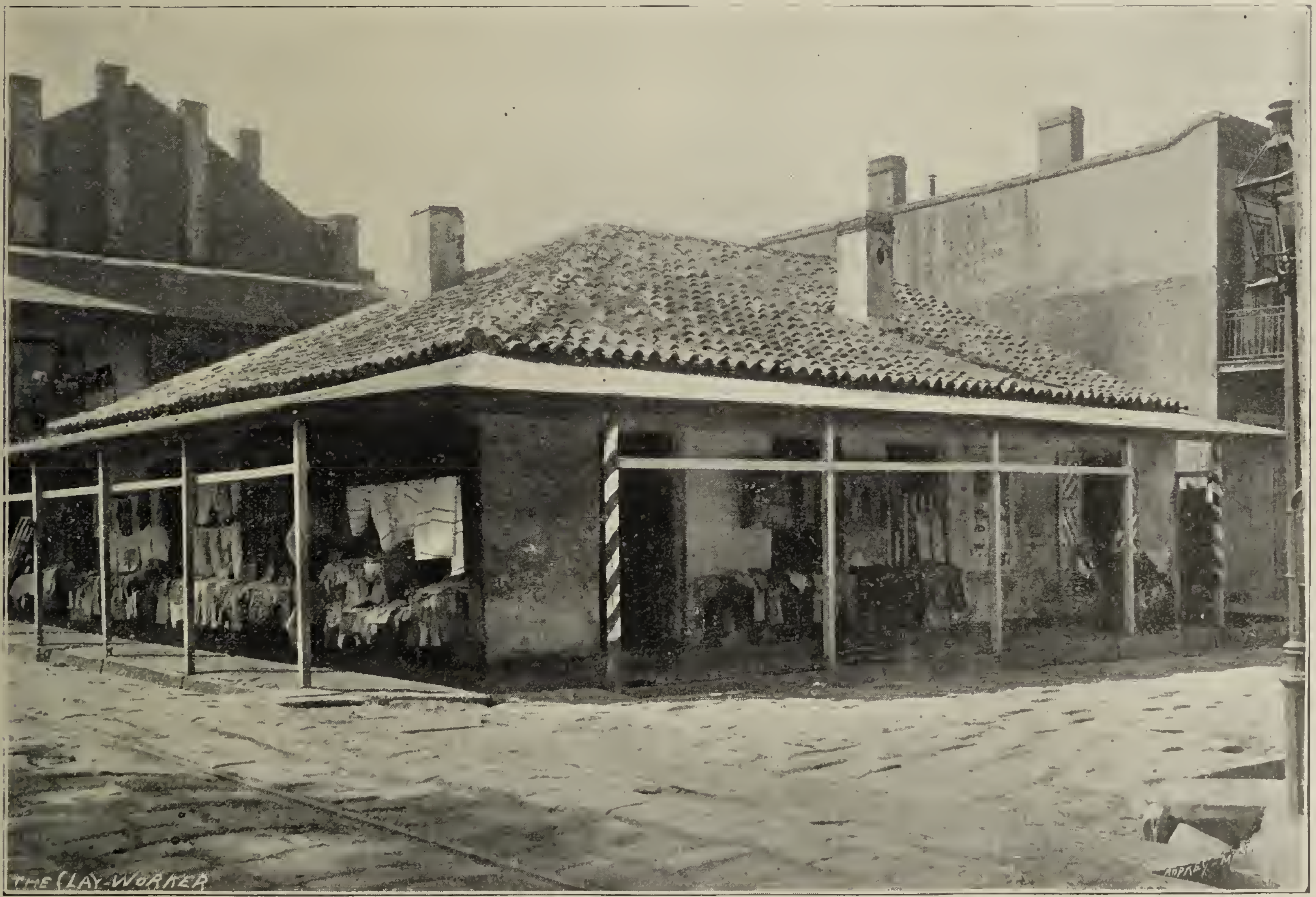
Written for the CLAY-WORKER.

ROOFING TILE—THE PLANT.

SUFFICIENT STUDY is not given to the arrangement of machinery in clayworking factories, and proprietors often find that they "have done those things that they ought not to have done, and left undone those things they ought to have done." Frequently the dry pan is so arranged in the building that the dust from it spreads to every department, even the engine room, covering the cogs of the wheels and penetrating the boxes, making the machines run hard and fast wearing them out; falling on the belts, it causes them to slip and decay, and attacking the engine, it causes the wrist to heat and the ways and cross head to wear rapidly. It shortens the life of machinery and the lives of the workmen. What is the remedy? We would have the dry pan, screen and pug mill in an annex to the main building, with partitions between, either of brick or double boarded with paper between, and with no doorways or beltways between. The driving shaft may extend through a partition wall, and where the belt and friction clutch pulley can be protected from the dust. The engine should be located on the opposite side of the line shaft, and should inclose the driving pulley on the line shaft, so that there shall be no beltways for the passage of dust from any other department into the engine room.

—Shrinkage of Clay.—

On account of the shrinkage of clay in drying and at dif-



A TILE ROOF, Probably a Hundred Years old, in the old French Quarter, New Orleans.

ferent degrees of heat, the ware is molded from one-eighth to one-twelfth larger than the pattern desired. For all salt-glazed goods, sewer pipe, stoneware, etc., which are burned to the point of vitrifaction, one-eighth is usually added for shrinkage, and for all earthenware goods one-twelfth. This does not always produce the right size, for clays vary so much in this respect that some have scarcely any shrinkage and others will lose one-sixth of their dimensions. It is, however, so commonly correct that rules are made for the use of terra cotta workers of one-eighth and one-twelfth added for shrinkage. Many difficulties arise from the shrinkage of clays. In the making of large pieces of terra cotta, ground fire brick, glass and burned clay are mixed with the plastic clay to diminish the shrinkage, but we can use no coarse material for roofing tile. It is a matter of first importance that the pattern of tile that we propose to make shall be of such a form that it will shrink uniformly. If it is not, many will crack in drying and many be so warped that they would be unfit to lay on a roof. Every drain-tile maker is familiar with the fact that if the core of his die is out of center, making the tiles thinner on one side than on the other, the tiles will all be uniformly curved. So a pattern of a roofing tile may be made so that the clay, in drying, notwithstanding that it molds and lies well upon the pallet, will warp uniformly and be unfit for use. A potter knows that a flat bottom crock is liable to crack at the center, or where the bottom joins the cylindrical part. To prevent this he makes the bottom concave on the outside and convex on the inside. The corners are slightly rounded. It has been found by carefully conducted experiments that sharp corners greatly weaken a casting in iron, and no doubt this is also true of moldings in clay. The shrinking of iron has the same effect upon a casting that the shrinking of clay has upon a molding in clay. You cannot make a large body of cast iron and make it solid at the center. It is so with clay. You cannot cast a heavy flange along the side of a cast-iron pipe and have the pipe straight, nor can you mold one in clay. You cannot cast a disproportionately heavy flange on the side of a flat plate of cast iron without its warping in cooling. It is so with clay. A casting will tear itself apart in cooling if it is not made so it will cool somewhat uniformly. It is so with clay. While the iron molder has simply the contraction of the metal in cooling to contend with, the clayworker has the contraction in drying and burning, the effect of heat upon the water in the clay and the cooling of the ware. It seems like a simple matter to make a good pattern for a roofing tile, but it is much more difficult than it appears. Many pretty designs have been abandoned because they could not be profitably made, not being designed with a knowledge of the art of clayworking or in accordance with its principles.

—The Plaster or German Method.—

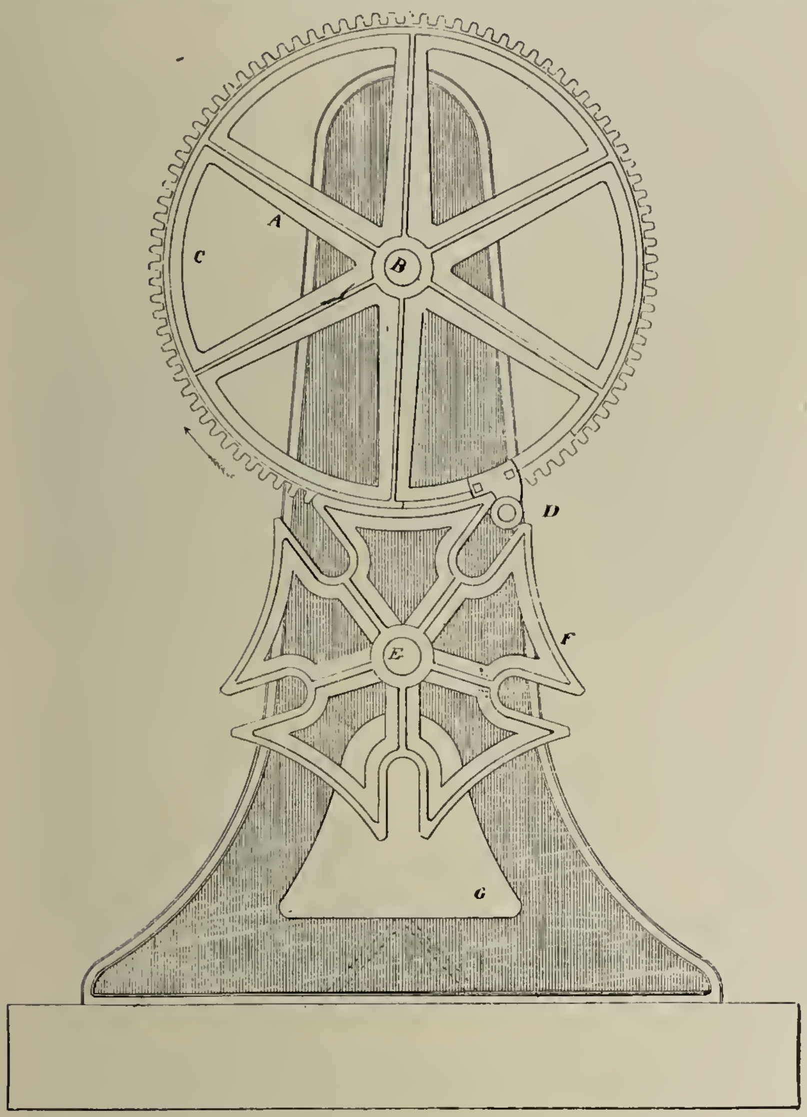
Having decided upon the form of tile you wish to make, have a good woodern pattern of it made, allowing one-eighth of an inch to the foot for the shrinkage of iron, and to that amount one-twelfth or one-eighth for the shrinkage of the clay. Add also to these dimensions sufficient for finishing to a smooth and true surface. As in the making of patterns to be cast in iron, the pattern maker must know how they are to be molded, what parts of the pattern lie in the upper and which parts in the lower flask, so that he can make draft in the pattern, so it is in this case. As much draft should be given as possible without detriment to the form of the pattern. But the certainty with which the freshly molded tile drops from the lower mold on to the pallet depends not only on the drafts, but the position the tile has in the lower mold when pressed. It is common to make the molds so that one-half shall be in the lower and one-half in the upper mold; but it may be better for some patterns of tile to have the parting at the upper surface on one side and at the lower surface on the other. It is a matter of judgment which may be improved by experience. Have two castings made from your pattern and finish the upper surface of one and the edges down to the lines of parting, and the lower surface of the other and the edges up to the lines of parting. These are to be imbedded in cast-iron flasks to their lines of parting, the edges of the flasks made to meet the same horizontal plane of these lines of parting. There should be about three-eighths of an inch between the flasks and the edges of the pattern, which may be filled with lead. These two flasks, with their imbedded patterns, make what is called by the Germans the "mutter" forms. The upper and lower forms of the press are molded on these "mutter" forms. It will be seen that if a mold in plaster in a suitable flask is made from the mother form that shows the lower part of the tile in relief, and another is made from the mother form that shows the upper part of the tile in relief, and the two molds are attached to a press with soft clay between, and are forced together, an exact reproduction of the iron pattern would be made in the soft clay. The form that molds the upper surface of the tiles is attached to the upper part of the press in order that when the tile is inverted its flat surface may rest upon the pallets.

The writer has seen the flasks filled on the mother forms by simply pouring fluid plaster through holes in the bottom of the flask and by putting plaster on the mother form and on the flasks, and, when partially set, putting them together and pressing them until the flasks meet the mother form. I think this is objectionable, because plaster should not be disturbed after it has once begun to set. The German manufacturers have small screw presses, which they sell with their tile presses for the purpose of pressing the plaster in the forms.

The durability of the plaster molds depends upon the fineness of the clay used. Coarse, sharp particles in the clay cut the plaster and soon destroy the mold. From what the writer has seen he would judge that from four to six hundred impressions would be the capacity of a plaster mold, and that it would require a good workman, with convenient appliances, to keep the molds of two cylinder presses in order. The cost of plaster, wages of workmen and loss of time in filling the molds amount to a considerable sum. We believe that more difficult forms of tile can be made with plaster molds, on account of their porosity, than it would be possible to make with metal molds; but if the form of tile that you wish to make can be made with certainty on metal molds they would be much more profitable to use. We would not pass judgment on the relative merits of the two modes of working, with plaster or with metal molds, for both have been used many years by manufacturers who make first-class ware. The blanks of soft clay are made without much reference to the form of tiles into which they are to be pressed. Thus, a tile 9x16 inches may be pressed from a blank 2½x4x12 inches. The clay is used quite soft, in about the condition a potter uses it on the wheel.

We cannot close this article more appropriately than by giving a brief description of the German machine as manufactured by the principal manufacturers in Germany. While differing in detail of no very great importance, they all have the distinguishing feature of a pentagonal cylinder, operated by a five-arm cam keyed to the same shaft. We have made a drawing of an elevation of a German machine in part, in order to show this ingenious and very useful device. To the heavy shaft E is keyed the pentagonal cylinder, carrying on its faces the five molds. Shaft B is a double crank between the bearings which gives the necessary pressure. A large cog wheel, A, is keyed to this shaft. On the side of this cog wheel is a cylindrical flange extending about four-fifths around the wheel, and about midway between the ends of the flange is fastened a casting carrying a friction roller, D. Motion being given to the wheel A, the friction roller D, moving in the slot of the cam F, turns the cam one-fifth of the way around and leaves it. The curved flanges of the cam strike the circular flange, C, on the driving wheel, and the cam and also the cylinder are held in correct position while the tile is being pressed, and the wheel revolves until the roller D enters the next slot in the cam F, and again turns the cam and cylinder one-fifth. We would like to know the name of the inventor of this ingenious device that we might give him credit, for we fear that his honors have been appropriated by some stock company or by the firm of "Ketchem, Cheatem & Co."

GEO. S. TIFFANY.



Mechanical Movement in German Roofing Tile Machines.

Written for the CLAY-WORKER.

BRICKS OF ANCIENT ROME.

BY JOHN BLACK.

THERE IS NO COUNTRY in the world that has derived greater benefit from the civilizing influences of the ancient Romans than England, and in no department of modern British industry is this more clearly illustrated than in the handicraft of the builder. It would be difficult, of course, to recognize much in common between the complicated operations involved in the construction of houses nowadays and those which were in vogue among the Romans two thousand years ago, but what has been called the "root idea" of nearly everything now accomplished in the building world is traceable to the early instruction we derived from that people. In the whole range of architecture, from our finest marble carvings down to our coarsest brickwork, both the historian and the archaeologist show the depth of our indebtedness to them for all the knowledge relating thereto that we originally possessed. From the point of view of mere utility, however, the most lasting and beneficial service they rendered in this way consisted in their

—Introduction of Bricks Into England.—

And not the least remarkable circumstance in connection with this innovation is the fact that the bricks of their manufacture have never since been excelled, in point of durability at least, by the finest production of the modern brick field. A word or two, therefore, about the methods of making and using them in ancient Rome may not be uninteresting.

It may be stated, in the first place, that the origin of the brick is involved in as much obscurity as the origin of the earth of which it is composed. It is known that the Romans first acquired the art of producing it from their more cultured neighbors, the Greeks, who, in turn, had derived their knowledge of it from the Phoenicians, through whom, it is believed, the invention may be traced to Egyptian sources. How much further back its pedigree extends it would be idle to conjecture; but it is alleged, as everybody knows, to have figured with considerable prominence in the construction of the Tower of Babel itself.

Be this as it may, bricks were extensively used by the Romans from a very remote period of their history, but both in quality and structure they were, for centuries, essentially dissimilar to anything with which we are now familiar. In the earlier stages of their Roman development they were either sun-dried merely or used whilst still in a moist condition, for it was not until the time of Julius Caesar that the practice of employing kiln-burnt bricks became popular. It may be thought, perhaps, at first sight, that the sun-dried variety could scarcely be a very durable or satisfactory building material, but the fact that the walls it composed have, in many instances, stood intact for over a thousand years is a sufficient proof to the contrary. The conditions of the Italian climate might, in some measure, account for this, but the elaborate—the almost painfully laborious—processes to which the clay was subjected before it was molded into shape were doubtless the true causes of this age-defying characteristic. No baker ever took more painstaking care in the preparation and kneading of his dough than the Roman brickmaker displayed in the manipulation of his clay.

—The Careful Preparation of Clay.—

Whether the substance he worked upon was pure clay or any of the marl or loam descriptions of it, so common among ourselves, his first care was to see that it was most carefully selected. Then, after various washing and sifting operations, it was beaten and pounded, either in stone mills or beneath the feet of oxen, until it had acquired almost an elastic consistency. Following this, it was turned over and over again, so that it might have the fullest exposure to the weather, and was subsequently mixed with dried rushes, straw or hair; then, finally, it was molded, compressed beneath enormous weights and exposed to the sun to be dried. Recent research has shown that bricks made in this way were extensively used, not only in Rome and Greece, but in Egypt and in the plains of the Euphrates, even as late as the Christian era, and consequently long after the kiln-fired kind was known. With the exception of the compressing and sun-drying operations, the class of bricks that were employed in building when still in a raw, moist condition were prepared in a precisely similar manner to those already described. They were set in the wall,

—Without Mortar or Cement—

Of any kind, and each course adhered so perfectly to the one immediately beneath it that the whole building, when completed, became one solid, homogeneous mass. When such structures were faced with a coating of fine stucco—as they almost invariably were—they became as hard and as durable as stone itself. It may be worthy of note that in some rural districts in Ireland, and, indeed, in England, where stone is scarce, some very inferior imitations of this curious masonry are still attempted, but they are as mud hovels in comparison with the stately edifices erected by the Romans. What may yet be accomplished, however, with the sunburnt composite bricks that have recently attracted some attention in this country remains to be seen.

When the efficacy of the kiln-burnt brick began to be recognized it was found that much of the immense labor that was formerly required in preparing and refining the clay could be profitably dispensed with, and that under the influence of the furnace coarser and more easily obtained earths became just as suitable. It was the discovery of this double advantage, not to mention the greater rapidity with which they could be baked, which led to the artificially burnt brick superseding to the sun-burnt and the moist. With its introduction there came simultaneously a considerable improvement in the cement used in Rome. This had always been of an excellent quality and was variously composed of blended compounds, of such ingredients as lime, lava, sand, clay, bitumen and pulverized marble. But, at this particular period, a fresh element—some powerful kind of size, the nature and composition of which is, unfortunately, wholly unknown to us—began to be employed, which literally welded the bricks together as firmly as if they had been fused. It must not be supposed that the brick buildings of the Romans, or their combined brick and stone houses—for they were sometimes in the habit of uniting the two substances in one edifice—bore much resemblance in outward appearance to ours. Structurally they were very similar, no doubt, and embodied as many different plans and architectural styles, but the extreme beauty and delicacy of the stucco work —often of the most artistically variegated tints—with which the richer classes decorated the exteriors as well as the interiors of their houses, gave them a superbly imposing appearance, of which we have but a vague conception, vague because none of our finest samples of this process of decorative work are at all comparable to the surpassing beauty of theirs.

To such perfection did they bring this art of mural enameling that for several centuries it was considered preferable, ornamentally, to the polished marbles in which their country so richly abounds. Its preservation, also, of the walls it was applied to gave them much of the strength of solid marble.

It may be mentioned as a matter of curiosity that the size and shape of Roman bricks were not of a uniform standard. In some instances they are found eighteen inches by twelve square, and from two to six inches in depth; in others they are seen to be smaller, but they are always square, oblong or triangular in shape. In whatever country they are found, they rightly convey the impression of possessing great strength and endurance, and their symmetry is always perfect. But notwithstanding this, it is regretable to have to record, on the testimony of more than one contemporary historian, that the "jerry-builder" flourished and fattened in Rome as he probably has in every other civilized country since. It requires some effort of imagination, however, to believe that he had a place among the mighty builders who created the architectural splendors of Rome, who founded the colony of Londinium, and who erected the colossal walls which still stretch in a fragmentary condition from the Clyde to the Forth and from Solway to the Tyne.

Written for the CLAY-WORKER.

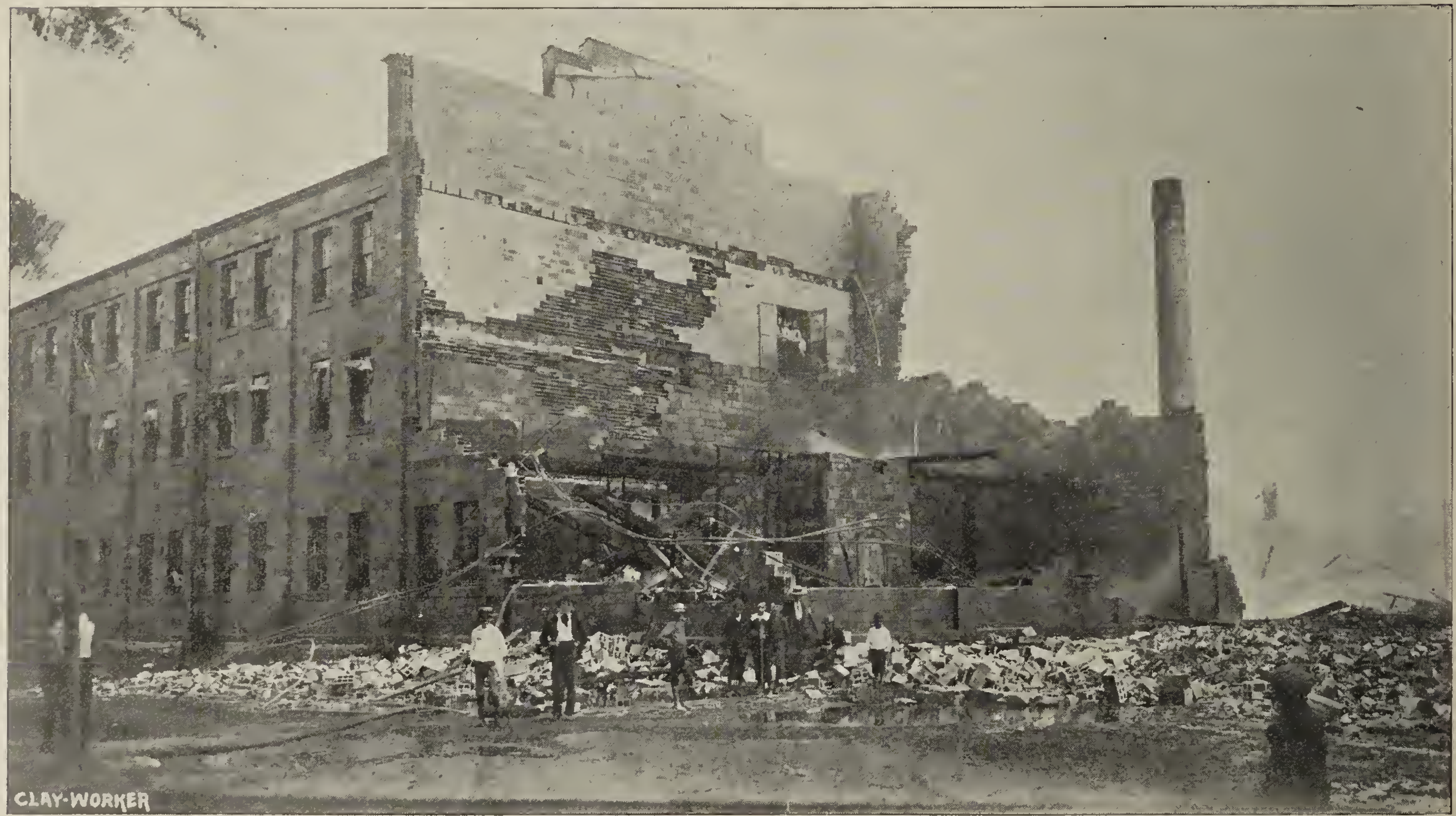
HOLLOW TILE AS A BUILDING MATERIAL.

WITH THE ADVANCEMENT of civilization comes the advancement of building. The history of the human race is best studied in connection with the study of architecture, and as we grow older we grow better, live better and pay more attention to our dwellings and thereby our health.

Healthily constructed houses, factories and shops are now demanded. The architect of to-day pays more attention to the heating and ventilation of his buildings than formerly. The people demand it. And it is well so.

The manufacture and use of hollow tile building ware has made possible the building of cheaper and more healthily constructed buildings. It is now possible to construct a building that will have a dry basement, more healthy dining rooms, at a less expense than before. Factories are constructed of this material that are dry and fire-proof. The people should become better educated to its benefits and uses, and it is for this purpose that this article is written. Hollow brick is not an experiment. It has been tried and found to be a success.

In writing on this subject the writer takes it for granted that the reader is more or less familiar with the use of hollow tile as a protector against fire of steel beams and columns used



ORGAN FACTORY SHOWING EFFECT OF FIRE ON HOLLOW BLOCK.

in the construction of the noted office and public buildings that have been erected in this country during the past sixteen years or more. This method of fire-proofing has advanced to such an importance that it is a very rare exception if a building of the class mentioned above has not this method of fire-proofing in its construction.

A Factory Built of Hollow Block.

However, this article will deal more on the use of hollow tile building blocks as a material for the construction of buildings to be used as dwelling houses, offices and shops. In some parts of Ohio, and more especially in northern Illinois, this material is used for the purposes above specified, and, we find, gives the best of results, and is rapidly becoming a much appreciated material.

A building is considered as being much more stable if constructed with hollow brick walls than if constructed with solid walls, besides possessing other advantages in regard to dryness and fire protection. Hollow tile wares are now made that combine these advantages, and also have the advantage which is now considered first, namely, that of cheapness.

The foundations of these buildings of which I speak are made of 8x8x16 semi-glazed tile, laid up in regular courses, selected as to color, in cement mortar. Each tile is manufactured with cross-webs, making each piece of great strength and solidity.

A specially designed tile, with molded edge and drip, under eight inches deep, is made for a water table course, with one and a half inches extension beyond the face of wall; wash, 1½ inches.

The girders carrying the floor joist are carried on pilasters of 16x24-inch tile, built at regular distances, which also form a part of the outside wall, adding greatly to the architectural effect. Girders are anchored to the wall with strap iron anchors. The ends of the joists, where they run into the wall, rest upon tile corbels formed of the same sized tile, extending from the wall four inches.

A special tile for window sills is made with the proper wash and drip, somewhat similar to the water table tile. For the jamb tile of the window openings a special tile is provided, allowing the usual four-inch reveals for window weights.

Various architectural effects can be readily obtained by tile made for belt courses, frieze and round corner tile, and factories will make special tile from drawings submitted by the architects if desired.

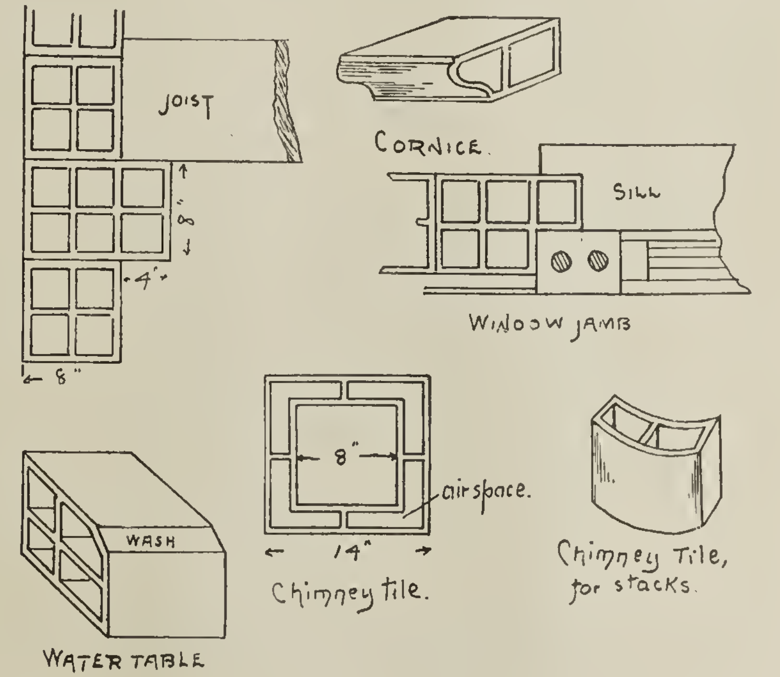
By means of this hollow ware a chimney much lighter and cheaper than a brick chimney can be built. For the building of chimneys a tile 5x12x12, with a proper radius, conforming to the proposed diameter of the chimney, is made, the tile being locked together with iron clamps. The air space necessary in a large chimney is had with the hollow ware. For chimney tops special tile are provided to relieve the monotony of the straight sides. A number of these chimneys have been built, and all give the best results. A tile now made and used as a chimney tile is being well received. The tile is made in one piece, with four air chambers, and can be rapidly set in place. The interior flue is 8x8, and the tile measures 14x14 on the outside. It not only acts as a flue, but the chambers on the side act as ventilators, that can be used by openings in the rooms. This does not interfere in any way with the flue draughts. Tile for the linings of brick chimneys are also made and largely used. A large percentage of fires are caused by defective flues, but this danger can be greatly lessened by the use of these clay flue linings. Tiles of various shapes and sizes, for uses that I will not take space to mention, are made, such as capping tiles, skew backs, etc.

Very severe tests have proven that vaults can be built of this building tile. The writer recently observed the burning of a large factory, where a vault built of this material rigidly stood the intense heat for several hours, and upon examination the papers and books were found to be untouched. The vault was built with a double wall of 8x8x12 tile, with a two-inch air space between, with the usual fire-proof vault doors. Upon the rebuilding of the factory this vault was increased in size, but the old vault was used and added on to, thus showing the confidence of the architect in this material as a fire-proof material.

The fire walls in this building were also built of this material, used in the same way as the building of the vault, and stood the test. The outer wall, next to the fire, scaled where the water struck it, and the outer shell of the tile fell away in places, but the damage was so slight that the wall was used in rebuilding.

The manufacture of this ware is a very interesting study. The writer recently visited the large plant of the Pioneer Fire-proofing Company, at Ottawa, Ill., and observed the making of this ware, which may be described as follows:

The hollow tile is made of fire clay as a base, which is delivered to the factory by clay cars, hauled over an electric tramway, from the beds, located about two miles from the factory, and dumped into the clay cellars, which have a capacity of 1,000 tons. It is then conveyed to the crushers, where, after being crushed, it finds an outlet in the side of the pit, and is caught up by the elevator cups and carried to the top of a seventy-foot tower. It is then screened, and, passing through a chute, is conveyed again to the ground floor, where it is tempered. This tempered clay is again elevated and distributed to the steam presses, which consist of a steam cylinder, thirty-six inches in diameter, placed in a perpendicular position, acting directly by means of a plunger head on the eighteen-inch diameter clay cylinder below, thus forcing the



Hollow Block Construction.

clay through the dies. The tile is cut the required length and trucked away to the dry rooms. These dry rooms are all made of the four-inch hollow tile, as are also the chimneys and the other buildings.

The works are operated by water power equal to 125-horse power. A large boiler plant furnishes heat, and also furnishes steam for the steam presses. The entire works and grounds of the company are lighted by electricity. Each tile is subjected to a pressure of 240 pounds per square inch in the damp state.

The clay bank shows a first stratum of loam, a second stratum of shale, a third stratum of two feet of coal, and, fourth, a twelve-foot vein of fire clay, with outcroppings of a very good quality of potters' clay.

In the manufacture of this ware it is very evident that clays of great strength should be used, and clay that will vitrify partially at a not very high temperature. The following is an analysis of the clay used by the Ottawa Company, made from samples submitted to Prof. G. A. Warner, of Chicago:

	Sample A.	Sample B.
Silica	45.79 per cent.	52.26 per cent
Alumina	22.44 per cent.	33.47 per cent.
Iron Oxide	trace	4.51 per cent.
Lime	6.35 per cent.	3.01 per cent.
Magnesia	9.00 per cent.	2.91 per cent.
Carbonic Acid	11.51 per cent.	trace
Moisture	.92 per cent.	2.74 per cent.
Potash, soda and loss	3.99 per cent.	1.10 per cent.
	100.00 per cent.	100.00 per cent.

In building residences of this material we are aided in getting the unique architectural effect so noticeable in these buildings by putting on clay shingle roofs, with terra cotta ridge rolls and finials; also by placing molded panels of terra cotta in the gable ends and over the doorways.

In regard to crushing strength, I would say that it varies from 2,500 to as high as 7,329 pounds per square inch, material tested being in all shapes.

In building with hollow ware, in my experience, I find that there are few purposes where we now use brick, stone or terra cotta that the hollow ware cannot be used, and with many advantages in favor of the hollow ware.

JASON F. RICHARDSON, Jr.

PULMONARY SCLEROSIS OF PORCELAIN MAKERS.

THE STUDENT finds a curious study in the so-called trade diseases—painters' colic, e. q., the peculiar skin diseases of millers who carry bags of flour, the lead poisoning of the workmen handling the old-fashioned lead glazing for pottery, and so on—and now, in the published report of a late session of the French Academy of Medicine, there appears a paper under the above title.

The paper, by M. Lancereaux, is based upon a great number of observations made by Dr. Lemaistre, of Limoges, who points out, first, that the inhalation of dust of various kinds, mineral, metallic or vegetable, induces sclerosal lesions on the lungs, which develop under the clinic form of true pulmonary phthisis. He thinks that among the porcelain workers whom he had occasion to visit the coincidence of tuberculosis and of pneumo-coniosis is purely accidental, the irritating action of the dusts favoring only pulmonary phthisis. If the latter develops slowly it is not, as has been claimed, because the lung tissue is resistant, but rather because generally it is a question of persons of some age, among whom tuberculosis develops slowly. However, some observers note that phthisis develops frequently at a very rapid pace. The use of alcohol, also, by the workmen is found to be very injurious, those who drink much being the first to succumb to the disease.

It takes sixty-four days now to make a trip around the world, from London, via Bombay and Yokohama, San Francisco and New York, but when the great Russian railroad is finished through Siberia it will take only forty-four days.

Written for the CLAY-WORKER.

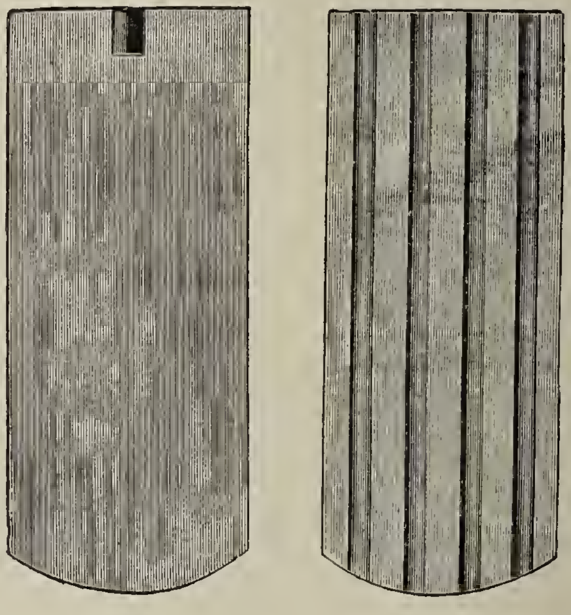
IN DEUTSCHLAND. No. 5.

German Roofing Tiles, and How They are Made.

AN AMERICAN CLAYWORKER traveling through Germany cannot help but observe with interest the roofing material almost exclusively used there, viz.: clay roofing tiles. One sees them in many various shapes, from the plain, flat, clay shingles, called beaver tails, to the elaborate interlocking roofing tiles. In some districts the tiles, in order to suit the popular demand, are glazed; in others, especially in Northern Germany, they are bluesmoked (see March Clay-Worker), but ordinarily they are simply burned out of red-burning clays, without being subjected to any other processes. The plain flat tiles (Fig. 1) and the so-called Dutch pan tiles (Fig. 1) are the oldest styles in use, being found on buildings built many centuries ago, and even at the present time they are most extensively used. The simplicity of their manufacture, the facility with which they are put on the roof, still endear them to makers and users, notwithstanding the fact that the modern interlocking tiles are far superior to them, giving tighter roofs, with less weight. However, the latter seem to come into use more and more. In describing the manufacture of German roofing tiles it will be well to divide the styles generally made into three classes, viz.: First, the plain, flat clay shingles, beaver tails and the pan tiles. These are largely made by hand, but machinery is being adopted more and more in their production, especially with beaver tails. Second, interlocking tiles, which can be made on auger machines only. Third, the real interlocking tiles, which are pressed out of slabs of clay on machines corresponding to our represses.

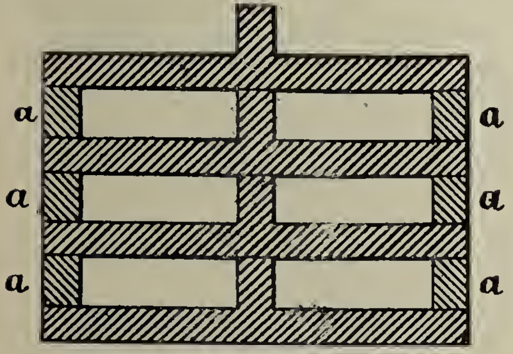
—Preparation of the Clay.—

Proceeding to describe the methods of manufacturing these tiles, we must first consider the clay used and its preparation. The clay used is not necessarily one specially adapted for this purpose, but ordinary brick clays are extensively employed. The main point to be considered is the shrinkage, for the more a clay shrinks the more it is liable to warp. For this reason it is endeavored to reduce the shrinkage as much as possible by reducing the plasticity, and this is accomplished by mixing grog or sand, or both, with the material if it is not nat-

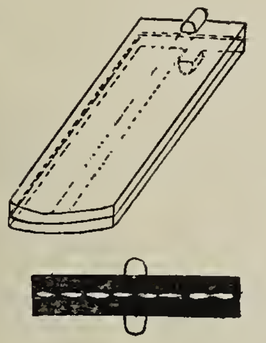


Plain Roofing Tile, (Beaver Tail.)

urally short enough. Of course, the amount of grog and sand to be added to a clay depends upon its physical constitution, and can only be determined by actual experiments. The economic question also plays an important part where grog and sand are not easily obtained, for not all kinds of sand are suitable for this purpose. We observed, as far as our observations went, that in factories where the greatest pains are taken to reduce the plasticity of the clay the manufacture is not only carried on with little waste, but the products, also, offer little difficulty in roofing, due to the straightness of the tiles, and hence they are more in demand than ware treated less carefully. We could cite a striking instance illustrating the truth of this statement, where two tile factories located at the same place, apparently using the same clay, differ in the mode of preparing the material, the one using grog and sand, and preparing the clay thoroughly, the other using some sand and paying less attention to working the clay. It is needless to say which one seemed to be the more prosperous. As to the preparation of the clay we can but quote the expression of the superintendent of a German roofing-tile works of our acquaintance, who says that the most thorough preparation is none too good for roofing tiles. In many factories the clay is dug in the fall, spread out in thin layers and allowed to freeze through the winter. In machine tileyards it is then run through several pairs of roller crushers or a wet pan, and tempered in one or two pug mills, or by passing it twice through an auger machine. The grog and sand are added to the clay before feeding through the crushers. Usually a spacious platform is constructed above the crushers, where the clay is spread out, mixed with the sand and grog and soaked with water, remaining in this condition from twelve to twenty-four hours. On hand tileyards the clay is nearly always weathered and prepared by spading, soaking and pugging. The latter process is generally effected in the well-known upright tempering mill, driven by horse power. Often, especially when the clay contains roots, it is trodden, a layer of soaked clay being spread out on an elevated sieve. A boy is engaged in tramping the clay through the sieve; thus all roots are left behind. In the hand process the sand is added before the soaking. In regard to removing roots from the material in machine yards, we have noticed that the openings of some pug mills were provided with sieves.



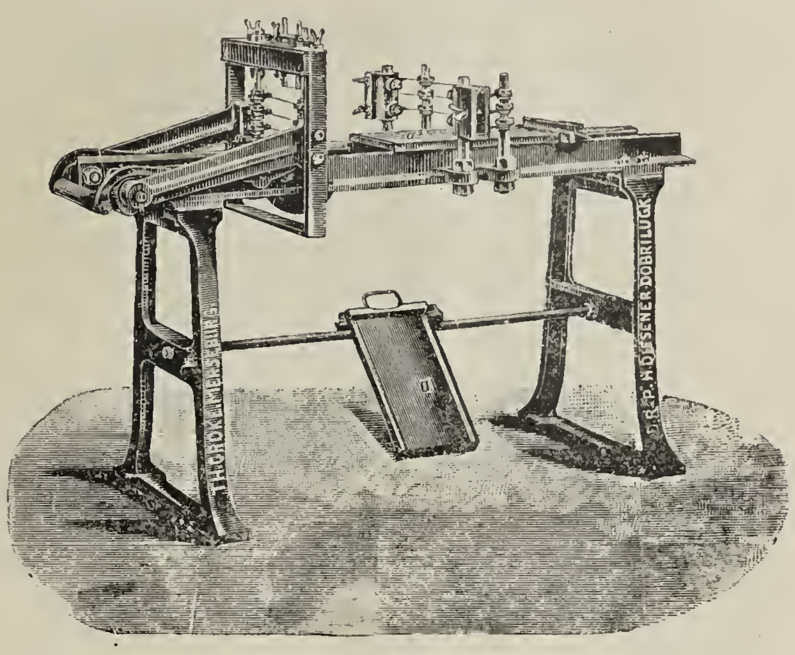
The Diesener System of Making Roofing Tile. Block of Four Tiles.



Block of two Roofing Tiles.

—Hand Molding of Roofing Tiles.—

The making of flat tiles by hand is a simple process. The first essential is a stout table, on which the molder performs his operations. Next of importance is the mold. This is simply a frame without a bottom, either iron or wood, having on the inside the shape and dimensions of the tile, its depth being just the thickness of the latter. Now a lump of the prepared clay is shaped into a block of about the size of the tile, from which a slab somewhat thicker than the tile is cut off with a wire. This slice is taken by the molder and thrown into the mold. The surplus clay is removed by drawing a sharp edged board along the edge of the mold, leaving, however, a portion of it at the straight end of the tile. This clay left over is shaped into a nib or nose used for hanging the tiles on to the laths of the roof. The tile is smoothed with the hands, with a liberal use of water. Now it is transferred to a sanded pallet and taken to the drying racks. The number of tiles molded by a man per day differs with different localities, but we believe that 1,200 tiles make about the average day's work. Care is taken to dry the tiles slowly, for too quick drying has a tendency to warp them. On hand yards, working only in summer, the drying is done in sheds by the natural method; on machine yards the tiles are always dried on drying floors above the continuous kilns, with steam heat as an auxiliary in winter time. When the ware is perfectly dry it is put into the kiln. The tiles are set on their long edges, as close as possible. Brick are generally used for the binding courses. The pan tiles are made in about the same manner as the flat tiles, only in molding they are finally pressed over a curved form, thus giving to them the curved shape.

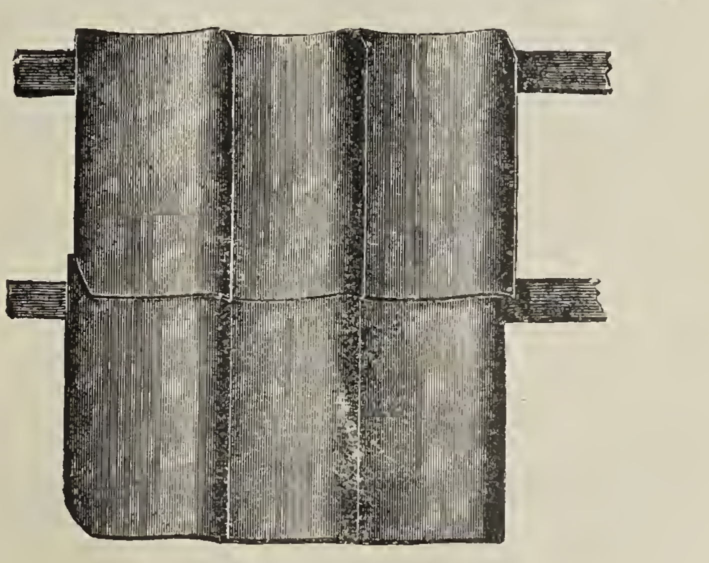


Diesener System. Cutting Table for cutting blocks into Tiles.

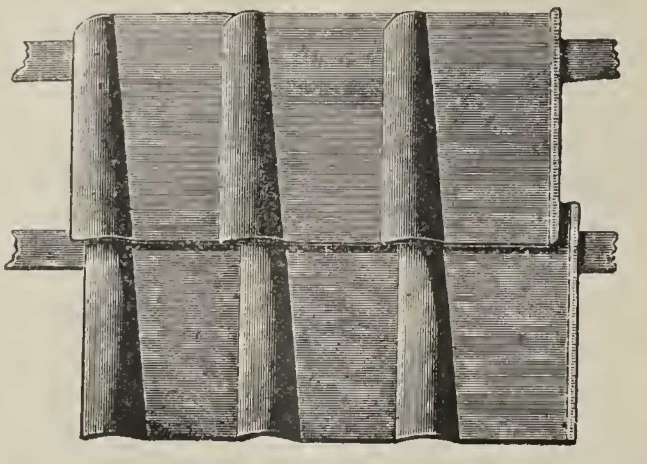
Fig. 2 represents a modification of the pan tile, called lap tile, which, however, is usually pressed out of blanks on a re-press.

—Flat Tiles Made by Machinery.—

The disadvantages of hand-made tiles are evidently their porosity and the fact that they warp easily in drying and burning. Consequently they cannot be burned hard without distorting more or less. Machine-made tiles, made on auger machines, being denser and made out of stiffer clay, do not possess these disadvantages in that degree, and the German tilemakers are gradually adopting the machine system. For making the flat tiles great progress has been made in invent-



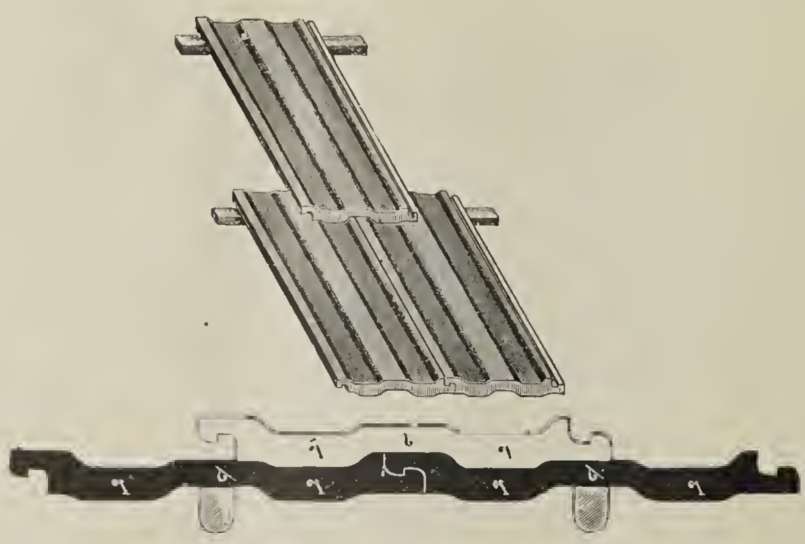
Dutch Pan Tiles.



Lap Tiles. (Kremp-Ziegel.)

ing systems by which the tiles can be cheaply made on a large scale, and almost perfect in regard to straightness, even if burned to vitrification. The flat tiles have long been made with auger machines, being run out in one or two columns, having a continuous rib on the one side. These columns are cut off on an ordinary cutting table into lengths corresponding to the length of the tile, which are taken to a table where the rib is cut off, leaving only a short portion of it on one end for the nib. This is done by means of a wooden fork with two prongs, between whose ends a wire is stretched. Cutting tables have been constructed which remove the ribs, so that the tiles are finished in one operation. A later improvement runs out a block combining two tiles (Fig. 2). But it was left to a Mr. Diesener to invent a process by which the tiles are made at minimum cost and which permits of burning them to vitrification in safety. In this system a block is made with the auger machine, from which four tiles are cut, and this is accomplished as follows: The block (Fig. 3) is passed out of the machine, cut into the required lengths, which are taken to another cutting table especially constructed (Fig. 4), with wires stretched across, which make a horizontal cut, severing the ribs from the partitions, but leaving to each tile the end of the middle rib, thus furnishing the nib. The ribs are called by the inventor compensation ribs. The tiles, though parted by the wire cut, still remain together, forming the block, and are dried and burned in this condition. For the accompanying cut of the special cutting table we are indebted to Th. Groke, Merseburg, Germany, who has made a specialty of roofing tile machinery.

Being taken away from the cutting table, the blocks are treated almost like ordinary hollow building blocks. Each block is put on a pallet to dry, thus effecting a great saving in the number of pallets against the ordinary methods, in which a pallet is required for every tile. But one of the chief advantages lies in the fact that in this process the warping in drying and burning is reduced to the minimum, owing to the compensation ribs, which prevent an unequal shrinkage.



The Schmidheyni Interlocking Roofing Tile.

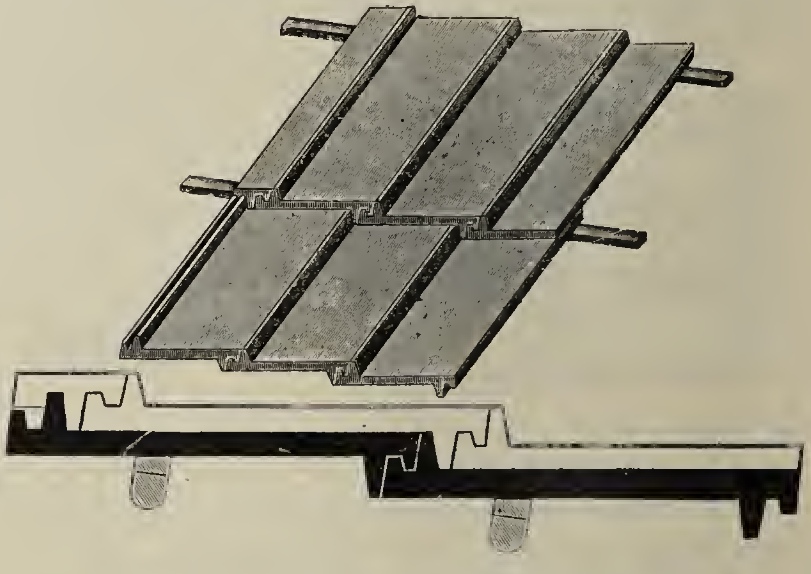
In the drying the blocks are usually dried rather slowly in the beginning, but as soon as they are stiffened the drying can proceed with the usual heat of a steam dryer.

The setting offers no difficulties whatever, and can be done much faster than in the ordinary methods.

In the burning, also, less care need be taken and higher temperatures can be employed, as the blocks are safely burned to vitrification. After being burned the tiles are separated by tapping the blocks with a hammer.

If glazed tiles are desired, 50 per cent. of them can be glazed by separating the blocks when dry into two parts of two tiles each and glazing the outside surface of each part. In bluesmoking, the blocks can be set whole, as the process pervades nearly the entire cross section of the tiles.

The ribs are necessarily burned along with the tiles, and would be considered waste were it not for the fact that in most cases grog is mixed with the clay. These ribs afford a convenient source of grog and are ground up with little expense for power in the so-called ball mills. In some cases the quantity of grog furnished by the ribs is sufficient for reducing the plasticity of the clay satisfactorily. However, if no grog is required and no use is found for the ribs, the tiles can be separated when dry and the ribs returned to the crushers. Of course, in doing this the special benefits of the block system are sacrificed. There are two objections urged against this method. One is that with some clays the places where the ribs have been are marked by a strip of color differing from that of the rest of the tile. The other objection is that in some cases the blocks, after being cut into tiles, fall apart, due to the peculiarities of the clays.



The Grate Roofing Tile.

Another method of making plain clay shingles without warping was invented by a Mr. Robinski. He runs out of a vertical sewer-pipe press or an auger machine a hollow block without partitions, whose walls correspond in thickness to that of the tiles, and having a continuous rib in the center of each side of the block. On every one of the four corners of the die a small steel knife is arranged, cutting into the edges of the block, but not deep enough to sever the sides entirely. The block is cut into the desired lengths and the ribs cut off on a special cutting table, leaving a short piece at the ends, as usual. The blocks are dried and burned and separated into tiles after burning.

One of the advantages of the two systems mentioned is that the thickness of the tiles can be reduced to the minimum. Tiles five-sixteenths of an inch in thickness are made without trouble.

Pan tiles, too, are now being produced with auger machines and cut on tables specially constructed for them.

—Interlocking Tiles Made with Auger Machines.—

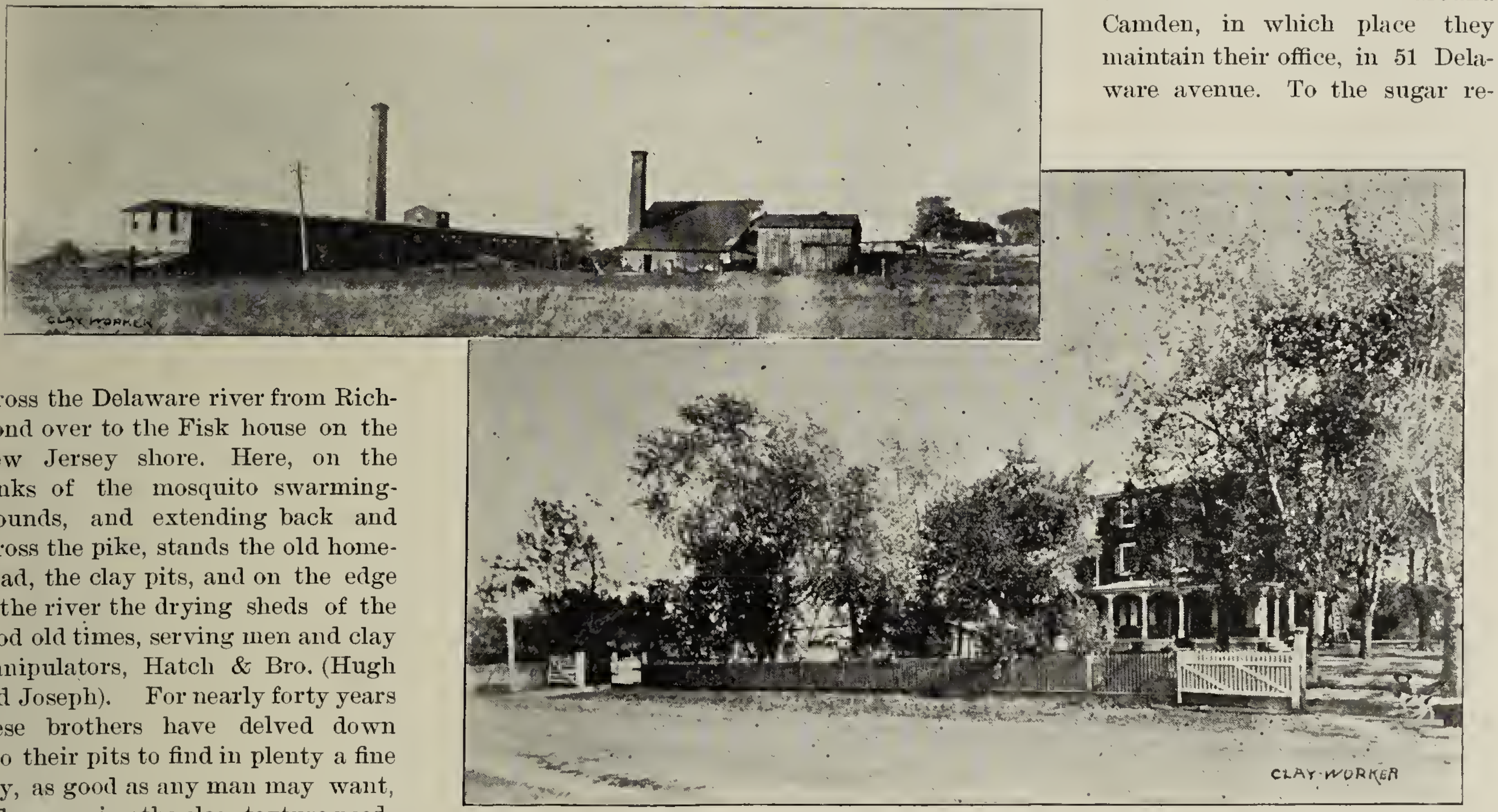
We will now transfer our attention to the second group of our classification. For half a century German tile manufacturers have been engaged in inventing shapes of roofing tiles which have interlocking joints and which can be made with auger machines. A great number of such styles are in existence, varying in the arrangement of the ribs and joints, but the simplest seem to be the most satisfactory. Fig. 7 represents the Schmidheyni tile, a characteristic specimen of this type of roofing tiles. In making it no other operation besides cutting off is required. If these tiles could be dried and burned without warping they would be a cheap and satisfactory roofing material; but as this is very seldom the case, and even a slight warping prevents the close fitting of the tiles, their manufacture is not as extensive as might be supposed. In laying them, hemp, hair or lime packing is used to keep the joints tight. A number of manufacturers make these tiles hollow, thus decreasing the weight, and, as it is claimed by some, at the same time also lessening the liability of warping.

Fig. 8 represents a peculiar kind of tile, called grate tile. It has the advantage over other styles of similar tiles that the joint ribs can be made of any desired height independent of the thickness of the tile.

Written for the CLAY-WORKER.

A BRICKMAKERS' CONTEST WITH THE PENN. RY.

THE Pennsylvania railroad, some fifteen months ago, in throwing out its octopus-like arms, made its survey and threw out its lines to branch off from Bridesburg, on the road from the good old conservative town of Bristol, to extend across the Delaware river from Richmond over to the Fisk house on the New Jersey shore. Here, on the banks of the mosquito swarming-grounds, and extending back and across the pike, stands the old homestead, the clay pits, and on the edge of the river the drying sheds of the good old times, serving men and clay manipulators, Hatch & Bro. (Hugh and Joseph). For nearly forty years these brothers have delved down into their pits to find in plenty a fine clay, as good as any man may want, and possessing the close texture needful for front or hard salmon. Starting with hand gangs, they answered the demand made upon them, and two to three million a year sufficed to fill the bill.



THE HATCH HOMESTEAD AND BRICK WORKS.

My visit to them arose from the contemplated suit about to be brought by them against the aforesaid railroad, which, with the indifference generally shown by absorbing corporations, propose to cut across the clay lands of these worthy brickmakers, seize, perforce, twelve and a half acres, and give them an inappropriate recompense. The Pea Shore railroad already wends its way right through and adjacent to the shed of the granulator, and this is accepted as all-sufficient by the owners.

The railroad made an offer of $1,500 per acre, notwithstanding that the Hatch brothers offered to prove that the ground, capable of turning out thirty or forty million brick to the acre, was worth six or seven times as much money. The corporation would not budge nor improve upon their offer; hence the suit.

The yard, which is kept open and running all the year round, contains some two hundred acres, extending from the old homestead, of which a reproduction is here given, showing it to be a good, comfortable house, about forty or fifty feet deep, with a broad porch which affords a splendid view of the works and river beyond. Crossing over the grounds which skirt the clay pits, I made my way down by a rough step-ladder on the ground level with the sheds, and there I could watch the men working in the pits, averaging some thirty-five to forty feet deep.

Under the bluff and over the railroad track, and down into another dip, and I found myself in the office talking to Isaac Hatch, the elder son. A straight look when I mentioned my name, a grasp of the hand, and a broad kind of a Christmas smile when introducing myself as a representative of the well-known Clay-Worker.

"Well, there isn't much to tell you. Going to write us up, are you? Will it be in next month's? You see, we have an old style Chambers machine, and turn out about 40,000 a day, a granulator and end-cut. Between fifty and sixty men are employed, and we manage to keep going all the year around. Last year being an exception, of course we had to shut down during the very cold weather. We turn out good stock brick, and, as prices go around here, I guess we're pretty much satisfied. Prices? Oh, they run from $4.50 to $10."

During the past year they have supplied many batches of the stock stuff used in and around Camden, in which place they maintain their office, in 51 Delaware avenue. To the sugar refinery they served 600,000, and 750,000 to the mills of Howland, Croft & Co. Laborers in the yard are paid $1.25 and burners $2.50 per day. The drying is all done by heat from the hot kilns, of which they have four, each capable of holding 380,000.

Since making my visit to the above yard the long-expected suit has been aired in the Camden County Court, with the following grievances and determination of the railroad company, since no happy conclusion can be arrived at.

The Pennsylvania Railroad Company endeavored to show that the price of twelve and one-half acres wanted for right of way, for which the Hatches asked $505,790, was wholly exorbitant, and the matter was referred to the commissioners for arbitration. Here the figure was reduced to $480,000, which the railroad company still declined to consider. After a careful survey of the clay pits and adjoining lands, the commissioners finally assessed the damages at $53,000. Again both parties appealed from the award, the railroad company on the ground that it was assessed at $100 per acre, and the Hatches on the score of its being too low.

The matter was finally taken into the Camden County Court, and Judge Howard Carrow, as counsel for the Hatches, presented a claim for $175,000 for the land and damages to the business. After a trial, lasting several days, eleven of the jury agreed upon $37,500 as a fair measure of damages, while the twelfth juror held out for $150,000.

For the second and last time this litigation, which has aroused considerable interest here, was given to the courts last week, this time resulting again in a failure on the part of the jury to agree, again the twelfth juror hanging out for $100,000, while the remaining eleven were willing to give a verdict of $87,500.

Now the animus of the Pennsylvania railroad is thoroughly aroused, and they have resolved to skip or skirt the lands of our fellow-clayworkers, and time, eloquence and money has been spent in useless litigation. Who's right or wrong we can't say. It is, however, almost safe to say that the Pennsylvania Railroad will compromise, as it means a saving of fifteen minutes in the run from Philadelphia to the seashore, now scheduled at seventy-five minutes.

REEVES AND SONS' BRICKYARD.

Within a stone's throw from the yards above mentioned stand the more primitive yards of August Reeves & Sons. Here, on the edge of their little ten acres, and facing the river, they have planted their kilns, and make brick and terra cotta in a manner compatible with leisure and comfort, turning out about one million brick a year, and a quantity of terra cotta. To these men the railroad magnates behaved in a manner quite magnanimous, giving them without contention $22,000 for two acres of ground.

MITSCHKA.

BY THE LIGHT OF THE KILN FIRE.

"THIS YERE MEETIN' 'll cum to order at onct."

And with the words John Donohue, as he appeared on the pay-roll, but whom we, along with his fellows, will call "Sandy," mounted the rostrum, which consisted of an immense lump of block coal and rapped loudly on the shed posts with the sledge standing handy.

It was the first meeting of the "Mud Puddle Club," and out of the gloom of the kilns and surrounding drying sheds there loiteringly came some eight or a dozen typical brickyarders, dressed just as they left work, some clay bespattered and some plentifully sprinkled with brick dust, their arms showing the red line half way to the elbow, above which they did not think it worth while to wash, coatless all, and wearing every description of head gear, brawny, strong and tough as only brickyard boys are.

They gathered about Sandy, sitting on whatever was handiest, three on a wheelbarrow, some stretching out on the broken coal, some sitting in the blade of a shovel and holding themselves up by the handle.

The night was chilly enough to make the warmth from the hot kiln grateful, and the yellow glare flickered, lighting up first one begrimed and bewhiskered face, now another, casting a weird, eerie light on the motley crew and throwing strange, restless shadows which stretched out their long forms into the night.

Sandy, the burner, was spokesman for the time being: "This yere gang o' bloomin' ijjots has cum together to-night fur the purpose o' formin' a club fur mutchel ederficashun an' henjoyment—mostly the latter—seein' as how we're all in the same boat, so's to speak, together an' hez worked buddies each for each, an' a brickyarder not havin' no sich great shakes o' fun, nohow, an' seein' as how our bosses hez theyre clubs an' conwentions—we'd jist thought we'd git ourselves together an' make us a club too so's't we cud meet hyar clost to a hot kiln an' talk over things ginrally—the queckstions o' the day bein' mostly the same."

"This here's a moshun, fellers, an' all as agrees 'ith it 'll hold up theyre paws."

The others listened attentively to this harangue with complacent smiles of pride and enjoyment, for Sandy was an universal favorite, and at its conclusion, and after the motion had been carried, Patrick McFlannigan, to whom we will give his usual sobriquet of "Paddy," a huge Irishman with a red head, a red shirt, a red nose and a row of red Galways under his chin arose and, after wiping off the stem of his pipe and passing it to his neighbor to keep alight for him, spoke thus:

"Shure an' your honor, Misther Sandy, I tinks a club is no club at all widout a prisydint, an' I tinks wot as youse hev made the fhurst spach an' seein' ez it wuz a dom good wan I tinks youse should be de prisydint o' dis great an' edjticashunizin' 'Mud Puddle Club.' Are yez all wid me—if dere is eny as aint, we'll hev it out wen dis meetin's broke up."

Now, Paddy could have felled an ox with a blow of his fist, but, although he could boast with any man about the yard, or out of it, either, for that matter, he was never known to have hurt a fly, so his threat was greeted with a loud guffaw.

Sandy, however, was elected president by an unanimous vote and immediately suggested the propriety of drawing up by-laws. Sanchy, the little wizened temperer, being the only "scholard" in the party, was called upon, and there being a dearth of paper and pencil, he took a new "batton" from the drying shed and, with a piece of coal, went to work. Whilst he and Sandy were attending to this arduous duty little Mickey, the pallet boy, was dispatched to the "corner grocery" with a watering pot to "rush the duck," and by the time he had returned with his makeshift foaming tankard and all had taken a good long pull, accompanied with sundry wipings of mouths on backs of hands, the by-laws were ready for the club's action:

1.—Doos are 10 sents per meetin'—the same to by beer wid

—eny man as don't pay up gits no beer.

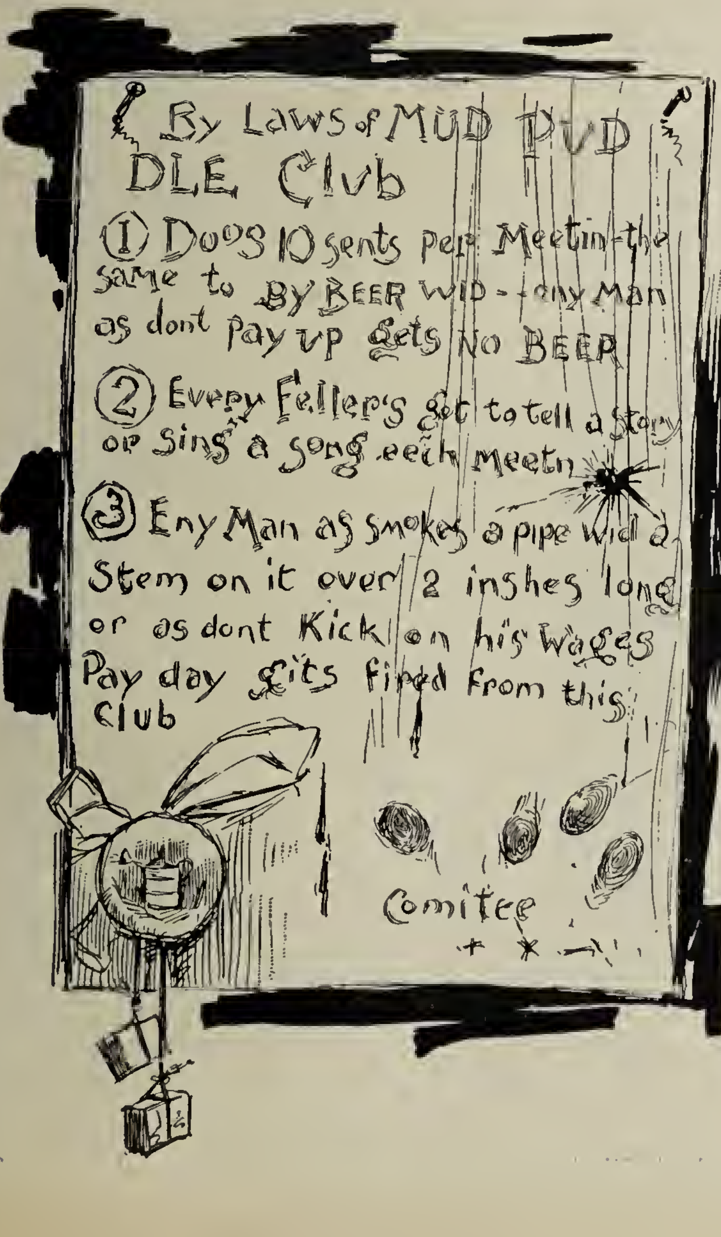
2.—Every feller's got to tell a story or sing a song eech meetin'.

3.—Eny man as smoks a pipe wid a stem on it over 2 inches long or as don't kick on his wages pay day gits fired from dis club.

These having been duly approved it was agreed that, as Sandy was president, he should tell the first story.

Sandy demurred, but the others wouldn't have it. Finally, two of them lifted him to his feet and, after many such remarks as "let her go, Sandy," "don't be askeered, ole feller," Paddy suggested that he tell them how he "sthopped the schrap," and after taking a look about his kilns, with hands folded behind his back and his little cap pushed backward from his sooty forehead, started his story. He told it disconnectedly and in bad language, interspersed plentifully with profanity that had a habit of rolling from his mouth freely in a rippling sort of way, quite as one would pass the time of day. We will tell it, not in his own way, but as Sandy himself would say, the following is about the "jist of it."

Sandy had been burning on this and the adjacent yard, not over a hundred yards away, for a great many years, working not only for Yates Brothers, the present proprietors, but for their father before them, and had watched the boys, of whom Tom was the younger, grow up, the pride of the old man's heart. They were both likely lads and had developed, under their father's teaching, into honest, square-dealing men of good business parts.



By Laws of MUD PUD DLE Club

(1) Dues 10 sents per Meetin—the same to By BEER wid—eny Man as dont pay up gets No BEER

(2) Every Feller's got to tell a story or Sing a song eech meetn

(3) Eny Man as smokes a pipe wid a Stem on it over 2 inshes long or as dont Kick on his Wages Pay day gits fired from this club

Comitee

+ * —\

Shortly after the death of Yates, Sr., however, it seems the brothers had a falling out over some trifling matter and within an hour or two John was called suddenly away upon a matter that detained him several days. The separation was unfortunate, as it gave opportunity for each to nurse his grievance so that when John came back, a surly nod was the only greeting between them. This wee little mole-hill of misunderstanding soon became the proverbial mountain of intentional affront. The men noticed the trouble and sided, some with one, some with another, until the partnership was dissolved, and Tom, with his sympathizers, started the new yard, while John kept the old one.

Business competition was made sharper by mutual spite until what was an excellent business for one yard became ruinous for two, and the men on each, having taken up the quarrel, personal fights were of nightly occurrence and things generally were as bad as bad could be.

Sandy had remained stoically neutral and persisted in doing the burning for both yards, treating each scrupulously alike, and doing his level best for the one as well as for the other. Often being questioned by both men and owners, he persisted obstinately in his neutrality and never, by word or deed, did aught to fan the flame of jealousy and hatred. He was, however, on this account, an outcast from the ranks of the men of both yards, and a very light kiln for Tom resulted in several of the men accusing him, one night, of "tryin' to bust up" their boss. He had put up with a great deal and, the kiln being a sore spot anyway, this accusation of intentional failure was too much for poor Sandy, and the result was that he appeared next morning badly the worse for wear.

"I kep' mighty still next mornin', bys," said he. "Didn't hev much time fur gab, fur me ole head gear wuz workin' considerbl. I fired up an' went on top to see how she wuz workin' 'bout as usul, an' laid low a waitin' fur my boss to come out. I hed a settlin' heat by that time on one fur John.

"In them days yez see's Medder Lane run right in clost to the sheds an' I knows about the time as Tom cums along of a mornin' an' I hed to work things purty peart like so's to git them two together—but as't happened John comes in yearly an' I meets 'im outside the shed. He looks me over purty well an' seein' I wuz lookin' sort o' meechin' like begins to ast queckshuns as to how an' why me eyes wuz bunged up an' so on. I puts him off till I sees Tom a-comin' down the lane, 'ith his head down so afeered he'd see som'at o' his own brother's doin's, an' jist wen he gits clost to us—me keepin' John's back pinted down the lane all the time—I yells, 'Whoa, Dolly,' as wuz the mare's name he wuz drivin,' an' she stopped in a minit coz she knowed me all right.

"Well! there they wuz—John and Tom, fiz to fiz, like as they hadn't been fur nigh onto two year or better an' they'd each a lef' thim premises suddint on'y I grabbed the mare's rein an' John's arm an' jist natchelly made 'em stay till I'd got through.

"Maties—I don't remember jist what I sed—but I tole 'em about dere ole fadder an' mother an' showed 'em the marks on me as hed always tried to serve 'em both faithful an' then I turned to Tom an' I sez, sez I, 'Youse the youngest an' it's right youse would be beholdin' to him as is older an' I knows sure ez I'm standin' yere,' sez I, 'that if youse wuz to hold out yer hand to John as is yer own brother he couldn't git "I'm sorry, Tom," outen his ole mug quick enuf, cud yer, John?'

"Fellers, that wuz the end o' the scrap, an' I'd spent s'much time about that bizness I'd clean forgot me kiln—the arches had browned down an' she cud'n't help but be light an' shaky, but they both said, 'Damn yer kiln, Sandy,' an' damned she wuz.

"Got any lush left, Mickey? My throat's got mighty dry like, strikes me." F. W. BUTTERWORTH.

Written for the CLAY-WORKER.

PAVING BRICK—ITS MATERIAL, MANUFACTURE AND USE.*—Fiftheteenth Paper.

BY DANIEL W. MEAD.

—Methods of Drying Brick.—

THE UNDERLYING principles of the art of drying brick have been briefly considered in the previous paper. The methods of the actual practice of the art may be classified for consideration as follows:

Methods of Drying Brick.
- Open Air Drying
  - Open Yards
  - Covered Yards
    - Movable Pallets
- Artificial Drying
  - Drying Rooms
    - Hot Floors
      - Flue heated
      - Steam heated
    - Slated Floors
    - Pallet Racks
  - Drying Tunnels
    - Steam Heated
    - Hot Air Heated
    - Furnace Heated

—Open Air Drying.—

Open air drying is the simplest method of drying brick and usually involves the least first cost. It utilizes the gratuitous heat of the sun, and therefore requires no expense for fuel. On the other hand, it is subject to all of the uncertainties of climatic changes. While the heat is gratuitous, it is uncontrollable. It may be utilized for days in succession, or for days the atmosphere may be so highly charged with moisture as to be incapable of receiving more moisture, and therefore incapable of drying.

The simplest form of open air drying is by placing the brick directly on the yard and exposed to the direct action of the sun and wind. The yard should be given a uniform grade and slope slightly in such direction that good drainage may be obtained in order that storm waters may immediately run off and the yard be in fit condition for further use as soon after a storm as possible. Sometimes the yard is paved with brick, the surface being made even with a thin layer of sand.

While the first cost of construction for this method of drying is low, the expense caused by inclement weather is often very high. The work of days may be lost by sudden rain, and the uncertainty involved makes large contracts, where time is an important factor, impossibilities. The brick plant subject to freaks of the weather must be run intermittently, and for a large proportion of the year is, in our climate, necessarily idle. The investment cannot therefore be utilized to the best advantage. The men employed are employed intermittently, and soon change their work for that which is constant and independent of the weather. The result is that either high prices must be paid or a poor quality of labor obtained for use in such plants. In either case the labor cannot be organized or systematized as it should be for the best results, and a large extra expense is thus entailed.

Every step toward certainty of production is an improvement. The use of hack boards under the brick keeps them from the moisture of the ground and the wash of light showers. The V boards to cover the brick in inclement weather will protect from light showers and soon save their first cost of the boards.

On the open yard soft-mud brick are placed singly, while stiff-mud brick are hacked from four to eight high. The soft-mud brick are also hacked for drying when they become stiff enough through drying to stand up under the pressure. When brick are hacked in this manner weatherboards are usually provided, together with V boards and hack boards, to protect them from the weather. These features are illustrated in Fig. 1. Close hacking is utilized to store the dried brick, both for utilizing space and for protection from weather until they can be set in the kilns.

—Covered Yards.—

In spite of these precautions hard storms will destroy most of the brick exposed in this manner. To prevent such losses the yards may be entirely covered by a roof to effectually protect the brick from rains. Such roofs are usually arranged with movable sections, which are hinged or otherwise, and which, when opened in fair weather, admit to some extent the sun and wind. Nevertheless, brick dried in covered yards dry much more slowly and hence require more yard room for a given output. This is not always without its advantage, for many clays give better results dried more slowly and evenly in the covered yard than by the rapid and uneven drying of the direct summer sun. It is generally found also that the saving from the direct loss by rains will bring the average capacity of the covered yard fully up to the open yard of the same area, while the expense of drying per thousand will be much less.

—Pallet System.—

Another modification of the methods for utilizing natural heat for drying is by the use of pallets. The pallet is a short board large enough to receive a number of brick, usually six, but the number may vary with the system adopted. On these boards the brick are placed as they come from the machine, or the brick are sometimes delivered directly on the pallets by the machine itself. In either case the pallets are taken on barrows (see Fig. 2) to the open yard or to pallet racks. The pallet rack, when covered with narrow but projecting roofs and provided with canvas sides to protect them from direct sun, wind and rain (see Fig. 3), is the most flexible, cheapest and desirable of all methods of drying in the open air.

The methods of open air drying above briefly described are not applicable to the drying of paving brick except in small factories and for summer suns. Where the manufacture of paving brick is attempted on a large scale artificial drying must be adopted to insure success. The amount of the investment in a paving brick factory is so large that the factor of uncertainty must be eliminated in order to utilize it to the best advantage, and in order to be assured that contracts accepted will be executed within the time specified, which is always an important feature of such contracts. With successful artificial drying the factory can be run winter and summer, and the product turned out, no matter how inclement the weather. This permits of a thorough systematizing of the business and the utilizing of both factory and men to the best advantage.

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—Artificial Drying.—

Drying on an Open Yard.

The simplest methods of artificial drying are the application of artificial heat to brick set as previously described for open air drying. That is to say, the brick are set on drying floors or on pallet racks and the artificial heat applied to them in these positions.

All successful methods of artificial drying must provide three requisite conditions:

1. The protection of the brick from the weather.
2. The application of artificial heat.
3. The removal of the saturated air.

In addition to these conditions, the plant should be so designed and arranged as to be built at the least first cost and to be operated at the smallest expense.

It is unnecessary here to consider the first condition in detail, for the building which must protect the brick from the weather must be designed also to best accomplish the two remaining conditions.

—Hot Floors.—

The hot floor is built either with fire and smoke flues beneath it to transmit the heat or the same effect is produced by the use of steam pipes.

When flues are used, furnaces are placed at one end, each furnace discharging its heated gases of combustion into long flues which extend under the drying floor and which may be almost any length desired if suitable chimneys or suction fans are provided to create the necessary draught. One hundred and fifty feet is a common length, and even longer flues can be used with economy. At the end furthest from the furnace these flues open into a cross flue, which communicates with one or more chimneys or draft stacks. The furnace end of the flues being the hottest, it is usually covered with a foot or more of earth and sand, which is thinned out to a few inches at the end near the chimney. The whole is then covered with a brick floor, on which the brick are placed for drying.

The brick are placed on this floor much the same as on the open yard, either singly or in hacks, two or more high. In this system the direct heat of the floor, rather than the circulation of warm air, dries the brick. The direct contact of each brick with the floor is usually preferred. Unequal drying is a fault common to this system, and the arrangement of the floor must be such as to prevent the unequal distribution of heat as much as possible. In this system provision must be made for admitting fresh air and the discharge of the air after it has become saturated. In covering such a drying room, care must be taken to have any timber supports of the roof thoroughly protected from the flues to prevent accidents from fires.

—Hot Floors Using Steam.—

Exhaust steam is also utilized to produce hot floors. One-inch wrought-iron pipe is usually used for this purpose. These pipes are connected with a header, which should be the full size of the exhaust pipe, and the small pipes are spaced about six inches apart on centers. The floor should be first carefully graded with a slope from the end at which the exhaust steam is to be admitted of not less than one inch in 10 feet. On this floor the pipes are laid, and, after being thoroughly tested may be covered about three inches with sand, on which a pavement of brick is laid flatwise, thoroughly compacted with sand, well swept into all joints.

A still better method is to place brick flatwise on a thin layer of sand between the pipes, and end to end with each other, over the entire floor. After this, fill in over the pipes and brick with one inch of sand, on which lay another layer of brick flatwise and crosswise of the lower course, compacting and filling all joints as before. These floors are utilized in the same manner as the furnace hot floors, but as a rule will not dry brick as rapidly, as the heat supplied is usually not as great. They utilize waste heat, however, to considerable advantage when properly built, and to that extent have an advantage over the furnace dryer, which uses coal directly for

From Machine to Drying Racks.

drying. The steam floors are also, as a rule, more uniform in temperature than drying floors heated by furnaces.

—Slatted Floors.—

Slatted floors are usually made from two-inch strips fastened to the floor beams, about one-half inch apart. On these floors the brick are hacked usually two on two, and from four to six high. The source of heat is applied below, and the drying is accomplished by the warm dry air rising through the brick. Sometimes these floors are constructed over hot floors, the heat from the floor below rising and doing additional duty on the floors above. Usually these floors are heated by steam pipes. The pipes are arranged with headers as in the hot floor, but are usually spaced a foot or more apart. Exhaust steam is utilized in these pipes during the day, and some live steam is usually admitted during the night.

When several floors are utilized in the same building the pipes are usually confined to one or two bottom floors and the ventilation arranged so that the air shall enter at the bottom, be warmed in rising through the steam pipes and then pass up through each of the floors. The results, as far as drying is concerned, in this type of dryer, are first-class, as the brick dry slowly and evenly, and almost any clay can be dried by this system.

Pallet, Rack and Open Yard System Combined.

—Pallet Racks.—

A variation of the above system is the use of pallet racks in the drying rooms. This allows more brick to be dried in the same space, and has some points of superiority in the more rapid handling of the brick, both on account of the use of pallets and also on account of the concentration of the brick in a more limited space.

—General Features of Drying Rooms.—

In all of the types of artificial dryers above considered either one of two methods of ventilation can be used to accomplish the removal of saturated air. That is, the necessary ventilation can be made constant or intermittent. Constant ventilation requires the admission of a steady current of air, heating the air in its passage, the saturation of the air during its contact in passing through the brick hacks and its constant escapement. Intermittent ventilation must provide for the application of heat to a confined space until saturation or the practical limit desired is attained, and then the rapid removal of the saturated air, the substitution of fresh air and the application of heat again. The last method is more economical of fuel, but usually much slower and requires greater attention. When suitable arrangements are made to accomplish the results by the first method it is much more satisfactory.

All of the methods of artificial drying previously described, while much in advance of open air drying, have still the defect that they require considerable unnecessary expense in handling the brick. The brick in each case must be taken from the machine and placed in the drying room, and, when sufficiently dried, must be again taken up and wheeled to the kilns. In none of the systems is the arrangement such that rapid drying can be accomplished without danger to tender clays, although brick are sometimes dried on hot floors in twenty-four hours. Where the drying is slow the amount of drying room required for large plants is very large, which makes the plant more difficult and expensive to handle. It is very desirable to accomplish the concentration of the drying arrangements, to increase the facilities for controlling the heat and make the action of the dryer positive and to secure economy in the handling of the brick. These results seem to be best attained at present by the tunnel system of drying.

—Tunnel Dryers.—

The tunnel dryer consists of a long, low room or building, divided into compartments or tunnels by parallel walls. Each tunnel is a distinct and perfect dryer by itself. Its arrangement for heating and ventilation is perfect in itself, and the number of tunnels varies only with the capacity of the works. Most tunnel systems include also the car system as well. By this system the brick are taken from the machine and hacked in open order on the cars. When a car is loaded it is shoved into the tunnel, and after it is dried it passes out on the same car and is run into the kiln for setting. This method prevents the extra handling of the brick necessary in all drying room systems, and is a decided advance in economy of operation.

—Intermittent Tunnels.—

Two methods of operation of the tunnel system are in use. By the first method a tunnel is first entirely emptied of dried brick, the heat is cut off and the tunnel is filled with green brick, after which it is closed, the heat is turned on slowly, with little or no ventilation, and after the brick are warmed ventilation is established. The ventilation should be such that the air will be removed as fast as saturated until the brick are dry, and then the operations as above set forth are again repeated.

—Continuous Tunnels.—

In the second method of operation the tunnel is kept under continuous heat and the operation is constant. The dry brick are removed at the lower and warmest end of the tunnel and the line of cars are shoved down and a car of green brick is admitted into the upper and cooler end of the tunnel. The action is here similar to that in the intermittent tunnels, for the green car encounters warm, moist air, filled with the vapors taken up from the brick in front of it, and for the first few stages little or no drying takes place, the brick simply becoming slowly heated. As the car passes on the air current becomes warmer and dryer, and by the time it reaches the lower end of the tunnel it has become entirely dry.

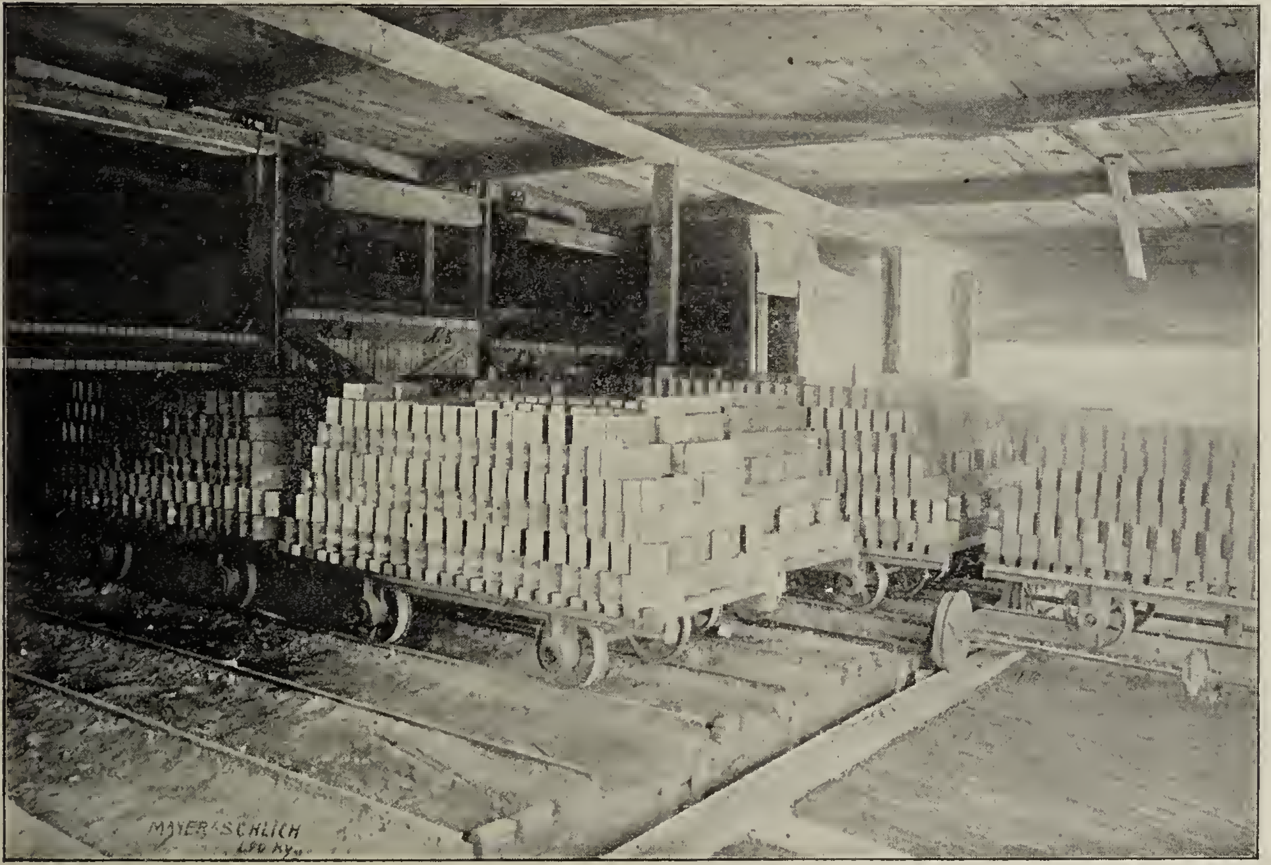
—Heating the Tunnels.—

The application of heat to the tunnel system is accomplished by four different methods. Two of them are quite similar to methods already examined, namely, to the furnace flue hot floor and the steam pipe slatted floor. In the first method the flue is built below the tunnel floor and the tunnel is heated by the radiation from the hot floor, air for ventilation being at the same time admitted from the front end of the tunnel. In the second method steam pipes are laid in the tunnel below the tracks, and the heat, usually partially or wholly from exhaust steam, is thus applied.

Two other methods of heating have also been introduced into various tunnel systems with good results. One consists in passing the furnace gases, mixed with hot air, directly through the tunnel and in contact with the brick. The other consists of arranging a compact heating chamber with coils of steam pipe, between which the air is forced or drawn into the tunnels, being heated in its passage by contact with the hot pipes.

—Ventilation.—

The ventilation of the tunnel is accomplished by chimneys, which are usually high wooden stacks of capacity sufficient to pass the large volume of air used for drying. When these are used natural draught is relied on for ventilation. As was pointed out in a previous paper, this method of creating a draught is much more expensive than by use of a fan, and, as its results vary largely with atmospheric conditions, it is much less to be relied on. A suction fan as a means of ventilation is positive, and can be regulated as desired, and, if properly set and managed, is the most economical and desirable. Fig. 4 shows the lower end of a tunnel dryer in which several cars of brick are shown dry and ready for the kiln.



TUNNEL SYSTEM DRIED BRICK.

—The Desirable System for Drying Paving Brick.—

Some type of the tunnel dryers is the most desirable for the manufacture of paving brick. This system is most within control and is most economical of both fuel and labor, and is, in fact, the most perfect method yet devised for drying brick.

(To be continued.)

Written for the CLAY-WORKER.

ANOTHER STEP AHEAD.

A Letter From Prof. Orton Concerning Matters at Our Clayworkers' School.

SEVERAL months ago there appeared in the Clay-Worker an article signed by one of its ablest contributors, Mr. Chas. F. Ferry, making friendly criticism of the course of study, then newly established, which it had been decided to offer to the public through the clayworkers' school. Without quoting in detail Mr. Ferry's remarks, suffice it to say that the burden of his complaints were concerning the sins of omission rather than those of commission in the course as offered, and that he thought it a pity that so good a movement should be stunted or dwarfed in its execution by the use of any ineffective methods.

Mr. Ferry's remarks did not at that time receive a formal reply for two reasons: First, because no one but those in authority in the school would be likely to take up the cudgels in its defense, and, secondly, because those occupying this position felt that what had been said had so much of truth and wisdom in it that it would be very difficult to make its fallacies equally apparent to the general reader. In short, Ferry pointed out gaps and deficiencies in our programme which we could not but know and recognize, but he failed to make allowance for the fact that what we offered was not a collegiate course, but an industrial one. We were beginning in a plain and simple way at a point where we thought we could make our work tell in the least possible time, and to have begun as he suggested would have been to begin at the top and go downwards.

It seemed then, and still seems, that the friends of technical education could better have uniformly bolstered up the work of the department, and left its inevitable tearing down to those so-called "practical" people, who do not believe in the educational method of attaining industrial progress.

My purpose in bringing up this bygone is not an invidious one, nor prompted by any desire to provoke a present discussion of the subject. It is mentioned now simply to show that the changes which were suggested then were such as would certainly regulate themselves if the school enjoyed the vigorous growth which its objects deserved and its prospects justified. And it is now my great privilege and pleasure to announce to the clayworking fraternity that good fortune has smiled on our work, and, as a natural sequence, that we are now able to add to our course those things which were lacking before, and whose omission was the cause of Mr. Ferry's criticism.

The readers of the Clay-Worker will probably remember that in describing the course of instruction of the school, as originally offered, the term "industrial course" was used; but possibly it may not be quite clear to all just what our idea of an industrial course is, and in what it differs from the other and more common technical courses of instruction.

Many important technical schools have found that they are constantly receiving applicants for admission who come direct from the workshop and factory. These applicants are frequently ill qualified by their previous educational advantages to take up real collegiate work, and though they are usually men of great force of character and strong, earnest natures, who know how little they do know, and who are willing to work hard to remedy this defect, still the facts remain that as students of a high grade collegiate course they are not satisfactory from their own point of view and are a hindrance of the work of their classmates.

The trouble has been in their previous training (or, rather, the lack of it), with which they have attempted to do the work. Many have been wild and adventurous boys, who have defied all efforts to educate them, and who have resorted to the shop at an early age in order to escape school. Many others are retarded by ill health or poverty. Hundreds and thousands of such boys find out after a few years how unfortunate has been their course, and how they are now held back from all advancement in life because they have no education. And in their efforts to rise above their surroundings many actually do get, later in life, the education which they spurned as boys.

It has been to reach this class of men that the industrial courses of education have been created. They do not pretend or claim to be complete or thorough except as far as they go. They do not enable their recipients to rise to positions of high responsibility, nor do they confer great versatility upon them. But what they do is to enable a man to increase his value, to earn more money, to win minor promotion, to enjoy a constantly widening existence, when otherwise he would fret his life away under the daily grind of routine labor, conscious that others supply the brains which guide his hands.

Naturally these industrial courses are short; they must be to enable a working man to take the time out of his productive period long enough to go through with them. They are elementary, so that they will fall inside the range of any who are willing to really try to master them. They are narrow, for in this day of specialization one cannot, in two short years, study anything but those subjects which lead by the most direct route to the goal of his ambition. But they nevertheless minister to the needs of thousands of men, many of whom are the best of the working classes, and in my opinion they are among the most beneficent developments of modern educational methods.

So, when the idea of technical education for clayworkers was in the throes of evolution, it seemed natural that, in creating this new class of clayworkers, we should start where others have left off, and try first to reach the industry through the class of men who are in the best position to appreciate their shortcomings and the possibilities which technical education would open to them. And I am very glad to state that the entire soundness of this view has more than proved itself during the last two years, for of the applicants for admission, and those who have considered it as a possibility, I think 95 per cent. have come from this walk of life.

And I think, furthermore, that the clayworkers' school will always find its closest medium of communication and its most sympathetic touch with the life of its industry through this short and industrial course. But, as a natural corollary to the success of this short or industrial course, comes the demand for better and more complete courses. Where many find help and profit as the fruit of partial education there are certain to be some who will want to go further and pursue the system to its logical end. There is in this country, so far as I have observed, at least, no class of trained ceramic specialists. I think there are none who even claim, with the least shadow of propriety, to be thoroughly competent consulting experts or engineers for the ceramic industries. There are, of course, many men, some of whom possess fine attainments, who do act as consulting engineers for the clay industries to some extent, but always as the agents of some specialty or process, and whose judgments are therefore open to the imputation of bias or indirection.

But thoroughly competent experts, who could build a sewer-pipe plant, or "cure" a bad glaze in a stoneware pottery, or decide between the respective merits of two coals for burning some special kind of ware, with equal ease and equal accuracy, do not exist as yet in our country.

Some of my readers may think that such specialists are a chimerical dream, here as well as elsewhere, and that they could not find employment if they were here in our midst. But neither supposition is true. In German trade periodicals appear the names of many eminent men, in positions of the highest and whose training is the equal of any in their land, and to any of these can the problems of clayworking be submitted with full confidence that accurate and unbiased verdicts will be rendered. And the events of the past two years have shown, to me at least, that the industries are eager to use the services of any one on whose opinion they can rely for rectitude and technical accuracy.

It is to create such men as these that a new course in the clayworkers' school has been projected, and in this new course it has been the intention to spare neither time nor pains to make its graduates fully competent for the responsibilities which they must expect to bear.

The following is the course of study as it has been finally adopted by the faculty of the College of Engineering of the Ohio State University, leading to the degree of Engineer of Mines in Ceramics:

—First Year.—

First Term—Drawing (4), free-hand; credit hours, 2. General chemistry (1), inorganic; credit hours, 5. German (1), elementary; credit hours, 4. Mathematics (7), trigonometry; credit hours, 5. Rhetoric (1), paragraph writing; credit hours, 2. Cadet service.

Second Term—Drawing (4), free-hand; credit hours, 2. General chemistry (1), inorganic; credit hours, 5. German (1), elementary; credit hours, 4. Mathematics (8, 9), trigonometry and algebra; credit hours, 2, 3. Rhetoric (2), theme writing; credit hours, 2. Cadet service.

Third Term—Drawing (2), lettering; credit hours, 3. Metallurgy (1), mineralogy; credit hours, 3. German (1), elementary; credit hours, 4. Mathematics (10), plain analytics; credit hours, 5. Rhetoric (3), prose analysis; credit hours, 2. Cadet service.

—Second Year.—

First Term—Ceramics (1), chemical laboratory extending through the year; credit hours, 4. Drawing (7), projections; credit hours, 3. Mathematics (11), analytics and calculus; credit hours, 5. Physics (3), mechanics and heat; credit hours, 3. Shopwork (A4), woodwork; credit hours, 2. Cadet service.

Second Term—Ceramics (2), chemical laboratory extending through the year; credit hours, 4. Drawing (8), descriptive geometry; credit hours, 3. Mathematics (12), calculus; credit hours, 5. Physics (4), electricity and magnetism; credit hours, 3. Shopwork (B3), forging; credit hours, 2. Cadet service.

Third Term—Ceramics (3), chemical laboratory extending through the year; credit hours, 4. Drawing (10), shades, shadows and per.; credit hours, 3. Mathematics (13), calculus; credit hours, 5. Physics (5), light and sound; credit hours, 3. Shopwork (D4), chipping and filing; credit hours, 2. Cadet service.

—Third Year.—

First Term—Ceramics (4), general principles; credit hours, 5. Mining engineering (4), mine surveying; credit hours, 5. Mechanical engineering (1), analytic mechanics; credit hours, 5. Rhetoric (4), advanced; credit hours, 2.

Second Term—Ceramics (5), bricks; credit hours, 5. Ceramics (7), advanced chemical laboratory work; credit hours, 5. Mechanical engineering (1), analytic mechanics; credit hours, 5. Rhetoric (4), advanced; credit hours, 2.

Third Term—Ceramics (6), pottery; credit hours, 5. Ceramics (8), advanced chemical laboratory work; credit hours, 5. Mechanical engineering (2), strength of materials; credit hours, 5. Rhetoric (4), advanced; credit hours, 2.

—Fourth Year.—

First Term—Ceramics (9), manufacture of bodies; credit hours, 5. Drawing (14), photography; credit hours, 2. Geology (2), general; credit hours, 5. Metallurgy (3), fuels and iron; credit hours, 5.

Second Term—Ceramics (10), glasses and glazes; credit hours, 5. Ceramics (12), cement; credit hours, 5. Geology (4), economic; credit hours, 5. Ceramics (13), ceramic construction; credit hours, 2.

Third Term—Ceramics (11), enamels and colors; credit hours, 5. Ceramics (14), reports on clay prop.; credit hours, 5. Ceramics (15), thesis work; credit hours, 5.

It is hoped that those who saw the defects of the industrial course will find in this engineering course the various deficiencies tolerably well filled. In fact, their error was in expecting of an industrial course that which the present new course is designed to accomplish. Without giving a synopsis of the work as now laid out, it will suffice to say that the main difference between the two courses is in the preparation which is exacted for one and not for the other. A comparison of the two will, of course, show that the four-year men will go somewhat further in the study of clays and ceramics than the two-year men, but the principal thing is that their minds will be so drilled that they will far surpass the short course men in the "grasp" or "control" which they will obtain of such subjects as are a part of either schedule. Also, the engineering training, which develops the ability of the student to plan, draw, execute and operate his conceptions, in the four-year course, is equal to that of any engineering course which the institution offers to the public.

For purposes of comparison the industrial course as offered for the succeeding year is here given:

—First Year.—

First Term—General chemistry (1), inorganic; credit hours, 5. Physics (1), elementary; credit hours, 5. Mathematics (1), algebra; credit hours, 5. Cadet service.

Second Term—General chemistry (1), inorganic; credit hours, 5. Physics (2), elementary; credit hours, 5. Mathematics (2), geometry; credit hours, 5. Cadet service.

Third Term—General chemistry (2), analytical; credit hours, 5. Geology (1), physical geography; credit hours, 5. Shopwork (B4), forging; credit hours, 3. Shopwork (D4), chipping and filing; credit hours, 2. Cadet service.

—Second Year.—

First Term—Ceramics (1), analysis of limestones; credit hours, 4. Ceramics (4), general principles; credit hours, 5. Geology (2), general; credit hours, 5. Cadet service.

Second Term—Ceramics (2), analysis of clays; credit hours, 4. Ceramics (5), brick; credit hours, 5. Geology (4), economic; credit hours, 5. Cadet service.

Third Term—Ceramics (3), analysis of glazes; credit hours, 4. Ceramics (6), pottery; credit hours, 5. Drawing (17), mechanical; credit hours, 5. Cadet service.

The difference between the two courses is also made apparent in the training required before undertaking either. For instance, the requirements for admission to the four-year course are as follows:

1. The applicant must be at least seventeen years of age.
2. He must present a certificate of good moral character from his last school or instructor.
3. He must bring credentials of scholarship from his last school or instructor.
4. There are three methods of admission to the university:
   (a) By certificates from other colleges or normal schools.
   (b) By diplomas from accredited high schools of Ohio.
   (c) By examination in the following subjects:

1. Arithmetic, descriptive and physical geography, English grammar and United States history.
2. English—(a) Composition and rhetoric. (b) English classics.
3. Algebra—Wentworth's or Wells's Elements, complete.
4. Civil Government—Fiske or Thorpe preferred.
5. Geometry, Plane and Solid—Venable, Wentworth or Wells.
6. History—Myers's General History.
7. Latin, German or French—About equivalent to two years' high school work.
8. Physics—Gage, Carhart and Chute, Avery or Appleton, complete.

The requirements for the two-year or industrial course are as follows:

Applicants must be not less than sixteen years of age, and unless they are over twenty-one years of age must pass an examination in arithmetic, geography, grammar and orthography, or bring high school or other certificates for these branches.

Here, also, the dominant idea of each course is clearly apparent. In the latter we wish to throw the doors open to all who come, well content with whatever progress they make, no matter how poor, if only we are sure that it is the best which they can attain. No one of even very moderate ability need fear that he will fail to keep his place if he can show that he is trying hard to do so and is making any headway. But there is no place here for the lazy or trivial-minded, and such will not be allowed to make the low requirements of the industrial course an excuse for doing less than they can properly accomplish.

But in the former course the institution recognizes the heavy duties and grave responsibilities which must fall on its graduates, especially the earlier ones, who must pioneer the way, and hence the requirements are such that none but men of good ability, good training and earnestness of purpose need consider them as within their range.

Wm. Lloyd Evans, M. Sc, First Assistant Director Clayworking Department Ohio State University.

But to carry all this plan into reality will mean an increase of facilities, will it not? Even so, and they will be provided. Aside from apparatus and plant, which has made a constant and healthy growth from the first, the new work will require added instructional force, and to meet this requirement I take pleasure in chronicling the appointment of Mr. William Lloyd Evans, M. Sc., as the first assistant. Mr. Evans graduated from the university in 1892, making his thesis on the "Effect of Sulphur Compounds on Clays." He obtained soon after an appointment as assistant chemist of the American Encaustic Tiling Company, of Zanesville, O., whose vast plant is the largest in the world devoted to this one branch of ceramic manufacture. Here Mr. Evans spent two busy years in the daily grind of a commercial laboratory, where the analysis of clays, bodies, glazes and colors was his business all the time.

Returning to the university then as a fellow, he has spent two years more, one-half of his time being devoted to teaching chemistry and the other half to new and advanced work, by which he has just won his master's degree.

From these facts it will be seen that Mr. Evans's acquirements are peculiarly fortunate for this position, combining experience both in teaching chemistry and executing the analytic work of a ceramic laboratory. In the division of labor for the new course Mr. Evans will take virtual charge of the chemical laboratory, and young men who are permitted to learn the intricacies of ceramic analysis under him may consider themselves fortunate. Being relieved of all but a nominal responsibility in the chemical part of the work, it will now be possible for the director to put at least a part of his time and force on the practical problems of clayworking which most need solution for the benefit of the craft.

It is not unlikely that the friends of the school may be feeling a little anxious to know what we have done so far, and possibly not a little impatient at the amount of "romancing" which we have allowed ourselves to do concerning the future. If any such feeling exists I do not deny that it is justifiable.

What about the past? Well, the readers of the Clay-Worker have already heard about the organization, equipment, students, etc., and really the only thing which has not been told is the story of the last year's work. You have all read in the formal statement of the course of study the names of the subjects on which the time has been spent. But do not many of you entertain a deep-seated doubt of its value? Do these terms which have been used mean very much to you, and would you feel much more confidence in a man merely because he had studied them? This brings us to the question, "Is it possible to teach the principles of clayworking in school?" Many have said that it is not, and many have thought so without giving expression to their idea. Perhaps the best answer to these questions and doubts would be a short account of the work done during the last term by the class who have now gone forth to earn their living.

The subject in studying has been pottery manufacture, as the brick and other coarser wares were treated during the winter term. Langenbeck's "Chemistry of Pottery" was used as the basis of the work, and though it has some important deficiencies, and was not designed as a text-book by its author, still it remains the most available accumulation of ceramic technology in the English tongue. In a recent communication from one of the best white ware potters of the country he said that while the book was a mine of information to him, still he found much of it unintelligible, and that the most of the potters found it all "Greek," and that, having purchased a copy of the book, they rarely opened its pages.

Our work has covered the following subjects:

1. Pyrometry and the Seger cones.
2. Red Wares or Earthenwares—Common raw clay bodies and no glaze.
3. Stonewares—Natural or raw clay bodies, with salt and slip glazes. How to make slip clay out of a common red clay by addition of suitable reagents.
4. Yellow Wares—Natural or raw clay bodies, with soft, raw lead glazes, either clear or of a brown color.
5. C. C. and White Granite Bodies—Artificial bodies compounded from the pure mineral ingredients of natural clays. Principles of the formation of such bodies and experiments showing the effect of each ingredient.
6. Fritted White Ware Glazes of the Lead-Boracic Acid Type—Principles of the "fitting" of a body and glaze to each other, and practical demonstration of the same by fitting a glaze to a body.
7. Porcelain Bodies and Glazes—Typical bodies used for porcelain manufacture, and the leadless, hard-fire glazes employed on such bodies.

The regular arrangement in each of these subdivisions has been to first take up the subject in the lecture room, and after drilling the students in the calculations needed, work was adjourned to the laboratory, where each man made his own body, his own glaze, his own ware, and finally burnt them to the required temperature. Each student actually did all of the work which a master potter would do in making a new body and fitting it with a glaze, and more than any master potter has been so far accustomed to do in making the Seger cones by which he regulated his burning.

Do you recognize in this list of topics, or rather in the power to handle them correctly, anything of value to your superintendent, or foreman, or burner, or glaze maker, or to your son or yourself? Would it not be likely to be useful information, or, rather, if you knew it, would you not be likely to find a place to use it? I think you would.

A word as to the qualifications of the students who have completed the course. They are six in number, and they represent the hard workers, out of a total enlistment of eleven, who began work together. As stated elsewhere, we can put up with everything but laziness or lack of interest, and such as could not show themselves in dead earnest were gradually made to see the futility of their trying to complete the course. The names of the six young men who have completed the work assigned as well as their respective abilities allowed, and who hold the certificate of the school to that effect, are as follows:

Elmer E. Gorton, Tonawanda, N. Y.
J. W. Wolfley, Delaware, O.
Edward J. Jones, Zanesville, O.
Carl Giessen, Canton, O.
David C. Thomas, New Straitsville, O.
Everett Braddock, Richfield, O.

In addition to this list, Mr. Samuel Geysbeek completed a special course in ceramics and ceramic chemistry with great honor, and I am glad to state that his exceeding faithfulness and unique acquirements have already won for him a position of great responsibility and bright prospects. The responsibilities resting on these young men are great. On their success and on the tact and perseverance which they use in convincing the clay industries that they can be useful to them depends in large measure the future success of the school.

But the responsibility does not belong wholly on one side. The scholars and teachers have labored hard to fit themselves for their share of the work awaiting them. But no amount of equipment, library, museum, no list of expert teachers, no brilliance of scholarship in the graduates can do all that is needed to make the work of the school a success. If the ceramic industries of the United States are to succeed to their rightful place in the race for international supremacy it must be by means of the technical education of the rising generation; but not their education alone can accomplish the end desired. The industries must do their share, and no one can do it for them. They have two plain duties: First, to give their rising generation opportunity to prepare themselves for the struggle ahead, and, second, to help them to use their acquirements when they have laboriously prepared themselves for their work.

A student who has finished a technical course is like a roll of sensitive film which has passed inch by inch before the lens of a camera. As the roll lies in the darkness of the camera it is a useless thing, a mere roll of transparent fabric, coated with a yellowish scum of chemicals, not to be distinguished in its appearance from one which has never been used. But in this wondrous coating there lies recorded in each molecule the lights and shadows which make up the grandest views of nature, the most delicate and complex of the productions of art, and the most subtle shades of human humor. And only when this roll has been through the mysteries of the "developer" and has been printed do we realize its wonderful powers and exceeding usefulness.

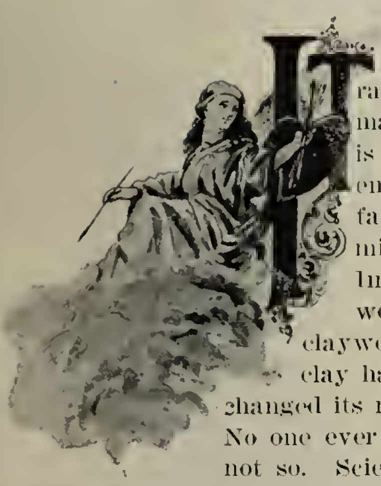
In this homely illustration the student represents the sensitive film. His mind is stocked with facts and figures, which are only useful when brought into the "developer" of business and professional life. It is to the intelligent rank and file of our American clay industries that these points are submitted, with full confidence that they will see the close application of the same, and that they will see to it that opportunities are not lacking for these young men to complete their education in the shop and factory.

PAVING BRICK BUSINESS GOOD IN IOWA.

The Des Moines (Ia.) Leader says in a recent issue: "The season of 1896 will be the most prosperous the four big plants in Des Moines, manufacturing vitrified brick for paving purposes, have experienced for several years, and with but one exception, the year when so much brick paving was done in this city, will be the best. When the season opened the indications were it would not be very prosperous, as but few contracts had been secured outside the city. Since the opening, however, additional orders from several cities that will do considerable brick paving have been received, and the assurances are reasonably good that the full output of the plants, amounting to 60,000,000, will be reached before the season is over. Contracts have been awarded that call for over 40,000,000 of brick."

It is not a question, it is a fact, and a fact best appreciated by the man who conducts his advertising properly, that proper space intelligently used in a trade journal which reaches the purchasing class can be made to yield far better results than any circular advertising, however handled, and at one-fourth the expense.—Glover, in Fame.

"SCIENCE, FALSELY SO CALLED."



IT IS SAID that the devil is sometimes arrayed as an angel of light. However this may be, it is unquestionably true that error is sometimes clothed in the garments of science. The apostle Paul spoke of "science, falsely so called," and we have it in our day mingled with the literature of clayworkers. In almost every work that treats of ceramics we read and in almost every convention of clayworkers we hear the statement that after clay has been once subjected to a red heat it has changed its nature and will never become plastic again. No one ever learned that on a brickyard, because it is not so. Science is a knowledge of facts. It is immaterial whether they have been brought to light in a brickyard or in a laboratory. We take with too unquestioning confidence statements of professors and chemists, even when they refute the plainest teachings of practical knowledge, and so this venerable old lie has been allowed to live until it appears to have the sanctity of truth. Now, you old brickmakers know better. All of your salmon brick have been brought to red heat, and yet you dare not sell them for weather brick. You know they will all go back to clay again if left on the ground a few winters. Indeed, it is quite possible to take a load of salmon brick, put them through the dry pan, pug mill and auger machine and make even a better brick than could be made from the fresh clay. But I think I hear a professor say: "Brick that have thus dissolved to clay again were never brought to what I would call a red heat." Ah! perhaps not. But have you not often said before your class in geology that this great globe of ours was once, long "before Adam was a boy," "one incandescent mass?" How learnedly you have talked to them of peridium clays having been formed by the decomposition of granite rocks! Were those rocks ever redhot? What became of the chemically combined water? Please put your review (?) of chemistry and geology together and see how they will fit each other, for, if they do not, be assured that "there is something wrong in your philosophy."

"From harmony, from heavenly harmony, this universal world began;
Turn harmony to heavenly harmony, through all the changes of its course it ran."

G. S. TIFFANY.

STRIKE AT LIMOGES.

AN IMPORTANT strike of employes of the porcelain works, at Limoges, France, took place early in June last, which seems to have caused a general stoppage of manufacture at that famous potting center. The strike has long been in process of incubation, so to speak; and as long ago as April last the local journals began to discuss the situation by printing the demands of the men and the reply of the employers.

The chief demand is, of course, for more wages, to which the employers answer that the margin of profit is so narrow, in view of the foreign competition the products of Limoges have to meet, that an increase of wages is simply impossible, since it would be impossible for the employers to recoup themselves by raising the price of the wares. German competition is cited as being especially severe and oppressive, and chiefly because German workmen in the same lines are paid an "incredibly low price" for hand work.

The first demands of the workmen were made about election time, which public event interrupted the negotiations, which were resumed early in June, after the election, the employers simply "standing pat," by referring to their former answer.

The firmness of the employers caused the workmen to reflect and to proceed cautiously, with the result that their demands were reduced to the single one of an increase of pay to one class only of workmen, the burners, and June 6 each of the employers received notice to that effect.

Everything, then, seemed about to be arranged amicably, when the kiln hands, the setters and burners, of the Guerin works demanded an increase of pay, threatening an immediate strike if refused. All the journeymen refused, also, to make the regular eight-day week, and immediately left the works. Next day the retouchers also struck.

M. Guerin reported at once to the Employers' Association, who at once agreed to close all the plants in case the strike was continued, and posted notices in their works to that effect. The usual eight-day proviso appeared in the notices, giving the men that length of time to change their minds, in order to conform to the law and the usage of Limoges. The notices seem to have had no weight, for, almost immediately after they were posted, the men quit work and on June 15 the strike was general.

It appears from the organ of the federated unions of the workmen that they insist that they will not return to work unless the following scale of wages is adopted:

Chief setters (or foreman at kiln)	200	francs per month
Assistants	3.50	francs per day
Chief thrower	120	francs per month
Second thrower	3.75	francs per day
Third thrower	3.25	francs per day
Assistants	3	francs per day
Burners	3	francs per day
Chief of kiln gang	4	francs per day
Others	3.50	francs per day
Enamelers (male, or females doing the same work)	120	francs per month
Enameler of decorations	3	francs per day
Retoucher (male, or females doing the same work)	4	francs per day
Retouchers (females)	2.50	francs per day
Placers (male)	3	francs per day
Placers (female)	3.50	francs per day
All others, journeymen or those under sixteen years of age	3	francs per day

All night work, except firing, and all piece work must be abolished.

The Moniteur de la Ceramique says: "It is quite certain that these demands, involving a sort of revision of labor tariffs for several classes, have no chance of acceptance."

WATER-PROOFING BRICK.

Experiments made to ascertain the length of time that brick and sandstone are rendered water-proof, or protected, by oiling show some valuable results. The oils used were linseed oil, boiled linseed, and the crude mineral oil known as "blue oil," and the exposure was on a roof fairly exposed to the sun and weather, the bricks being good, sound, machine-made. It is stated that the amount of oil and water taken up by the sandstone was very much less than that absorbed by the bricks, although the area of the sandstone cubes was much the greater. Equal amounts of the raw and boiled oils were absorbed; the blue oil, however, was taken up in much greater quantity by both bricks and sandstone, but by the end of twelve months the whole of the thirteen and one-half ounces of blue oil had apparently evaporated, and the brick had returned to their original state, but those treated with raw and boiled oils were unchanged. Finally, it was seen that the sandstone cubes treated with raw and boiled oils returned to their origanal weights, but not appearing to have lost the good effects of the oils, being practically impervious.

GALESBURG, JAN. 19-20, 1897.

Secretary G. C. Stoll advises us that it has been decided to hold the next annual meeting of the Illinois Clayworkers' Association at Galesburg, Jan. 19 and 20, 1897. Further details will be given later on.

Written for the CLAY-WORKER.

SOLID AND GASEOUS FUEL.

BY D. W. STOOKEY.

IN THE DECEMBER CLAY-WORKER Brother Waplington still contends "that all solid fuel must be gasified before it is available as fuel." I thought I had explained very explicitly in the October number that this is not the case, and took free, solid carbon as an example. I admit that many fuels do pass into the gaseous state before burning, but I do not admit that all do. I further claim that this one exception, solid carbon, is such a large part of our ordinary fuels that its share in producing the total amount of heat is very considerable and cannot be disregarded in studying the heat producing values of different fuels or of any given fuel in different forms.

I want to make some plain statements, and trust that Brother Waplington will not take offense if I seem to be blunt, for I certainly only want to get at the truth of the matter, as I believe he does.

Gaseous fuels burn wih a blaze or flame. The flame is of different colors and different degrees of luminosity, depending upon the composition of the gas being burned. Lumps of free, solid carbon burn with a red glow and do not assume the gaseous state until partially burned by uniting with the oxygen of the air and forming carbonic oxide or carbon-monoxide, where one atom of carbon has united with one atom of oxygen. The carbon has now changed to a gaseous fuel and will complete its burning by each molecule taking up another atom of oxygen and forming carbon dioxide or carbonic acid gas.

As was shown in the October number, nearly one-third of the total heat of the carbon was evolved by the union of the carbon with the first half of the oxygen, whereby the solid carbon was first transformed into carbonic oxide, or carbon-monoxide. Now, since this solid carbon has united with oxygen, that is, burned, and in this uniting has evolved heat, it may be called a fuel, and hence a fuel will burn without first passing into the gaseous state.

Brother Waplington takes hydro-carbon fuels as types of all, and by the use of the candle and kerosene lamp shows that the fuels are gasified before burning. This is evidently true for the fuels mentioned, but does not prove the statement for all fuels. He further says: "Gaseous carbon is only hypothetical or an assumed substance, not having been obtained in a free state, at least not to my knowledge."

As we cannot consider carbon as a gas by itself, we can only hope to find it in gaseous form when chemically combined with some other substance, as oxygen in carbon-monoxide or carbon dioxide, or with hydrogen, forming the hydro-carbons.

By considering the substances in solid fuels we will see that there is nothing present in sufficient quantities to unite with all, nor nearly all, of the carbon of the fuel that would gasify it previous to combustion. The constituents of the fuel itself are carbon, hydrogen combined with carbon, as hydro-carbons and ash, with some other substances in very small quantities, so small as to be inconsiderable. Everything in the fuel, therefore, that could combine with carbon to gasify it is already appropriated, with a large surplus of solid carbon remaining.

The only other possible source is the air, which is composed of a mixture of oxygen and nitrogen, with very small amounts of other substances. As the union of oxygen with carbon is combustion, we cannot consider that in this connection and have nitrogen left as the only substance that is present in any considerable quantity. Carbon and nitrogen do not unite together, and hence we have no possible means of gasifying our surplus of free carbon save only by union with oxygen, which is combustion, and in which solid carbon is the fuel.

Further on Brother Waplington says: "There appears to be no question about carbonic oxide bearing the first installment of heat given out by carbon. * * * If this be conceded, I fail to see where the question arises, for I am not aware of heat being derived from any of the ordinary carbonaceous fuels previous to their gasification."

This surely is a queer statement. In reality the first installment of heat is produced from solid fuel by imperfect or incomplete combustion, and the products or results of this incomplete combustion of a solid fuel are heat and carbon monoxide. In other words, the carbon monoxide is a product, with heat, of the combustion of a solid fuel, and is in no sense the cause of the first installment of heat. It is a new fuel that has just been formed by the incomplete combustion of another fuel, which was solid and was available as fuel.

—This Is Important.—

This subject is an important one and is of economic value in the industries. The discussion of it here is not simply for the gratification of the ambitions of Brother Waplington and myself, but in order that the truth may be known. Many scientific investigations and discoveries that seemed to be more curious than useful have, in time, proved to be the foundations upon which valuable industrial inventions have been erected.

The student of physics twenty-five years ago was taught that a metal plate vibrating before an electro magnet produced electrical currents of varying intensity in the wire with which the magnets were wound, and yet this scientific fact was known many years before inventive genius caused the metallic plate to vibrate by the impulses of the human voice and gave the telephone to be the servant of man.

Mankind has known for generations that the human voice produced waves of varying length and intensity in the air, and yet it was left for Edison, of the present generation, to receive these waves upon a sound disc and record them by means of a metallic point upon a cylinder of wax, and give to the world the so-called wonderful phonograph. Instead of being wonderful, the phonograph is absurdly simple, and the wonder is that it was not produced ages ago.

Radical changes are being made in many fields of industry, and the realm of fuels and heat production are feeling the influence of the times. The old anxiety as to the exhaustion of the supply of coal is relieved by the prophetic suggestions of scientists and inventors, who talk of heat wells for obtaining our needed heat from the interior of the earth, and of windmills and storage batteries for accumulating electricity, to be afterwards utilized in the production of light and heat. Already Niagara is partially harnessed and made to grind light and heat and power in competition with the coal producers and gas companies of the Empire State.

The manufacture of artificial gas from solid fuel for the production of light and heat is an old industry, but added interest has been awakened in the subject by the recent discoveries and experiences with natural gas. The use of natural gas showed so vividly the desirability of gaseous fuel that renewed interest has been awakened in the production of fuel gas artificially. The advocates and friends of artificial gas have so far realized their anticipations that they have claimed, as I stated in a previous paper, to produce more efficient results from a given amount of coal by first converting it into fuel gas, and then burning that gas in the furnace, than was obtained in the ordinary coal burning furnace by the burning of the same amount of coal. If this be true, it stands as a shame and rebuke to the inefficient methods of manipulating the combustion of coal in our modern furnaces, for it is surely inevitable that a portion of the potential energy of the coal will be lost by the lack of perfection in the gas producer, and as I have shown above, that part of the stored heat of the free solid carbon is evolved in converting the solid into gaseous carbonic oxide. I cannot but believe that coal burned directly in furnaces should give more economical results than when subjected to the more complicated methods of fuel gas production and burning.

—Fuel Gas.—

While I am on the subject I would like to express a few ideas as to fuel gas, its composition, formation and combustion. I may be in error in some of my ideas, but if I am and express them it is in the hope that by exposing my ignorance Brother Waplington will come to my rescue. I hold that it is no disgrace to be ignorant, but it is to remain so when we have opportunities to be enlightened.

When fuel gas is mentioned we naturally think of the common illuminating gas used in all large cities. As I understand, there is a vast difference between them. They are both formed by heating coal or some fuel in order to volatilize or gasify the combustible constituents of the fuel. Illuminating gas retains its gaseous condition at all ordinary temperatures and contains only a portion of the combustible ingredients of the coal from which it has been made. A residue of impure carbon is left in the retort as coke. Tar and several other objectionable substances are extracted by a system of purification before the gas is ready to be sent out from the gas works.

In the production of fuel gas, as I understand, all substances in the coal that are volatile at the temperatures of an ordinary furnace are gasified and passed directly to the gas burner, without being allowed to cool at all. This list of volatile substances includes the hydro-carbons, tar, sulphur, water, ammonia, etc. Since the draft of the furnace of the gas producer passes with the gas to the burners, we have, in addition to the volatile gases above named, carbon monoxide, which is formed by the incomplete combustion of the solid carbon. This partial combustion is necessary in order that the carbon may become gasified and pass, with the other gases, to the burner. The fuel gas, which thus appears to be of a very complex composition, is further diluted by the nitrogen of the air and a variable amount of carbonic acid gas resulting from the complete combustion of some parts of the fuel. I say a variable amount, for it may be more or less, depending upon the efficiency with which the apparatus is manipulated. As only enough air is to be admitted to the gas producer to gasify the fuel, the problem of supplying the air necessary to the combustion of the fuel gas must be met at the burner.

Knowing that this subject is one that Brother Waplington has studied and in which he is interested, I take this method of trying to induce him to write upon the subject. He may not care to, but if he is willing I for one would like to have the matter thoroughly discussed in the columns of the Clay-Worker. There are several reasons why gaseous fuel is desirable for clay burning, and if artificial gas can be made to take the place of coal at prices not too much in excess of the cost of coal I am sure the clayworking world want to know it.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 45.

—Steel Continued.—

AS STEEL now enters largely into the composition of the tools and machinery necessary for the modern clayworker, he ought to become pretty well acquainted with the different grades of steel and their properties, and he will be no loser by knowing what causes so much difference in the qualities of this indispensable metal.

It is no uncommon occurrence for the user of steel tools to complain of the poor quality of the steel he is using, when a definite and intelligent order would have secured just the quality needed. The steel complained of may be poor for the purpose to which he is submitting it, but it is an excellent steel for some other purpose. The finest tool steel would make very unsatisfactory steel rails, and the finest rail steel would be as unsuitable for tools. Tempering, also, has much to do with the working results of a tool. A chipping chisel, if tempered very hard, would give results about as gratifying as a nicely vitrified paving brick that has been spoiled by chilling or quick cooling; both would splinter as soon as touched by a hammer; on the other hand, a razor with the temper drawn down very mild would shave about as well as a sheet of tin.

Tool steel is not a sufficiently explicit term to order by, for, although it may secure your crucible steel, it is indefinite as to the hardness you require. Do not imagine the steel maker or merchant inquisitive if he asks you for what purpose you want it; he only wants to supply you with the grade suitable for that purpose.

The mere mention of tempering steel implies that it is not its chemical composition alone that we must rely on, but on its mechanical make-up as well, for tempering is purely mechanical, and, in most cases, confers toughness on hardness. Take again, for example, the nicely annealed vitrified paving brick.

In determining the kind of steels we require for certain purposes we must consider the kind of duty they are expected to perform. There is considerable difference in the requirements for chipping tools and those for turning, boring and planing; that is, a different grade of steel is required for a chipping tool and a planing tool. Boring and turning are very similar to planing, all three cutting by a steady and constant pressure, while a chipping chisel and a blacksmith's "set" do their cutting by percussion, or by blows from a hammer. Now, the planing, boring and turning tools may and should be made of harder steel than chisel steel so as to retain a good cutting edge for a long time, whereas, if a chisel were made of such hard steel, a piece would, most likely, fly off the edge or the head every blow struck. From what has now been said, I think it will be apparent how ambiguous is the term tool steel. There can no fine line be drawn which will define where steels for different purposes will be indicated, nor any prescribed rules laid down for tempering, only in a general way, and then it is presumed that steel with a certain carbonization or hardness has been used in making the tools. As a rule, it may be stated that soft substances require the hardest steels, especially where fine cutting is needed. Here I would observe that cutting must not be confounded with pushing aside nor with tearing apart.

Razors, lancets and other surgical cutting instruments of good quality are made of hard steel, and are stiffly tempered. This is to enable them to carry a fine, keen edge.

The hardest steels for soft substances may appear paradoxical to some, but it is a well-known fact that a chisel to cut hard cast iron must have a milder temper than if it were to be used on wrought iron much softer; of course, it would also need a modification of the cutting edge angle.

—Machinery Steel.—

This is another class of steel that requires a good, wide margin for quality, because the uses are so varied and multifarious. In numberless cases has steel ousted good wrought iron, and in many instances with advantage in both price and quality, notably so with steel rails. I remember a good deal of old fogyism and determined opposition by engineers to steel rails, and the same kind of spirit is daily manifested by old-time brickmakers to the improved methods of to-day. Steel boilers and steel shafting, especially steel boilers, met with similar opposition, and does yet, but, to a very limited extent, they have all proved the survival of the fittest, and now it is steel everything, almost. And what was it that made it possible to furnish the engineer and machinist with such cheap and suitable steel for these various purposes? The inventions of Henry Bessemer and C. W. Siemens. Their inventions will be noted later on.

I wish here to make a few remarks in the way of a slight set-off to the oft-repeated assertions of our excessively practical, non-scientific brethren, who, no doubt, sincerely believe what they preach about the practical side of brickmaking and clayworking generally. I would here have it understood that while I by no means ignore the necessity of manual training in the yard or shop, and this applies to any shop or works of any description, I am pretty well convinced that if his training and practical experience is confined to what he derives from the yard or shop, he is by no means an accomplished clayworker or other mechanic.

Old stagers delight in disparaging what they are pleased to call theory and theorists, and some of my friends lose no opportunity of informing us that A is no brickmaker, neither is B. "Why, seven years ago one was in a dry-goods store and the other a clerk in an insurance office." They neither of them know anything about brickmaking, but they think they do. "They are great theory men."

I observe that these great theory, know-nothing, dry-goods and insurance clerks appear to be forging ahead of the bred and born practical men, who can only emptily boast of being the third generation of brickmakers. These practical third generation brickmakers follow in the wake of their non-practical theoretical brethren in the adoption of improved machines, kilns and dryers. How is this? There must be something in this much despised theory. Let us look into the matter.

Theory, according to my lexicographer, is "speculation; that speculative science which is distinguished from art." And theorist, "one given to theory and speculation." Theoretical, "depending on theory or speculation; not practical."

Now, for a clearer conception of these words or their full meanings, we must consult other works besides dictionaries. A text book on physics will modify and enlarge our views on this subject. Any acknowledged good one will do. My preference is Anthony & Brackett's, but there are scores of others, much easier to read, and few, I think, any harder; still, I prefer the one named, therefore quote from it.

As the basis of all our knowledge of nature is observation and experiment, it follows that "'to be of value, experiments must be conducted with system, and so as to trace out the whole course of the phenomenon. Having acquired our facts by observation and experiment, we seek to find out how they are related—that is, to discover the laws which connect them. The process of reasoning by which we discover such laws is called induction. * * * In conducting our experiments, and our reasonings likewise, we are often guided by suppositions suggested by previous experience. If the course of our experiment be in accordance with our supposition, there is, so far, a presumption in its favor. * * * The term hypothesis is usually employed instead of supposition.

"Concerning the ultimate modes of existence or action we know nothing whatever; hence, a law of nature cannot be demonstrated in the sense that a mathematical truth is demonstrated. Yet so great is the constancy of uniform sequence with which phenomena occur in accordance with the laws which we discover that we have no doubt respecting their validity.

"When we would refer a series of ascertained laws to some common agency, we employ the term theory. Thus we find in the 'wave theory' of light, based on the hypothesis of a universal ether of extreme elasticity, satisfactory explanations of the laws of reflection, refraction, diffraction, polarization, etc."

From the above it will be seen that many brickmakers and clayworkers generally misuse the term "theory" to a great extent. We know, of course, that by a theoretical man they mean a man with only opinions of his own, a hypothetical or supposititious man, but if we accept the scientist's definition of theory it must be conceded that so far as knowledge of nature is concerned we are all theorists and cannot rise above it.

The art of doing a thing is another matter. The art of tempering clay by treading it with bare feet, and making bricks by hand is not indispensable to-day. That branch of science called mechanics has very nearly supplanted hand and feet work in tempering and molding clay. Science is also invading the burning of it, hence the burner of twenty-five or thirty years' experience in old-time burning is being taught how to manage his fires by a youngster who probably never burnt a kiln of bricks in his life, and the practical old hand molder stands by his newly-purchased brick machine and takes lessons from the young mechanic who erected the machine for him. Yes, the young machinist is teaching the old brickmaker how to make bricks, and how the clay should be tempered, too. And now what has caused such a change to come over the scene? The infusion of theoretical ideas into the clayworker's art, divergence from the deep worn ruts of our forefathers, and an unquenchable thirst, nay, even a very pressing demand, for improved methods of manufacture, etc.

Messrs. Bessemer and Siemens were the theoretical men, or two of the men, who revolutionized the manufacture of steel and iron. Were these men practical iron and steel workers? Not they. I venture an assertion that neither of them ever puddled a heat of iron or melted a pot of steel in their lives, yet the world justly acknowledges them at the head of the iron and steel business. And what placed them there? Why, they were firm believers in laws and facts that science has revealed to such as care to see them, and their observations, experiments and reasonings were all methodical; they did no guess experimenting and wondering what would be the result. Their experiments were all reasoned out and the result partly, if not wholly, foreseen.

I have gone out of my course a little to warn my young friends against the inconsistent idea that to become a practical brickmaker it is necessary that you should be born and bred in a clay pit, and that only those of this birth and breeding ever know anything about brickmaking or ever become successful in the business.

In my next some of the wonderful discoveries of the two gentlemen named above will be described.

WM. WAPLINGTON.

Written for the CLAY-WORKER.

THE COMING ERA FOR GOOD BRICK AND GOOD PRICES, AND THE WAY TO HAVE THEM.

BY J. W. CRARY, SR.

THE TIME HAS COME when the quality of brick is of far more importance than the quantity. The ancients were satisfied with sun-dried brick, excepting, perhaps, at the building of the Tower of Babel, and then it is reasonable to suppose that only burned brick were used in the foundation and for facing the outside of the walls. When the Romans began to build they found that sun-dried brick would not stand their climates, and they necessarily had to learn the art of burning brick to a certain extent. This was done by piling up, or setting, a small kiln, which was "cased," and "daubed," and fired forty-eight to sixty hours. Of course, the brick were very imperfectly burned, but enough could be picked out to front or face the walls of a building and protect it against winter weather. The Romans introduced the art of brickmaking into England and into all their provinces, and the remains of their buildings show that considerable progress was made in the art of brickmaking. Modern Europe has made great progress and improvement in brickmaking, but with all their advance in the art, their kilns of brick are not of uniform hardness or perfect burning. Their best kilns show several grades of brick, about six or seven in the common kiln.

—The United States Has Excelled All Other Countries in Brickmaking,—

Both in quality and quantity, yet we have several grades of brick in every kiln. Our best average kilns have the "arch," the "paver," the "dark front," or "stretcher" and the "light stretcher," and the "dark" and the "light salmon." In some of our markets these brick are assorted and sold according to the grade. The average kiln will turn out about one-half first-class hard brick. The difference in price between first-class hard and salmon is about one-half, and the difference in other grades and first-class hard is about 25 per cent. Now, if we take, say, the New York brick market, putting first-class hard at $5 per thousand, second-class at $3.75, and salmon at $2, we have $412.50 for 100,000 brick. Now, if this 100,000 brick had been burned as it should have been, it would have counted out 90,000 hard, $450; 10,000 salmon, $25; net, $475—showing a gain of $52.50 in good burning.

—This Shows the Difference Between Skillful and Unskillful Burning.—

So, if a brick plant makes 10,000,000 brick per year and pays a thoroughly competent brick setter and burner a salary of $3,000, he saves $2,000 clear, saying nothing of reputation for making first-class brick, which is of primary importance to permanent success. The time is at hand when inferior brick are and will continue to be rejected by all respectable architects and owners of buildings. The honest, competent architect knows that a wall well and properly built of first-class brick is the only kind that is suitable for a good and valuable building, and that it is very bad economy to try to save money by using cheap, inferior brick. A house that costs, say, $4,000 will take 100,000 brick. The cost of 100,000 good hard brick, delivered at the building is, say, $700; the cost of 100,000 inferior brick is $500, a saving in brick of $200, and an indefinite loss in the value of the building, but at least $1,000. In fact, it cannot be compensated by a deduction of cost between good and bad brick. It is like a "blow hole" in iron-cladding for a ship. The ship would be worthless if even one faulty plate were used. This matter of good and bad brick is commanding a lively and respectful attention with all architects, owners and builders. There has been some sharp and cunning management in the interests of inferior brickmakers. One of the games is to get brick enough of a first-class manufacturer to face and front up walls, then go to the botch brickmaker and get his inferior goods for "filling in," and thus the building contractor is making a show of good work by stealing the name of the good brickmaker. Another game is for all the brickmakers to form a trust or syndicate to sell all of their brick. A common fixed price is agreed upon. The members of this association are composed of all sorts of brickmakers. There are six bad, botch brickmakers and three good expert ones. The syndic, or trustee, goes on and sells the bad brick on the reputation of the good brick. Large sales are made, and the account is made up showing the average profit, which is divided pro rata, without reference to the quality of brick, so that the good brickmaker is really selling the bad brick of his neighbor without credit or profit to himself. There are other plans and tricks of botch brickmakers, such as getting largely in debt to those who will be compelled to take their brick or else lose their claim. Bright and sharp as "Uncle Sam" is, I have known him to be badly fleeced by sharp brick botchers.

—The Only Remedy for These Evils Is to Educate People in Good Brick.—

Let brickmaking be a profession, as in law or medicine. Money without brick brains will never make a true brickmaker. It requires a peculiar and high order of talent to make a first-class brickmaker. A man with money who never opened a law book might just as well try to start a law office by hiring a lot of lawyers, "jack legs," etc., as to start a successful, first-class brickmaking business without a full, practical knowledge of it. The thing is not only inconsistent, but it is presumptuous and illiberal.

Let thorough experts make brick. Such men don't want to start mammoth brick plants. They want to see and direct everything, even to details, on the place. No sane, reasonable man should or would want to make over ten millions brick in a year. If he is a man of capital and desires to put it all in the brickmaking industry, let him buy clay lands and start the leasing or royalty system. Furnish expert brickmakers with all needed means and let each one have a yard that will turn out, say, a half million brick per month. This would give the poor expert brickmaker a chance to live, and the royalty to the owner would be a better and surer profit than he could make if he had all combined in one great plant.

—It Is Claimed that Big Brick Plants Can Make Brick Cheapest.—

I deny this; the proposition don't hold good in any legitimate business. Employes and superintendents must be increased, expenses and risks are multiplied, while profits remain at the minimum, with always a tendency downward because of competition, which is likely to be encouraged by the example set before it. If A doubles his plant, B will say, "I must keep up with the procession." So, before long, the supply outruns the demand, and then it is too late to avoid the resultant losses. This is just now the situation in many of the big brick markets. If the greed of the big brickmakers had been confined to reasonable operations the price of brick would have been maintained, and all concerned would have been employed steadily at fair pay.

All real expert, well-skilled brickmakers should have a perfect understanding, tacit or otherwise, that they will not increase their "output" beyond a present ready, good demand, and that they will not knowingly sell brick to those who want them in order to hide and work up "salmon brick" and other low-grade brick used by the common speculative builder. Every well-skilled brickmaker should advertise in such a way as to show the difference between a good brick and a bad one, so that the general public would soon learn and know a good brick from a bad one, and that it is always good economy to use the best brick for all permanent, valuable work. It is a singular fact that brickmakers seldom advertise. They seem to think that everybody knows, or ought to know, that they are making brick. True, a good brickmaker don't need to advertise his brick much, as they are always in demand in good times, but brickmakers who are really entitled to the name by virtue of their skill in the business should take the special pride and interest in their profession to show the public, by a proper advertisement, that there is a difference between good and bad brick, and that the good brick is always the cheapest in the long run or in present intrinsic value.

—Brick Are Not Like Most All Commercial Commodities.—

People don't expect common store goods to last forever, but if they buy what they think is a good brick (excepting fire and paving brick) they think, of course, it will last forever. Now, the proper way for good brickmakers to do is to show the general public that no brick is suitable or reliable for good building purposes unless it has been made of good clay by an expert, and thoroughly burned. Once get this idea to be popular by constant talk and advertising and the brickmaker that carries six or seven grades of brick in stock will either close up or post up. So long as the consumers of brick are made to believe that a salmon brick is just as good as a hard brick for all inside work they will patronize botch brickmakers. Any good architect or builder will say that if what is called a "nine-inch wall" is built of good hard brick by an expert bricklayer it is stronger and more reliable than a "thirteen-inch wall" with salmon brick "filling in." The perfect "nine-inch wall" is not only stronger than the "thirteen-inch wall" "backed in" with salmon brick, but it saves four inches of room, which, in many cases, would be more than equal in value to the whole cost of the wall. Salmon brick can be properly used for inside furnace work or for inside chimney flues, or for any inside temporary work, but for permanent building no good builder will use them.

—To a Certain Extent Good Brickmakers Have a Monopoly.—

There always has been, and it is quite probable that there always will be, a scarcity of first-class skill in this line of art and industry. Any well-disposed, sensible young man can, in reasonable time, become fairly qualified to follow any trade, profession or industry outside of brickmaking. A good mechanic, bookkeeper, lawyer, etc., in one place, can just as well work and practice in another place. He simply has to practice the same rules, art and skill over and over. The repetition involves no new problem or principle, but when a man learns to be a first-rate brickmaker in one particular kind of clay, and then goes to another place to make brick, where the clay is very different, he then becomes a student instead of a master. For instance, he has learned to make brick thoroughly where the clay is, to a very great extent, infusible. Now he is called to a place where the clay is fusible. He would be "green," and would have to set and burn several kilns before he could properly fill his new position. So, as I have often said, in and out of the Clay-Worker, until a university is started to teach practical brickmaking in all kinds of clay the only way that a man can become a first-class brickmaker is to visit and work at places and brickyards where each works a different kind of clay, and, when all taken together, use all kinds of clay that will make brick.

—The Coming Professional Brickmaker.—

Within a very few years we will have the professional brickmaker. He will first graduate in a school of the Prof. Orton sort. That will give him the science of the art. Now, if he is mentally and physically qualified to be a true brickmaker, he will spend at least three years in visiting and working in brickworks that are entirely unlike, so far as their clay is concerned. Now all this will need a peculiar kind of young man (for it would be a hopeless task for an old man). He must have plenty of good common-sense brains; he must have a good, natural, healthy physic for patient study and endurance; he must be calm, deliberate and yet prompt and watchful; he must watch for new things to happen, while waiting for old things to happen; he must be on the alert to detect and provide for any new phase in the appearance or development of his work in hand, and all this requires science as well as practice.

—There Are Phenomena in Brick Business Peculiar to Itself.—

If, for instance, we set two kilns in all respects exactly alike; now we set fire to them at the same time and fire both alike, as near as possible. In one the fires will work even and uniform from "head" to "middle," all over the kiln. In the other the fires will work uneven and in spots. Now, this will quite often happen, though all the conditions present are, to all appearances, exactly alike. Now, of course, there must be a cause for this difference in the action of heat, but the cause is so "occult," so hard to detect, that it rises to the dignity of witchcraft in the minds of the fellows that burn brick by "main strength and stupidness."

—The Causes of This Inequality in the Action of Heat Are Various.—

In some spots the brick may have been a little too wet, or set a little too close or a little too open. Then the draft in the furnaces may be a little unequal, or there may be a slight difference in combustion of fuel in the furnaces, or, in changing the watch of firemen, one of them may be unskilled or careless. These and other things may happen and not be noticed by the common superintendent. I have watched all these things with intense interest in order to see if there could be fixed an exact rule and formula for setting and burning brick with uniform certainty in grade and quality, without some system of controlling the heat independent of draft or combustion of fuel in the furnaces. And after careful and repeated experiments I have found that the only possible way to direct and control the heat in a brick kiln with uniform certainty is to "damper" on top of kiln instead of bottom.

—The Old and Common Way of Controlling Heat in a Brick Kiln—

Is to increase or diminish the draft and heat in the "arches" or furnaces. This is done by opening or closing the doors or slacking the fires. This not only exposes the arch brick to unequal temperatures, which check and crack the brick, but fails to control the draft up through the kiln as desired, besides the loss of time by the different changes of temperature. One of the most essential things in burning brick perfectly is to get up and maintain a regular, uniform heat in the arches sufficient to burn the brick and hold the heat until it rises to the top of the kiln.

—The Only Way to Control and Distribute the Heat in an Up-Draft Brick Kiln—

Is to damper the top. It is impossible to properly control the heat in any other way without serious injury to the kiln. The fire will come out uneven and in spots on top of kiln. When these spots are sufficiently burned they must be covered so as to cut off the draft and deflect the heat to colder, unburned places, and this covering must continue until the whole kiln be covered, without any change in the fires in the arches.

—The Above Outline of My System of Burning Brick—

Has often been stated in the Clay-Worker, and most of its readers are familiar with it, but it is of such vital importance to the new brickmakers and to those who contemplate changes and improvements in their systems of setting and burning that I think it right and proper to repeat the peculiarities of my process for their benefit. When a man starts a brickyard one of his most important considerations is the setting and burning. If these points can be successfully assured at reasonable cost, he can afford to venture a little in other things until experience corrects his mistakes.

There are two things absolutely necessary to success in brickmaking, viz.: good clay and good setting and burning. The great mistake of many who start as brickmakers is that they first look for clay and machinery, trusting to chance for setting and burning. I have no space here for speaking of any of the different kilns advertised and in the market. All have their peculiar merits, and the "down-draft" idea seems to be most popular. It claims to great excellence over the old so-called "Dutch kiln," which means the common old up-draft kiln, or clamp, and the old style of setting and burning. I admit that the down-draft kilns are better than old-fashion up-draft kilns, with their way of setting and burning, but when a man asserts that no kind of up-draft kiln can be made or used to burn as good brick as a "down-draft kiln," to put it very modestly, I will say that he does not know what he is talking about.

—In the Way I Set and Burn Brick in an Up-Draft Kiln—

I can get a stronger heat, and more regular and intense, than can possibly be had in a "down-draft kiln," unless it had an air blast. In my system the combustion of fuel is more perfect and the heat more intense than in any down-draft kiln. I can melt or vitrify all the brick from bottom to top of kiln, and do it with natural draft in furnaces. Can any "down-draft kiln" do more than this? It is absurd to say that any degree of heat descending is greater than the same degree ascending. I have no brick kiln patent to sell and have no interest for or against patent kilns. I ask no favors. I invite no controversy, but will say that it is unbecoming in "down-draft" advocates to assert that only "down-draft kilns" will burn paving brick. No down-draft kiln burns a larger percentage of hard brick than my up-draft kilns.

Written for the CLAY-WORKER.

THE DEMAND FOR SCIENTISTS IN THE INDUSTRIAL WORLD.

ONE OF THE MOST serious epochs of a young man's life is the few weeks, or possibly months, immediately subsequent to his graduation from college, when he chooses for himself a vocation in life. I say chooses for himself, though in many instances the young man is waiting to find some industry which has a vacancy unfilled and feels disposed to make a selection of a man whom they think is best prepared to meet the exigencies of the position. The largest percentage of young men enter scientific schools immediately after graduating from high or preparatory schools, therefore the average age of the graduates from our scientific institutions does not exceed twenty-two or twenty-three. The best of them are well drilled in all the useful scientific branches—in fact, have studied their subjects so exhaustively that they could become experts in any one of them by giving their time to further study and practice in a special line of work. Only those who have derived the benefit of a scientific education can realize with how much ease a young man is able to grasp the scientific principles and laws upon which the processes of any of our industries depend. Every man, young or old, who becomes associated with a manufacturing industry, is capable of making himself valuable, not by prosecuting the actual routine work which is set before him alone, but by suggesting improvements in the methods of manufacture of a product, no matter how simple or small these changes may be. It is a single step toward a cheaper and better way of reaching satisfactory practical results. Now, for a young man to be prepared to suggest changes which will be valuable and not so impracticable that no real good can be derived from them, he must have, first of all, a general knowledge of the sciences. With this he will be able to see at a glance upon what physical or chemical laws a process depends, and can interpret the real effects of the various methods of treatment used in bringing the raw material into the form of a fine finished product. Many of the foremen and superintendents of factories in this age are working at a great disadvantage, and why? Those of us who have been connected in any way with a manufacturing industry and have familiarized ourselves with its movements, even to the slightest detail, can understand how very often responsible and valuable vacancies occur and have to be filled. I mean by that such positions as general manager, superintendent of the works or the foreman of a department. Most manufacturing concerns follow the old custom of advancing their employes, step by step, from the lowest positions to the highest, as they prove themselves worthy of the promotion. This being so, the majority of men who are filling the most responsible practical positions to-day have worked up from a boy's simple duties, and by reason of their industrious, sober habits, rather than any particular manifestation of brilliancy, they have been advanced to a high official rank. There are many features in relation to such a place which recommends it strongly for adoption in a general way in any firm or corporation. The ties which bind old associates together and their experience, having both been of a long duration, are sure signs that where such men are placed they are liable to remain and discharge their duties to the best of their ability. On the other hand, usually these men have had no more than a common school education, and, therefore, are never capable of comprehending the scientific principles upon which the different manufacturing processes depend. The consequence of such a lack of scientific knowledge among the head practical men is to destroy and discourage any progressive spirit which should exist in these factories. In this case the controlling power is a man of only a crude practical insight into his business. He is to be consulted upon all suggestions before any employe is permitted to enter upon a large, practical test of any scheme; but since he is not a scientific man the new idea does not impress him with the same force or value as it does the mind which is fired with a thorough scientific education. In this way manufacturers are making great mistakes. I think the trouble lies just here: Manufacturers appreciate the value that a scientific man is in any of their industries, but for some reason they still labor under the delusion that the graduate students who come from a scientific school must have the promise of a large salary before they are willing to enter into the employment of a corporation. This is such a serious mistake, and for which I think the manufacturers are to blame. Just count the number of young men who graduate from our best scientific schools every year, standing ready after they leave college to begin work in some mill or factory at a moderate salary. All of these young men have the good sense to realize that they have accumulated only a theoretical knowledge, the rough edges of which have yet to be trimmed down by practical experience. They look at the first year or two after they leave college more as a continuation of their studies along a special line of work. At the end of that time the student finds himself falling into the ways of and making himself valuable in business. Then his scientific education begins to make itself felt by giving him a deep insight into the processes of a factory to such an extent that constant thought results in the development of improved practical methods and a means for obtaining a better product. After many years of experience the student, by virtue of his general knowledge of the sciences, has made radical changes from the old, the manner of treating and handling his stock from the raw to the finished state.

I should think many of our small manufacturers, who do not support even a clerk who knows anything of the advanced sciences, would begin to understand the advantage which they would derive by following out this plan. Their inability to accomplish this is certainly not because young scientists do not stand ready to prove to the small corporations that they can "begin at the bottom of the ladder," or that if the progress they make is not satisfactory from a financial standpoint they are not willing to withdraw from service. As a bit of encouragement to the young technical graduate I will say that the field for investigation and new discoveries is not being exhausted by any means. Many of our old bright and capable inventors have worked long and achieved much in solving the many problems of chemistry, mechanics and electricity, but the valuable and extensive data which these old teachers leave has only helped us to see more possibilities of invention. When the student begins to apply his sciences in some industrial work he can see at once that years of study and research do not even begin to exhaust this field, which still possesses such infinite resources of undiscovered laws and forces, but rather help us to appreciate something of its vastness and scope. No, the theory is certainly a false one, so often heard from the blind, uneducated minds, that the old and wise chemists have determined all that there is to be known of the chemical nature of organic and inorganic matter, and that we must seek long and diligently before we find important problems which have not already been solved—and this is as true of mechanics and electricity.

CHARLES FERRY.

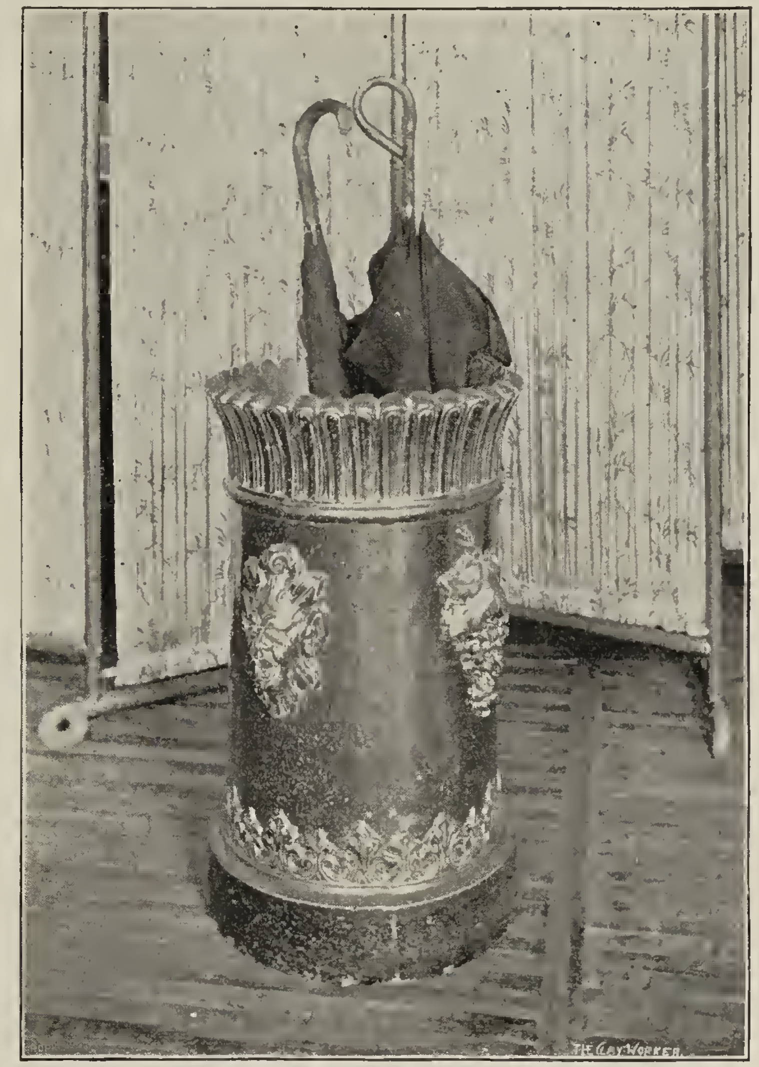
Troy, N. Y.

READY FOR THE RUSH.

The Leader Manufacturing Company, Decatur, Ill., write that they have practically replaced their patterns lost in the Union Iron Works fire during last August. They are again accumulating a stock of their standard machines and have taken extra precautions to prevent a recurrence of a similar loss. The number of patterns burned as 1,272, and were of such machinery as they build regularly. At the time of the fire they were fortunate in having on hand a large stock of goods, and have been able to supply all demands made on them without serious delay. While their goods have not been on the market long enough to become antiquated by any means, and gave the best of satisfaction, they did not neglect the opportunity to further improve the designs where advisable and practical, and now feel that their specialties, as enumerated below, are fully up to the highest standard of the present time, as regards design, material, workmanship and efficiency. Their line now consists of auger brick machines, power represses, pug mills, disintegrators, crushers, automatic cutters, elevators and the usual line of supplies suitable for all capacities. Their course, under the circumstances, indicates a large amount of faith in the future of the better class of brick and brickmaking machinery. For that reason they propose that each and every piece of machinery turned out by them shall be the best of its class. Among recent shipments are two represses to Danville, Ill.; a brick machine to McLeansborough, Ill.; a grinder to DePere, Wis.; a brick machine and power to Vandalia, Ill.; a brick machine and power to Sullivan, Ill., and a repress to Marietta, O.

A HANDSOME UMBRELLA HOLDER.

A VERY USEFUL souvenir comes to the Clay-Worker sanctum from the great clayworking establishment of Evens & Howard, St. Louis, in the form of an umbrella holder. Our readers may see by the accompanying engraving that it is handsome in design and very substantial, thus being well suited to hard, everyday office use. In color it is mottled brown, salt glazed, and is particularly appropriate for our "den." Evens & Howard are among the largest producers of sewer pipe and fire brick in America, their ware being recognized as standard the country over. In addition to these products, they also make a large variety of chimney tops, hollow building blocks and glazed terra cotta ware of all kinds, including an attractive line of lawn ornaments. If the reader wants anything of this sort we advise him to write them for illustrated price list.



ADVERTISING.

EXTENSIVE advertisers—those who have by advertising methods built up great businesses—never cut their advertising because of temporary depression in business. They know that if they keep up the good work they are "in it" with the revival. The best results from advertising come to those who "keep everlastingly at it." "In time of peace prepare for war." In time of quiet prepare for business. Patrons are used to looking to advertisements for guides in purchases, and one who drops out of a standard advertising medium is measurably dropping out of business. It is a wiser plan to stick to the ship, and by signs of enterprise, rather than signs of distress, prepare for the brighter days which are ultimately certain of realization.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

The Chicago Spirit.

Editor Clay-Worker:

Your letter of inquiry regarding the reason for the non-continuance in business of the Illinois Building Material Company was duly received. I am also in receipt of several other letters bearing upon the same subject. I have also read your obituary notice, as well as dear Captain Crafts's eulogy on the Connecticut institution. Up to this time I have held my peace, and should continue to do so were it not that my silence might be construed into a sort of acquiescence of the strictures made upon me. My reply will be brief.

There can be no comparison made between sixteen Connecticut brickmakers and sixty-eight of the same trade doing business in Chicago.

The man who could successfully guide the Connecticut team and only break his leg would doubtless break his neck trying to direct the movements of the Chicago team.

The Chicago brickmakers are willing to show down with their Connecticut brethren on the question of which has the greater mind or intellect.

The editor of the Clay-Worker, in his bran new uniform of sackcloth, with his raven tresses filled with ashes, mourns as one without hope. Let not his heart be troubled. It may be that the present cause of his great sorrow is but the silver (no reference to the present political situation) lining to the cloud so obscuring his avaricious vision.

To my dear Chicago brethren, who have worried so much over my shortcomings, who have intimated plainly their belief that the idle wheels of my brick machinery were running at lightning speed in my head; to the dear friend in the Nutmeg State, who seems impressed with the belief that Chicago brickmakers are minus sense, minus brains, and in a fair way to be minus bread and butter, and to all others anxious or troubled about my course during the past months, let me say that up to this date no complaint has reached me from any stockholder of the company under my management, and no intimation that it met with their disapproval.

Lastly, my private opinion, thus publicly expressed, is that only those financially interested in this company have any right to a voice in the conduct of its affairs. Yours respectfully,
D. V. PURINGTON.

Chicago, July 1.

Kentucky Clays and Clayworkers.

Editor Clay-Worker:

For the past few weeks the fire-brick yards of this section have been doing but little. The demand for their product has fallen off, and there is no immediate prospect of increase in any of the markets reached by the local product. Most of the yards are running in part force only, though one or two are going well. With anything like the ordinary conditions the business would have opportunity for most pleasing results. Fire clay has never sold cheaper at the mines than this season. The prices, f. o. b. cars, at the several principal Carter county clay mines range from 85 to 90 cents per ton, where but a few years ago, under similar conditions, the price was as high as $1.25 per ton. This applies to the No. 1 clay entirely. No No. 2 clay is brought in from Carter county. There is ample supply close at hand here to furnish all necessary. So it is also with plastic clays at Ironton, only the No. 1 being brought in from a distance. The depressed conditions locally are due to no small extent to the short-sightedness of the operators, who have confined their attention in the past principally to the demand of the coking and furnace regions of Virginia and West Virginia. Now they are appreciating the fact that they have missed grievously by not going more persistently after the trade of the South, and that territory will come in the coming season for more than usual attention. At present the only works that have any particular hold on the Southern markets are the several Portsmouth plants. The brick made in this immediate neighborhood equal in every respect the Portsmouth product, the same clays and same methods being employed, and the local operators count upon beating Portsmouth out in the matter of price, as cheaper production can be had here. The advantage in this respect comes in the way of cheaper fuel and plastic clays, all of which have to be taken to Portsmouth by rail. The two districts will be solidly arrayed against each other next year.

Here the Ashland Fire Brick Company have been running about three weeks, after a month's shut-down for repairs of a general nature. They are running to nearly their full capacity, and putting out as a day's work 12,000 brick. They make all kinds of fire brick and oven tile to any pattern, and have held a better run of orders than any of the local plants. The same clays are used—Carter No. 1 and local plastic. They are making no changes, and expect to be able to keep moving at their present lively rate for some time yet. Much of their trade comes from the coke fields of Virginia, while they have also some interests in the South.

The Clinton Fire Brick Works, another local concern, has been actively engaged also for quite a while, and are still running at nearly their full capacity. The same territory, to a considerable extent, is handled by this concern and the above-mentioned plant, both producing the same order of material and nearly uniform grades. This company has added lately some improved kilns, that are said to be furnishing most pleasing results, and all about the plant there are evidences of the improvement that naturally accompanies successful operation.

Opposite the city, in Ohio, on the line of the Norfolk & Western Railroad, is the Petersburg Fire Brick Company, formerly the Forest Dale Fire Brick Works. This plant is one of the oldest in the field, and but recently passed back into the hands of the original operators. They handle fire brick and tile, and have made some red brick the past few months, the latter only, or principally, for local use. Now they are running only about half time, and the future is indefinite. They have clay mines close at hand, and use principally their own raw material. Sales have been fairly good, confined largely to the South and West.

The Ironton Fire Brick Works, more in the city proper, have been doing nothing since the first of the month, and will not resume until business materially revives. They are now finishing the burning of a kiln that takes in all of their unfinished brick. This concern controls fire clay banks in Carter county, Kentucky, but uses a native plastic clay secured but a short distance from the plant. This is one of the largest plants in this region, and will produce about 25,000 per day. They make, in connection with their fire brick and tile, red brick and paving material of high grade.

The Parker & Austin Fire Brick Company's works, in upper Ironton, are making only about 8,000 per day now, and may shut down completely unless there is a revival in the demand. Their capacity is about 12,000, and this figure is nearly averaged in the usual runs when full-handed. All brick are hand-made, and any size or quality of brick or tile is furnished per order. With their own clay mines in Carter county, native plastic clay beds under their management, and cheap fuel, they expect to make a strong bid for Southern recognition in the fall and spring. They make no paving brick.

In the Carter county clay field the Olive Hill (Ky.) Fire Brick Works will resume on the 15th, after an idleness of several months. The company has an excellently equipped plant, with all the modern conveniences and machinery, and, with the best quality of clay, will be in shape for doing work that cannot be excelled. This company controls some of the finest fire clay lands in the entire field, and have everything favorable to success in plenty.

The mines of the Portsmouth Fire Brick Company, located near Brinegar, in Carter county, no very great distance from Olive Hill, are being worked most vigorously. This company has a very desirable tract of land in a good, rich vein, ranging from three to seven feet, and, with railroads penetrating it entirely, are in fine shape for operating to good advantage. This they are doing.

The several other operations on the mining order in the field are being pushed at a lively rate, and the indications are good for considerable more investment this season. The country bearing the clay is of liberal extent, not nearly all taken, and will eventually become of a value not dreamed of at present. The clay is the very finest, and always in demand.

Ashland, Ky., July 11. C. O. L.

Diversified Brickmaking.

Editor Clay-Worker:

The brick business itself is too dull to provoke a living thought worthy of a place in the columns of the Clay-Worker; but to suppose or even presume that brick men are men of only one idea and not able to take up thoughts on other lines is a libel on the average brickmaker. It would seem to me to be legitimate for brickmakers to consider and the Clay-Worker and other trade journals to open their columns to the discusssion of the subjects that are supposed to underlie the present dullness. This, I think, can be done without making it a political matter or discussing the subject in a partisan sense. The great absorbing subject of finance now before the public should not be regarded as a political question solely. Of course, it must come before the political parties, and it has come before them and "ripped them all up the back;" still, this financial question owes allegiance to no particular political party, but appeals to the people.

Brick men and others cannot have prosperous times whilst the subject of which is the best system of a circulating medium is in a state of chaos. When the giants in political economy differ as radically as they do, it would seem folly for plebeians to take up the subject, but the wise ruler of the universe often chooses the weak things to confront the strong. We do not propose to discuss the question, but venture to ask some questions and make some suggestions that may provoke thought and produce clearer views from others. It would seem reasonable to expect that the respective advocates of the several systems proposed would be able to state their views clearly and then back them up by clear and intelligible argument. But they do nothing of the kind. They assume everything and prove nothing. Their remarks will apply with more or less exactness to all shades of belief. But a recent case will illustrate the point. The seceders at St. Louis published what they called a statement of their distinctive principles. This statement occupied about two columns in the daily papers, and yet that part of their address that referred to their distinctive principles, "the free coinage of silver," was referred to in a space of about four inches of one column, and in such a vague and general way as to carry no weight with it as an argument. If the free coinage of silver will be such a universal blessing to this country, there should be some way found to prove it.

There are several countries which have the silver standard and free coinage of silver. Let the experience of these countries be fairly and truthfully stated. Japan has had the silver standard, and I have seen in print a statement made by an ex-representative from this country to Japan that the best mechanics in that country get but 26 cents a day, and some labor as low as 4 cents a day. What the silver standard has to do with this state of affairs is not stated. The experience of India and Mexico should be presented by the advocates of this system. The gold standard advocates have the experience of several enlightened countries, and these should be presented. We are in darkness on this subject and light is wanted, let it come from where it will. It is claimed from the experience of other nations that two metals of unequal intrinsic value can never be circulated on a parity, unless the stronger guarantees the weaker, as in this country, and in that case it is but a single standard after all.

Now, a pertinent question is this: Why should we want a double standard in regard to money as a measure of value and not a double standard of measure in regard to other matters? We want no two yard sticks, one two feet and the other three, and both regarded as equal, or two standards in liquids or anything else. What is the single standard? We understand it to be the measure that measures all other things, even the paper and the silver dollar, and maintains its supremacy as a measure, not by the fiat of any power, but by its own intrinsic uniform value in all countries.

The advocates of the double standard claim that the silver dollar should be equally a standard with the gold dollar, while the one is worth 40 per cent. less than the other. It would seem reasonable that if the silver dollar must be a measure of value with the gold dollar, it should contain enough of silver to make it of equal value with its running mate—but we cannot pursue this further; difficulties present themselves on all sides. I am not sure that I understand what the advocates of the free coinage of silver at the ratio of 16 to 1 want the government to do. Will assume that they want the government to coin all the silver bullion offered, not only mined in this country, but all offered from other countries, and stamp, say, 60 cents' worth of the bullion as worth 100 cents, and guarantee it worth so much, and compel you and I to receive it as a legal tender at its face value. They not only ask Uncle Sam to do all this, but when they feel like it they ask this obliging uncle to give them 100 cents (a gold dollar) for their 60-cent silver dollar. If the government should do all this, say, for Mr. Teller's silver, why not for Mr. Jones's copper or Mr. Smith's aluminum. They may be as good citizens as Mr. Teller and as much entitled to a boost by the government as Mr. Teller.

These are some of the dark spots that need an X ray turned on them. But hold a minute; a thought has struck me with tremendous force. It is this: Would it not be well to have the government boost the price of brick and also cause old Money Bags to build? Now, in order to see the beauty of this 16 to 1 free coinage heresy, let us turn again to Mr. Teller. He presents $60,000 worth of silver bullion at the mint, and the government coins it for him and stamps it worth $100,000 and hands it back to him, and thus virtually makes him a present of $40,000. The argument in favor of this special generosity of the government to this certain citizen is that it will make money plenty and times good. It about assumes that Mr. Teller, having received a gift of $40,000 from the government, will shut his eyes and open his heart and scatter broadcast these $40,000, so that you and I, who have had heretofore to earn our money, may have a chance to pick up some of these 60-cent dollars. But Mr. Teller will do nothing of the kind. He will deposit his $40,000 with his $60,000, the same as other people, and you nor I can get a cent of it unless we earn it. How the fact that the government has made Mr. Teller a present of $40,000 is going to put money into our pockets is not apparent. Perhaps the advocates of 16 to 1 free coinage can tell, but so far they have not done it, backed up by any reasonable argument. It is worthy of note that the chief advocates of 16 to 1 free coinage are silver miners, and they simply want the government to advance the value of the product of their mines 40 per cent. The testimony of parties so deeply interested could not be received into any court of justice, and hence their advocacy of the financial system should be taken with many grains of allowance.

The government is the people and the hills where the silver ore is found belongs to the government, and hence to the people, so that it stands to reason if any one is to make 40 per cent. the government should have it. This would work no hardship to Mr. Teller. He would get the market value of his product the same as you and I do in other branches of business. It seems to me that this ought to be clear to the comprehension of all who are not blinded by self-interest. But, Mr. Editor, how the government, by a dishonorable act of favoritism to one class, will make better times is more than I can tell. If you have any light in your sanctum on this subject, turn it on.

There is another evil lurking in the folds of darkness that is extremely dangerous to the well-being of the body politic in this country. It is the fruit of the blind prejudice, and is kept alive by untruthful and unscrupulous demagogues. These demagogues impress the common people with the belief that the wealthy classes are their natural enemies, and this is carried so far that many of our laboring men think that because a measure is favored by bankers or financial men, therefore they should be against it and vote against it. The majority of the common people do not think to investigate for themselves, but are led astray by the designing demagogues. Because the intelligence of the world and the financiers of the world are in favor of a single standard, therefore they must, they think, have a selfish end to attain and want to rob the poor by making a small percentage on bonds, mortgages, bank stock, etc. This is the burden of the harangue of the demagogues. They are, however, careful not to mention the fact that free coinage at 16 to 1 means about 40 per cent. to the silver baron at the expense of the government, while the percentage of the banker is but a trifle in comparison.

J. K. CALDWELL.

DOWN IN JERSEY.

Editor Clay-Worker:

AT PRESENT writing the manufacturers of this district are shipping very little material. The hollow-brick factories are piling the stock in yards, apparently running only to keep men together. What the outcome will be it is hard to tell. Building operations in this city are still moving along as briskly as ever, but principally on small buildings.

The old Perth Amboy Terra Cotta Works have laid off all but a very few of the mold makers, with no future prospects. This is something unusual for this time of the year with this firm.

The C. Pardee Works are to be closed entirely July 1. It is said Mr. Pardee has sunk $1,500,000 in this plant within five years, prices on their product being too low to allow of a reasonable profit being realized on the investment. This is the only recourse. But as Mr. P. is a very wealthy man no one will suffer loss except laborers, who will have to look elsewhere for work. We are sorry to see this establishment close, and hope business may so improve shortly that it may again start up.

I see Mr. I. H. has undertaken the task of getting on my back for making a few remarks about his enamel. I hope, before this goes to press, to say a few more things. I wonder if what I said before hurt him any? I certainly have no desire to get behind my friend Jaquart. If I make a statement above my signature that is false I am always ready to "take water." If I am correct, "I will never, no never, go a-swimming." I simply made the quotations from a letter received from Mr. Jaquart upon the subject at his request, and say so plainly here, so I. H. will not think me "beating around the back door."

It is rumored upon the streets here now, July 1, that the C. Pardee works will not close down, but will be run in another name by a party who has been in the hollow-brick business before in this vicinity. We hope this is true, as it will keep the labor employed.

A visit to the Raritan Hollow-brick Company's plant a few days ago showed many changes. The Central Railroad of New Jersey have extended their tracks to this factory, and, with new trestles already erected, Keasbeys are "right in it" for handling clay and coal. This railroad will eventually be extended to Weber's factory, also Ostrander's, and, it is said, on to Bound Brook, there connecting with the main line from Philadelphia to New York. If this is carried out, a short route will be possible from Philadelphia to the seashore along the Jersey coast. At any rate, this gives the factories along the north shore of the Raritan a new outlet.

An experiment to test the hollow brick made by the Raritan Hollow-brick Plant has recently been made at their factory. A brick building about 10x12 feet square was erected, lined with hollow fire-proofing material. A large quantity of wood was placed inside the building and set on fire. After a fire had been raging for three hours at a very high temperature, a stream of water was turned on to quench the fire. An examination showed wonderful results. The material made by this firm under the skillful management of Mr. J. C. Rossi has always had a good demand. These tests are always being made to see just what results will be. They are no doubt expensive, but this firm never stops at expense if knowledge is desired.

A recent charter issued to Mr. C. W. Boynton and Henry Maurer for an electric road from Rahway to Boynton Beach looks as though these two clay manufacturers were looking out for the future welfare of their neighborhood. Mr. Boynton is the owner of Boynton Beach, the famous picnic resort on the Sound, three miles north of this city, as well as the owner of a hollow-brick plant adjoining the grove. Mr. Maurer's plant is south of Boynton and across Woodbridge creek. Evidently the intention is to bridge this stream and run the cars to Mr. Maurer's plant, and eventually to this city. As they are both very wealthy, no lack of capital will prevent. The grading and materials are already on the ground for the line from Rahway to Boynton Beach. With electric railroad connection to the north and the new outlet up the Raritan, along the numerous clay manufacturing plants, this city cannot be surpassed for shipping and traveling facilities.

For great hustling abilities Mr. Milton Edgar, the clay miner, of this city, is away up in G. A schooner of 650 tons was loaded last week in twenty-four hours. Six hundred tons of this clay had to be mined and hauled over one mile on a tram road to the river, twenty men doing the work. This is quick work, we should say. But as prices are low, everybody has to hustle nowadays to make the mare go. Mr. Edgar has recently imported from the State of Maine a thoroughbred trotter, record 2:17, so that now he can put the dust in most of his competitors' eyes.

Mr. Guy Weaver, who has been the traveling salesman for the firm of Mandeville & Hall, manufacturers' agents, of this city, has severed his connection with this firm, and is now in the same business on his own account.

Mr. Marcus Schautz, formerly with Isaacs's, now the Standard Works, is at present at the C. Pardee Works, handling the hollow-brick department.

We notice the genial face of the veteran clayworker, Mr. Philip Gibson, on our streets frequently. Evidently his health has returned, if an improved look is any evidence.

A trip to Weber's Fire Brick and Gas Retort Works, on the Raritan, a few days ago, showed this immense plant running full handed. As this firm make a specialty of gas retort work, they, of course, have a trade while other industries lag. People must have light, if other matters are delayed, and, of course, when a gas plant burns retorts out they must be replaced at once. I hope, in the near future, to give you a full description of this plant, which is a very complete one, and will no doubt interest your readers.

"The Protection and Prosperity" caravan cannot come too soon to suit yours truly.

It is rumored at this writing that the Perth Amboy Terra Cotta Works has received a large contract and that in a short time everything will be booming again. We hope this may be true, as the loss to the city merchants is great when their pay roll is stopped.

A visit to South River found the American Enameled Brick Factory doing some fine work. This firm has secured contracts for several large buildings in New York for their "single fire" brick, which, by the way, are giving great satisfaction to architects. Mr. Jacquart, the Superintendent, gave me a couple of hours' time talking over business prospects, which are extremely bright for this young establishment. Prices are better, but it seems the freight to New York is outrageously high, being over $5 per thousand, the hauling to buildings taking another five. It is a notorious fact that it costs more to freight enameled brick from South River, N. J., to New York, distance thirty-five miles, than it does from England to New York.

Common brick are selling at $3 at the kilns at South River. How the boss expects to take a profit from this is a conundrum. Still, they keep the wheels turning.

A great deal of rain during the latter part of June has no doubt spoiled many brick on the open yards. Of course, this comes in the expense account also. The balance sheet will no doubt show a loss this season. W. R. O.

Perth Amboy, N. J., July 6.

Ohio Valley News.

BUSINESS among the paving brick works continues very good, and an unexpected June rise in the Ohio river made it better, as many Southern contracts were filled and the stocks at all the paving brick plants greatly reduced by these river shipments.

The demand for sewer pipe is only fair and nearly all the plants have large stocks. The sewer pipe firms withdrawing from the combination, better known as the Central Sewer Pipe Company, show no disposition to cut on the Central Company's prices. The break was caused by dissatisfaction in the distribution of the orders, and those expecting to profit in the way of price cutting will be greatly disappointed.

Mr. R. A. Whiston, of Toronto, O., has leased the Lone Star Brick Works, located at Penrith, W. Va. This plant had been leased from E. A. Freshwater, the owner, about a year, to Miller & Sloan, of Toronto, who became greatly involved in debt and were compelled to make an assignment. Mr. Whiston has a ten years' lease and is a practical brick man, and this is an excellent plant, in the best of repair, with abundant clay of the best quality. It will be successfully operated beyond a doubt.

The Empire Fire Clay Company, of Empire, O., had about $2,000 worth of pipe and fittings destroyed, on June 24, by a small stream near their works overflowing and undermining a platform, upon which the pipe and fittings were piled, causing its fall and resulting in much breakage.

The Buckeye Fire Clay Company, of Uhrichsville, O., have built an addition to their brickworks for the manufacture of sewer pipe. This department has just been placed in operation, and their product will be sold through the Central Sewer Pipe Company.

Mr. S. G. Hilliard, of Philadelphia, succeeds De Haven Lance as Superintendent of the Mack Manufacturing Company's sewer pipe and brickworks at New Cumberland, W. Va.

The partnership agreement between the partners composing the McElfresh Clay Manufacturing Company, operating the old Anderson Bros.' Sewer Pipe Works, at Penrith, W. Va., having expired June 1, the plant has been closed down. The works had been leased from Mr. W. L. Standish, who bought the works in at trustee's sale six years ago. The works will remain idle pending a suit in the West Virginia Circuit Court, known as Joseph Campbell et al. vs. Anderson Bros. et al., W. L. Standish being the principal defendant in the case, and the one holding the largest liens and claims. Mr. Standish purchased the works at trustee's sale under a deed of trust which he held on the property for $42,000. In the suit brought by certain creditors of Anderson Bros. the validity of the deed of trust was attacked by the plaintiffs. The matter was argued before Judge Campbell on this phase of the case, and he handed down a decision which virtually set aside the deed of trust as null and void. No formal decree was entered at that time, and the factory and property in litigation will be sold at an early day.

A. J. Baggs, President and General Manager of the Royal Clay Manufacturing Company, located at Midvale, near Uhrichsville, Tuscarawas county, Ohio, made an assignment June 24 for the benefit of creditors of the plant of which he is President, to Ross J. Alexander, of Bridgeport, O. This was shortly followed by the assignment of Mr. Baggs. The liabilities consist of bonds of the company to the extent of $100,000 and $50,000 floating debts. The assets, which will fully cover all liabilities, consist of the company's works, built at a cost of $360,000; 137 acres of land, rich in coal and fire clay, adjoining the plant. The affairs of the company show that they have made money every year since starting, and they had been in tighter places before, but were able to keep afloat. This time a judgment note for $10,000 and another for $15,000 precipitated matters and the crash followed. The cause was low prices, inability to collect outstanding collections and an over-supply of manufactured goods on hand. The crash had been impending for some time, but had been averted by skillful management. Mr. Baggs, one of the heaviest stockholders, was on the company's notes individually to the extent of $60,000, and all his property, including his Bridgeport residence, built at a cost of $15,000, the planing mill property in Bridgeport, worth nearly $15,000, and two other pieces of property of less importance, are included in the assignment. There is a plan on foot among the bondholders, consisting of Parkersburg and Wheeling (W. Va.) parties principally, to put the big plant in operation. This is one of the largest sewer pipe works in the United States, and had the largest quota of orders in the Central Sewer Pipe Company, being entitled to 15 per cent. of all the orders received. BUCKEYE.

The New York Market.

SINCE LAST WRITING, the weather around this section of the country suits nobody, particularly the brickmakers and farmers. June, so far, has overdone the matter with rain. In the past two weeks the yards have lost seven days' molding from too much wet weather.

The men are growling because the loss of time cuts short their supply of Fourth of July money. The bosses know that they cannot ship smooth brick to market at the present rate and reach cost. As for washed, the rate is low; in fact, the buyer about makes his own price, as in the present case the green brick are badly washed, which comes under the head on the yards of nutmeg graters. Some of the pits have been drawn off the yard and made into double coal. With the rain came wind, which kept the men busy trying to keep the hacks covered, and on one yard removed part of the roof of the boarding house, as well as damaging the shed. Fire also took a hand to help reduce the bank account of Mr. Charles Walsh, but fortunately to not a very large amount. About $150 replaced the damage. The evil of the world, the small boy, was the cause. After quitting time, which here is about 6 o'clock p. m., the youngster started a fire between the wood under the shed and the river side of the shed. As luck would have it, it was not yet dark and was discovered in time, and by lively work the shed was saved. Just as the fire was under control one of those wind squalls which frequently occur in this neighborhood sprung up, and for a few minutes it revived the fire so that it looked as if it would make a clean sweep. Fortunately, it lasted but a few minutes. If the fire had slumbered in the wood bank till night, nothing would have saved from total destruction J. W. Gilles's and the Gardner Bros.' sheds, the combined length of the two sheds being eight hundred feet, as well as two dwellings used for boarding houses.

One of our manufacturers expected to have all his brick made by the Fourth of July, but he will have to mold after date for a few days to make enough to fill his shed. He will then have made seventy arches this season, and has still thirty of last season under the shed.

Editorially, over a year ago, when the brickmakers of Tidewater were trying to form a combination to help the trade, you said: "Will such a combination benefit the practical brickmakers, or will they become merely servitors for the capitalists and lawyers? is now the question before the Eastern brickmakers." Well, it did not materialize in the light of the past movements, as well as present, and from the columns of the last Clay-Worker it would seem as if the Chicago brickmakers, as well as the Eastern, want capitalists, lawyers or some one besides themselves to "mold" them into a compact business body that can run their own business so as to make money out of it, as they seem to lack the "sticky" nature of the material in which they deal. To read between the lines of the Clay-Worker, the practical brickmakers throughout the country, except the Connecticut manufacturers, need some one or a body of men who will hold them to an agreement among themselves. Do you not think so?

—How Is This for a Case?—

As your readers are aware of this last formation to help the trade, and formed on lines that eventually help most those who stick, one would think that all who signed would do all that was in their power to stand by the movement, and not do anything to embarrass the organization, especially when they have no cause to complain of the acts of those who are joined with them as a body to put money in their pockets. It takes but a small hole to sink a ship, and the withdrawal of one member might jeopardize the whole body by causing others who had not the nerve to withdraw under fire to ship out because so and so did. It is satisfactory to report that such was not the case, but the one who did should be ashamed of himself.

In my last report the Consolidated Company was moving along safely. About the 1st of June a new factor appeared. The buyers could get all the stock, or about all, that the demand required from the commission men, and let the consolidated brick lay at the dock. I might say it was a boycott by the dealers. If there was any move that should strengthen the newly-formed body for a united effort that move should have done it. To complicate matters, one of the Haverstraw members took his barge load of brick to a commission man to sell, as, he said, he had gotten tired of having her lay in market, as she had been there for ten days, and he knew the cause of her laying was because of the boycott. Why he did this is one of the things that will probably never be known, as his boat in other years has had to lay the same length of time waiting for a buyer. If it was the need of money, that was offered him, he knew that in the hands of the commission man he could cut price and get her unloaded. The company would not do that, but would help him if in need. He gave them no excuse for his action at that time, a time when such a course was detrimental to the success of a movement that was only a month old, and the parties that he knew his stock would go to were the ones that all the cry has been against as the cause for low prices—the commission man and the buyer. There are, we are told, necessary evils in this world, and such men as he must be one of them.

—Success and Failure,—

As depicted in your last number, cut a large, clean hole. Any one at all conversant with the manufacture of brick need only to put on his thinking cap to prove to his satisfaction every word of that article. As stated, to consider the consumption of brick in the territory within their reach—is there a limit to where brick cannot be sent by the present facilities of railroad?—one would say that within any distance where two loads a day, of a thousand each, or still nearer, where three loads a day can be delivered, would naturally be within the space which you would expect to deliver stock. In both distances our manufacturers were beat on prices last season by shippers forty miles distant, in the one case from Haverstraw, and the other, brick from South River, N. J., secured the contract. The success or failure of making brick in the future is one which will depend on the cutting of corners as close as possible.

—Local Trade—

Is dull, and it is a strange state of affairs that with six yards within a mile of town one yard delivers about all the brick, and as it is not because the quality is any better—well, they must be cheaper.

A small sewer is in course of construction about a mile from the yards which will require 100,000 brick. One of the manufacturers put in a bid of $4.85 per thousand, delivered—think of it!—and did not get it. His next neighbor was the successful bidder, as it was a case of lowest man win, and they seem to win all the time.

—The Market—

Has not felt the June shipments to the extent looked for. Undoubtedly the wet weather has had favorable action in retarding the forwarding of stock to point of sale. It may be only temporary. If next week should be clear they will be rushed on the market and a tumble of rates ensue.

It is rare in the last few years that it has been possible to report within a week of the Fourth a gain in price, but am able to do so on certain grades. The specials have advanced 12½ cents, and now bring $5.25. On all other grades the same quotations remain, from $4 to $5 per thousand, with top for Jersey, $4.50. A. N. OLDTIMER.

The Cheapest Brick Dryer.

Editor Clay-Worker:

I wish to ask through the columns of your valuable paper which is the cheapest successful brick dryer for a poor brickmaker. Cars, track, tunnels, steam, etc., are out of the question in price and expense of maintenance, etc. I make about 800,000 brick in a season. Am tired of spreading them on the ground and losing by storms. I make by the old reliable machine. Make a good, solid brick, that never cracks in any weather until they are in the hacks; then, if it is cloudy, they dry quite solid, but if hot and windy they become very shaky and break easily. They dry hacked under a shed, but it takes a month or more to dry them. A little advice from some one experienced will be very thankfully received. Hard wood is worth here $2.25 per cord; soft, $1.50. I had in mind a hot floor. Are they successful? I wish to make eight or ten thousand per day. GEO. H. JENKINS, Clayton County, Iowa.

THE CLAY-WORKER

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THE BUSINESS OUTLOOK.

We are in the midst of what should be a busy season with brickmakers. It is but truth to say that in some degree the promise of the early spring has not been realized. In commercial centers the preparations for as many large buildings as usual gave indications of a busy season, and the estimate of the summer's output of brick was made on that basis. While it is yet true that in the matter of large buildings there is little, if any, falling off from the demand of last year and the year before, yet the demand for brick is manifestly less now than at any time for several years, and the prospects of any immediate improvement are not flattering. This demonstrates that the country and village trade has not been properly estimated as a factor in the brick industry. This is partly because it is difficult in advance to obtain reliable statistics relating to this branch of the business and partly because so few realize the force of the old Scotch proverb, "Many a mickle makes a muckle."

It is not wise just now to spend too much time in inquiring who is responsible for this condition of affairs, for what is true of the brick industry is equally true of every other calling except the bicycle business, and probably the beer business also, if, indeed, each of these does not play an important part in the general disturbance of trade. Just how, we shall not stop to discuss. But there is a question of vital importance not only to brickmakers, but to all who suffer from the "times."

Premising that the times, after all, are not so out of joint as to forbode any permanent disorder to business or to the body politic, for they are just a repetition of what has happened about every twenty years, and is likely to happen periodically as a kind of reminder of the unsubstantial nature of terrestrial affairs, we wish to suggest what to do about it. First, don't get blue about it. Most of us can live on much less than we have been in the habit of living on, if we have to, and yet live much better than our fathers did; and don't give up the ship under any stress of weather; but, most of all, don't advertise your distress by any word or deed. Some people are never happy unless they are making a poor mouth about their personal affairs. They seem to have been born that way. The typical American keeps a stiff upper lip, even in the face of disaster.

DISASTER TURNED TO PROSPERITY.

In the thirties there was a disastrous fire in the city of New York, the most disastrous ever known in America to that date. It was a hard blow on many young insurance companies of the period, so that when the officers of the several companies met the next day many of them concluded there was nothing to do but surrender. When the Aetna directors met in private consultation they discovered that their loss would not only absorb the cash on hand, but it would eat up all their capital twice over. "We can do nothing but go into liquidation," said one of them. "We will do nothing of the kind," answered another. "This is our opportunity. We will just keep our mouths shut as to our real condition, put on a bold front, borrow money to pay losses and conspicuously invite our policy holders to call for their money without waiting for the expiration of the days of grace." They did so, and while a dozen or more companies with more assets and fewer losses went under, never to be heard of again, the really insolvent Aetna at once became one of the most popular insurance companies in America, and took a front rank for solvency and integrity, which it has held to this day, and all because of grit and gumption.

It may be necessary to curtail expenses, but be prudent in the selection of the items on which you retrench. Unless for other reasons than hard times you wish to go out of business, be careful to do or say nothing that will suggest even a thought of this. This dark day will soon pass over. Politicians wish to make capital of it, but business men understand that it is only a wholesome reaction from a season of indiscreet economic ventures. Keep your plant alive and let the world know you are at the old stand doing business or ready to do business when it offers. One of the secrets of the great success of the late A. T. Stewart and of the prosperous Wanamaker is that the harder the times the more they advertised and the more conspicuous they made themselves. Push things; don't let things push you, and you will come out ahead. Remember, "keeping everlastingly at it is what brings success."

THE MONEY QUESTION.

We have no desire to talk politics in the ordinary sense, but we feel keenly that our own, as every other, business interest is in the balance, and ask our readers, irrespective of party affiliation, to consider seriously the conditions that confront the people from a business standpoint. The money question is one that affects everybody, and none more seriously than the laborer. It therefore behooves us all to consider the subject dispassionately and without prejudice, remembering that we are all dependent one upon another. Whatever tends to help the employer helps the employe, and vice versa. If our monetary affairs are disturbed and business is paralyzed, capital and labor will both suffer. If, on the other hand, wise counsel prevails, as we believe it will, and confidence in the stability of our currency is restored, we will enter upon a new era of prosperity that will bring as large a measure of profit to the wage earner as to his employer. Both classes are equally interested in solving the problem of what constitutes "sound money."

SIXTEEN TO ONE.

A few days ago a man of more than average intelligence asked: "What is really meant by the phrase, '16 to 1,' so often heard in discussing the silver question?" For the benefit of those who have been studying clay more intently than monetary affairs we will state briefly that it simply means that since 1837 in our American coinage there is about sixteen times as much silver as gold in a dollar, though not exactly. But this does not apply to halves, quarters and dimes. There are in the latter only fifteen and a half to one, corresponding with the French franc and its fractions and multiples. But it has not always been so. In the first coinage, that of 1786, the ratio between silver and gold was about eleven and one-fifth to one; that of 1792, about fifteen and two-fifths to one. These changes in ratio were made so as to make the currency value of gold and silver in a dollar as near their commercial value as possible, but as the latter changes under the law of supply and demand, just as the relative values of corn and oats do, it is impossible to maintain the ratio on the basis of real value.

FREE AND UNLIMITED COINAGE.

In all early mintage gold and silver of the required fineness were coined for the owner in unlimited quantities, free of cost; that is, taking to the mint a pound of bullion of either metal, he took away a pound of coin in the same. While the relative coin value and commercial values of the metals remained substantially the same this worked no great inconveniences, but the unusual output of gold about the fifties, without a corresponding increase in the output of silver, made the silver in a dollar worth more than a dollar in gold, hence owners of silver bullion would not have it converted into coin, and much of that already coined was exported as bullion or was used in the arts at home, and the silver dollar disappeared from the currency, though the halves and quarters and dimes, being less valuable, remained. The mint was ready to do the coining free, but the owners of bullion would not permit it. This continued about twenty years. In 1873 the mint ceased to coin silver dollars entirely, as it could not afford to pay for the privilege.

DEMONETIZATION OF SILVER.

This term, as used in political parlance, is misleading. Every silver dollar that had escaped the artisan or exporter retained its full legal-tender character, but being too expensive, relatively, the government ceased to coin it, coining only gold. But about that time, unexpectedly, the silver mines of the world, largely through new machinery and new methods of separating the metal from its native impurities, began to put silver on the markets of the world in such quantities that the quantity in a dollar, which had sold at $1.03 to $1.05, went down to 90, then to 80, then 70 cents, and so on, until it is now worth only about 53 cents. When, therefore, the government resumed coining silver dollars in 1878 it bought silver at the market price, in such quantities as is supposed to be sufficient to maintain the parity between the coins, the difference between the commercial value and the coin value incurring to the government, not to the owner of the silver thus coined. The owners of the silver mines contend that the government should still coin all silver brought to the mint without cost to them. This is what is meant by "unlimited free coinage." Some people agree with them; some do not.

THE UNIT OF VALUE.

This phrase is often abused in the discussion of the silver question. It has nothing to do whatever with coin of any kind. It simply means that a dollar shall be the measure of value in America instead of a pound, as in Engalnd, or a franc in France, or a mark in Germany, and that its fractions shall be decimals. The government has a right to say what shall constitute a dollar; so much gold, or so much silver, or so much iron, or so much copper, or so much nickel, properly coined. It has exercised that right as to gold and silver and copper and nickel, but never yet as to iron, and probably never will, and it has three times changed the weights of its coins, and may again if deemed best. At present 412½ grains of standard silver constitute a dollar and one-sixteenth of that in gold the same. Neither has precedence of the other, and probably never will.

STONE BLIND.

To be purblind is dreadful; you have to wear spectacles or never see beyond your nose, and sometimes not then. To be color blind must be sad, for what good is a rainbow if you cannot distinguish colors? And the beautiful flowers might as well blush unseen as to be seen only by those who cannot tell the difference between blue and green. To be blind in one eye is a calamity, for the blind side is in constant peril, but to be stone blind is much worse, and calls for our utmost commiseration, and such is the condition of our amiable neighbor, "Stone," of Chicago. Naturally enough, it sets forth the value of stone as a building material, and the Clay-Worker concedes that for some purposes, in some localities, it is entitled to respectful consideration in some parts of some buildings, but though we have shown by irrefutable arguments that brick and terra cotta are the building materials of the world, and that workers in clay are the world's greatest benefactors, "Stone's" only answer, reduced to a nutshell, is, "Can't see it." Of course not. Stone blind! How can you? We recommend a vacation. Get away from quarries and stone surroundings, for you may not be beyond recovery if you act at once. There is a beautiful world outside of your den, if you can be persuaded to open your eyes to look at it; and it is built mostly of brick and terra cotta, with here and there a stone for special purposes in special places. We highly commend stone for several uses, but when it attempts to put on airs we feel called upon to rebuke its arrogance by citing it to facts and figures.

We fear, however, our neighbor is tending toward that only worse condition than stone blindness, for none are so blind as those who will not see. Nevertheless, "Stone" is an admirable trade journal, and we would miss it much did it never come again to our sanctum, as we are sure all stoneworkers would, if they should allow their spasm of retrenchment to begin by discontinuing their subscription to it or crippling it in any way. It would take many years for a successor to gain the prestige it has acquired, and in that good time coming, which is nearer than some may think, it will be as impossible for those who work in stone to do without just such a magazine as "Stone" as for an intelligent, progressive worker in clay to do without the Clay-Worker. However, our contemporary should be careful not to strain his optic nerves trying to see points of advantage in stone as a building material compared with brick and terra cotta. Looking for a needle in a hay stack would be less trying and fully as fruitful.

STREET PAVING.

One of the queer freaks of judgment of those connected with municipal affairs is the recent tendency to return to the old-time wood block pavement. To be sure, it is just a little different from the decayed pavements of a few years ago, else there would not be the opportunity for new hope and expectations. It is said by those interested in block pavements that they are being very largely used in Paris, and that the blocks are creosoted, for which reason they are vastly superior to the old block pavements and other paving materials. It is true that wood block pavements are being used in Paris and that the blocks are creosoted. It is also true that it is not expected in that city that these pavements will last for any great length of time. The common block pavement, without the saturation of creosote, was put down with the expectation that it would last four years and a half. The saturated block pavements are expected to last five years and a half. These pavements are only used on the grand boulevards and in very fashionable quarters. They are put down more on account of their relatively noiseless qualities than for any other reason. It is well known that block pavements are the most unsanitary pavements in use. The blocks are capable of becoming thoroughly saturated and giving forth noxious odors at all times. We have a new pavement of wood blocks, recently put down on our principal resident street, which is beginning to show bad ruts even now, and in a year or two there will be a natural swing back from wood coverings. In the meantime we are pleased to note that the cause of brick pavements is advancing, and that with the better understanding which has come about with respect to the manufacture and laying of this material the field for its use is a constantly widening one.

A SIGNIFICANT FACT.

In considering the currency question a point that is worthy of more than passing thought is the fact that without exception the lowest wages paid for labor prevail in countries now operating on a silver basis. The "common people," to whom the political demagogue so loves to address himself, should ponder well this "straw."

TRADE LITERATURE.

THE PROGRESS PRESS BRICK AND MACHINE COMPANY, St. Louis, have ready a new catalogue, illustrating and describing that well-known dry press, of which they make five different sizes—two, three, four, five and six-mold press. The book contains some valuable pointers for prospective purchasers of dry-press machinery, to whom a copy will be mailed free on application to the Progress Company, whose chief business is brickmaking. They have two press brick plants at the intersection of King's Highway and Oak Hill Railway, where visiting brickmakers are always made welcome.

"BETTER BRICK AT LESS COST PER THOUSAND" is the catchy title of a new eight-page circular issued by the Chisholm, Boyd & White Company, Chicago. Its chief illustration is a view of a brick plant equipped with their square down-draft kilns (Flood's patent). An equally interesting cut is that of a sectional view of a modern dry press plant, showing the position of machinery, elevators, screens, shafting, etc. Copy free for the asking.

TERRAZO TILES, what they are and how to make them, is fully set forth in a pamphlet received from H. B. Hilgeman, 306 Oriel Building, St. Louis, a copy of which will be mailed to any one of our readers who is sufficiently interested to write Mr. H. for it. He is quite confident that there is a large market for these tiles, and that in a comparatively short period they will be made at many places in this country, for he claims a terrazo tile plant is a natural adjunct to a well-equipped press brick manufactory.

"GOLD, SILVER AND PAPER MONEY" is the title of a little pamphlet, for a copy of which we are indebted to J. Howard Simmons, President of the Fourth National Bank, New York city. The purpose of this little book is to present clearly and accurately every important fact connected with the history of American currency, without attempting to influence opinion or support a theory. It is intended to be a brief non-partisan statement of facts, and will prove of value to those who want to study the all-absorbing money question. We presume a copy will be mailed to any one asking Mr. Simmons for it.

THE F. D. CUMMER & SON COMPANY, Cleveland, O., have favored us with a copy of their new catalogue. It is a book of over a hundred pages, and contains much valuable information on drying clay, brick and many other materials. Their system includes both stationary and portable dryers, in which is used direct or indirect heat, as circumstances demand. They claim that their system and apparatus both are radically different from any heretofore introduced, and that they can guarantee satisfactory results and a saving in fuel bills that in itself is a fair profit for a large manufactory. All details are carefully considered in this new catalogue, which has been got out regardless of expense, and will prove valuable to all interested in the drying problem. Write them for a copy, mentioning the Clay-Worker, and it will be mailed free of charge.

WE ARE INDEBTED to the Wabash Clay Company, Veedersburg, Ind., for the courtesy of an invitation, which reads as follows:

"This card entitles the bearer, T. A. Randall and his friends, to the privileges of the Wabash Clay Company's headquarters during the Republican National Convention, which convenes June 16, 1896. We shall occupy Rooms 110 and 111, second floor, Gay's Central Building, northeast corner Third and Pine streets, St. Louis, one block east of Planters' Hotel. Entrance, No. 204 North Third street. Headquarters will be opened Monday morning, June 15.

"If you wish information in regard to getting around the city, the points of interest, etc.; if you wish to write or dictate letters; if you wish to make appointments with friends; if you get tired and wish a place to rest, we shall feel honored to have you avail yourselves of our headquarters. Have your letters and telegrams forwarded in our care and they will be kept for you."

"THE WABASH CLAY CO., Veedersburg, Ind.
"Countersigned: R. D. CULVER, President.

We accepted the invitation and were made to feel at home by the cordial welcome extended. We will also admit that we enjoyed the refreshments, which were served with lavish hand, and carried away a jag of joy.

SOME OF OUR VISITORS.

F. S. Brown, of Rogers & Co., Royersford, Pa., extensive manufacturers of stove linings and fire brick, paid us a brief visit the 13th inst., and reported trade in that line as in rather a comatose state.

R. Dorman and C. William Rubright, worthy sons of the well-known brickmaker of Corning, N. Y., called at the Clay-Worker office early in the month. The former is now engaged in the modeling department of the Indianapolis Terra Cotta Company. The latter is enjoying a vacation.

H. J. Flood, the genial missionary of the Chisholm, Boyd & White Company, Chicago, honored the Clay-Worker sanctum with his presence one July day. He said he had been South "for his health," but his robust appearance made us suspicious. We surmise that a good strong trade nibble had enticed him back to Georgia. He reports the brickmakers of Atlanta unusually busy, the Northern visitors to the Cotton Exposition leaving money enough there to enable the natives to do a large amount of building. Mr. Flood admitted that while trade was dull, it might be worse, his company having secured a few good orders during the year, with prospects for more.

W. S. Ravenscroft, formerly of Ridgway, Pa., looked in on us recently. He is now in charge of the works of the Ohio Mining and Manufacturing Company, at Shawnee, O., and says they are getting under way in good shape. As was noted in a previous issue, this is a new press brick plant, and was equipped throughout by the Simpson Brick Press Company, of Chicago. Its equipment includes two four-mold Simpson presses, two Stevenson dry pans and two Simpson clay steamers and screens, and one screw press for ornamental work. Something of a departure in dry press plants is the installing of a standard tunnel dryer. This entire equipment, Mr. Ravenscroft says, is A No. 1.

One way of making hay while the sun shines is to advertise when your competitors are out of the paper.—Fame.

Mention the Clay-Worker.
When writing to advertisers,
Mention the Clay-Worker.

MISS MAJOLICA DARE.

Miss Majolica Dare, of Farragut Square,
Is a collector of China and Pottery ware
So quaint and so curious, so rich and so rare,
That a novice, to see it, would wonder and stare.

She has Russian tea-caddies and Japanese jugs;
Quaint bowls and odd pitchers and ancestral mugs;
With Majolica jars upon Syrian rugs,
And old pepper pots that are stopped up with plugs.

There's a plaque with St. George a-killing a dragon;
A Derby tureen and an old Norseland flagon,
And other strange pieces she has reason to brag on—
Enough to fill up a furniture wagon.

She cares not for society, friendships nor beaux;
For diamonds nor rubies, and little for clothes;
She turns a deaf ear to the poor and their woes,
And seems but to live for her "Chelseas" and "Bows;"

And she seems not to note how the foot-prints of age
Have pressed, in their passing, her face's fair page.

All the ills of the earth she can quickly assuage
With a bit of blue china, the collector's last rage.

Who finds a new planet afloat in the air,
Or who grows a new blossom, both fragrant and fair,
Wins fame; and why not Miss Majolica Dare,
With her old blue, historical pottery ware?

Let her hang her old plates on the gold-tinted wall,
And her "President's China" around the back hall;
Her Punch-bowls, and Pitchers, and Teapots, and all,
Where her dear friends can see them whenever they call.

And when Death shall claim her—as some day he must—
They will doubtless cremate her, and bury the dust
In a Gres stoneware jar that will fade not nor rust
Till the last trump shall waken the unjust and just.

And I think her as wise as the sage at his best;
For what can we do here but live and be blest,
Each in his or her way, and then sink down to rest,
Like the golden-haired Sun in the arms of the west?

Washington, D. C. Mary E. Nealy.

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Books for Brickmakers.

IT IS pretty generally conceded that wonderful progress is being made in the ancient and heretofore unprogressive art of brickmaking. Among the best evidences of this is the fact that the brickmaking craft is no longer without a literature of its own. There are now some good practical books treating on the manipulation of clay—the making, drying and burning of brick. The list is not so large but that every brickmaker can afford to have them all. Get them and read them.

"BRICKMAKERS' MANUAL," Morrison and Reep	$3.00
"BRICKMAKING AND BURNING," J. W. Crary, Sr	2.50
"TABLE OF ANALYSES OF CLAYS," Alfred Crossley	1.00
"VITRIFIED PAVING BRICK," H. A. Wheeler, E. M.	1.00
"PRACTICAL FARM DRAINAGE," J. J. W. Billingsley	1.00

RECEIVER'S SALE.

THERE WILL BE offered for sale at public auction, on the 18th day of July, 1896, at the brick works near the town of Hillsboro, Ind., on the Peoria division of the Big Four Railway, the entire brickmaking plant and equipment of the Hillsboro Brown Stone and Pressed Brick Company, consisting of eighty acres of clay, ranging from six to eight feet in depth, which makes a beautiful dark red pressed brick. Beneath this is twelve feet or more of excellent shale, from which a high grade paving brick can be made, and beneath the shale a deposit of good brown stone. The brick plant includes a four-mold Penfield dry press, large Penfield dry pan, elevating and screening machinery, forty-horse-power Chandler & Taylor engine and a large boiler, all as good as new and contained in a well-constructed brick, metal roofed building. There are two large Eudaly down-draft kilns and ample stock sheds, in which there are several thousand fine pressed brick; also, a standard gauge railroad, connecting the factory with the Big Four Railway, and a large locomotive. Terms, one-third cash, one-third in six months and one-third in nine months. For further particulars address PERRY HATT, Receiver,
Hillsboro, Ind.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville, Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, **ST. LOUIS, MO.**

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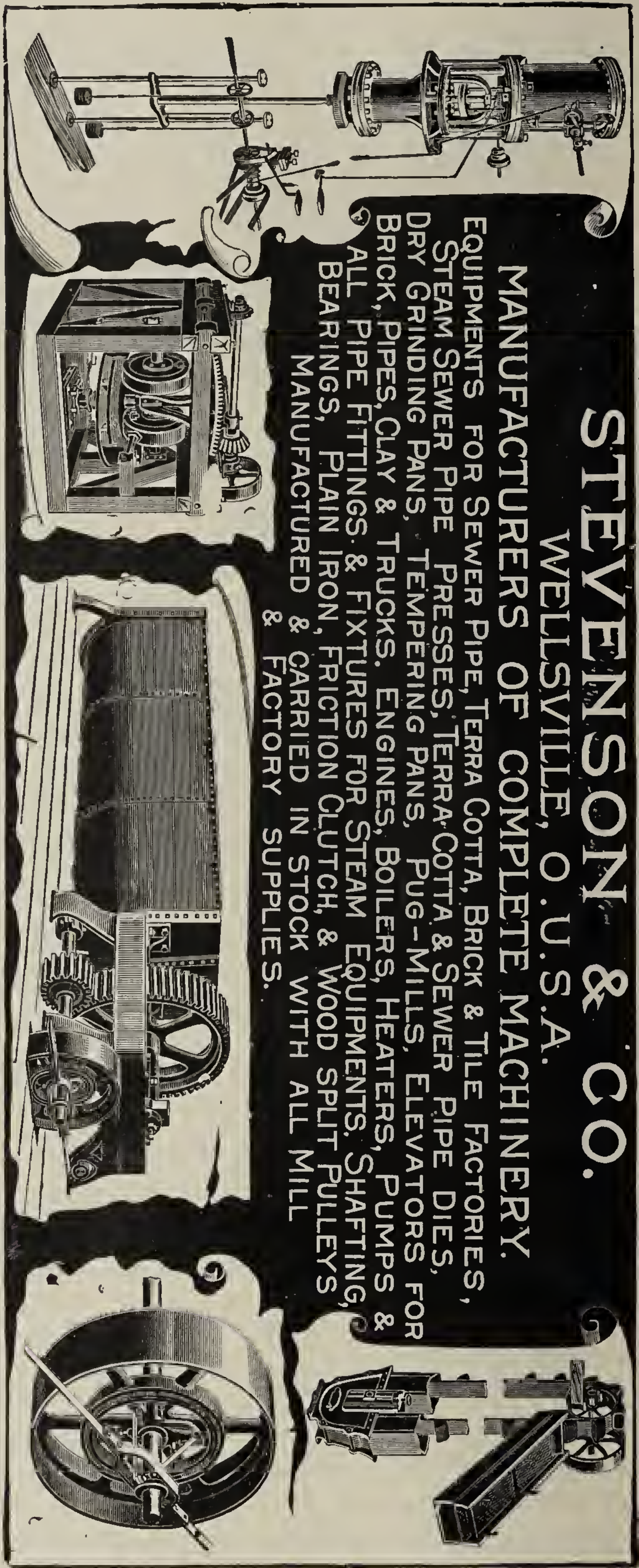
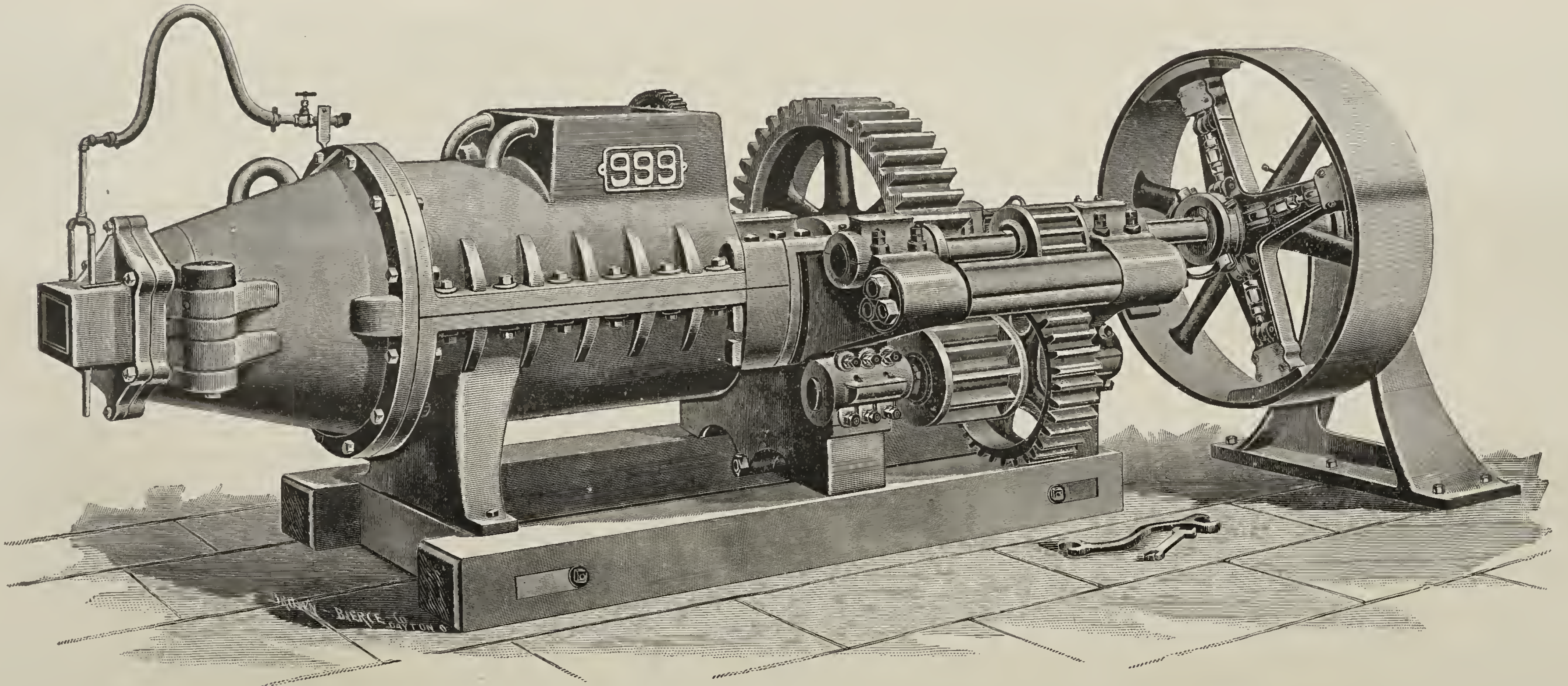


STEVENSON & CO.
WELLSVILLE, O. U. S. A.
MANUFACTURERS OF COMPLETE MACHINERY.
EQUIPMENTS FOR SEWER PIPE, TERRA COTTA, BRICK & TILE FACTORIES, STEAM SEWER PIPE PRESSES, TERRA COTTA & SEWER PIPE DIES, DRY GRINDING PANS, TEMPERING PANS, PUG-MILLS, ELEVATORS FOR BRICK, PIPES, CLAY & TRUCKS. ENGINES, BOILERS, HEATERS, PUMPS & ALL PIPE FITTINGS & FIXTURES FOR STEAM EQUIPMENTS. SHAFTING, BEARINGS, PLAIN IRON, FRICTION CLUTCH, & WOOD SPLIT PULLEYS, MANUFACTURED & CARRIED IN STOCK WITH ALL MILL & FACTORY SUPPLIES.



999 Brick Machine, Capacity 60,000 to 100,000 Brick per day.

C. W. Raymond & Co.,

Columbus, Ga., March 25, 1896.

Gentlemen:—We are running our new outfit of Brick Machinery purchased of you, and are simply delighted with the way it works and turns out brick. The Pug Mill works like a charm, tempering the clay and mixing it thoroughly before it reaches the Brick Machine which takes it beautifully and turns out a first-class brick in every respect—smooth, square and with well defined corners and edges. In fact, it is just what we have needed for the last 3 or 4 years. We feel that we are now in position to compete with any brickmaker **anywhere** in the market.

Your machinery we think cannot be beat and we take pleasure in testifying to its merits. There are four other machines at work in our neighborhood and we would not exchange for any of them.

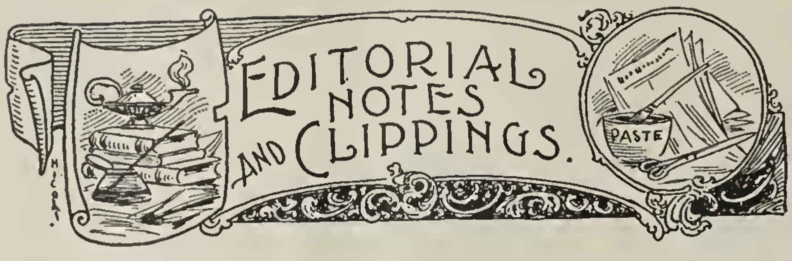
Very respectfully yours,

(Signed) SHEPHERD BROS.

C. W. RAYMOND & CO.,

Send for Catalogue.

DAYTON, OHIO.



EDITORIAL NOTES AND CLIPPINGS.

New Cumberland, Pa., is to have a new brickyard.

A new brickyard will be opened by W. G. Richards at Nevada City, Cal.

R. A. Faulkner contemplates starting a brickmaking plant at Long Beach, Cal.

Contractor Thomas, of San Andreas, Cal., has started up a brickyard at that place.

Ben L. Smith advises us that he is going to start a new brickyard at Abbott, Tex.

The brick and tile plant of Melchior & Champion, at Trio, O., has been leased to Samuel Bordner.

F. Spill and Jos. Caul are running a new brick plant at Leonmister, Mass., with very good success.

W. A. Walker, of Biggs, Cal., has started one brickyard at Marysville, Cal., and another at Sliger Ranch.

C. H. Folck and Willard Algire have formed a partnership, and will manufacture brick at Fayetteville, Ark.

Jno. Hoffman is running his brick plant at Riegelsville, Pa., to its full capacity, turning out 20,000 brick daily.

The brickmaking firm of Foster & Nichols, of Boise, Ida., has been dissolved. F. Foster will continue the business.

E. E. Spencer, Gas City, Ind., desires to obtain a slip clay in Michigan similar to that of the famous Albany slip clay.

Chas. Steffen, employed at Bertler's brickyard, in Manitowoc, Wis., was instantly killed by the caving in of a clay bank.

A company in which N. I. Shugert, of Rochester, N. Y., is interested will manufacture enameled brick at New Brighton, Pa.

Gilbertson & Kay are putting in new machinery at their new plant, at Jackson, Cal., which will have a daily capacity of 20,000.

Hennessey Bros. have purchased a large tract of land near Springfield, Mass., with the intention of establishing a model brick plant.

F. L. Kenyon, Oklahoma City, O. T., writes that he will take up the manufacture of drain tile in connection with his pressed brick works.

An agency of the Elsinore Coal and Clay Company, of Los Angeles, has been established at Long Beach, Cal., under the management of W. H. Wise.

Cooper Liggett is going to open up a small brickyard at Hanford, Cal., for the purpose of burning brick to be used in the building of the new courthouse.

The brick plant of John Carothers, at West Newton, Pa., which was recently destroyed by fire, has been rebuilt, and they expect to begin operations at once.

Jas. Horner, of Astoria, Ill., writes that they are not at all rushed to fill orders at present. He has only burned one kiln of brick this season, but has another ready to fire.

A slight loss, which is wholly covered by insurance, was caused by the burning of one of the dryer sheds at the Ogden Brick Company's works, Binghamton, N. Y., June 27.

A new brickyard, with a capacity of 20,000 per day, has been opened at Union Point, Ga., by S. H. Sibley and J. H. Carlton. A very superior quality of brick is manufactured.

Pike's Peak Brick Company is the name of a new company that has been organized for the manufacture of brick at Colorado City, Col., by J. F. Brown, B. L. Morrison and C. G. Morrison.

The Ball-bearing Car Wheel and Manufacturing Company, of Cleveland, O., have announced that they will hereafter transact business under the name of the Atlas Bolt and Screw Company.

Robert Goodwin has moved his large brick plant from Jefferson to Redfield, Ia., the citizens of the latter place having given him ten acres of ground close to the railroad, where clay and water are convenient.

The Schofield Pottery, at Oak Hill, Pa., has been purchased by C. A. and Fred Barker, W. H. Elverson, J. P. Sherwood and Dr. H. S. McConnell. New machinery will be put in and an improved flower pot will be manufactured.

On July 3 the buildings of the Wallace Tile and Sawmill, at Delaware, O., were entirely destroyed by fire. No insurance was carried, and the loss, which amounted to about $2,000, was total.

H. T. Madgwick, Lewiston, Ida., in a recent letter inclosing subscription, says very little brickmaking is being done this season, and that he has not yet started up his yard, but expects to before long.

The brick manufacturing plant of Bradley & Son, Anderson, Ind., was completely destroyed by fire on the morning of the 24th ult. The loss is estimated at $5,000. The plant will be rebuilt immediately.

George Williams, employed at the Catskill (N. Y.) Shale Brick Works, while oiling the machinery, was caught in the belts and killed before the machinery could be stopped. The body was terribly mangled.

The Lebanon (Pa.) Brick Company have decided to increase the facilities of their company, and will accordingly put a number of improved equipments in their yard No. 3, which they expect to have in operation in a short time.

The Alfred Clay Company has been incorporated at Alfred, N. Y., to manufacture clay goods. The directors are D. S. Burdick and John J. Merrill, of Alfred, and John W. Hogan, of Syracuse, and they have a capital stock of $10,000.

Michael Manion, a brick manufacturer of Cliffwood, N. J., while dismounting from a wagon, fell under the horse's hoofs and was badly hurt, the hoofs of the horse striking him in the face, breaking his nose and mangling his features.

Heavy rains caused the Dunbar creek to overflow its banks, just above the works of the Dunbar (Pa.) Fire Brick Plant, with the result that hundreds of half-burned brick were destroyed and work on the yard suspended for a day or two.

The Central City (W. Va.) Brick Company has its plant running in full and will be able to keep going for some weeks yet. This concern has the contract for furnishing the brick for the new schoolhouse soon to be built at Hinton, W. Va.

E. E. Flurie & Bro., of Newport, Pa., have purchased the brickyard of Jno. Shelley at Tridle Springs, near Mechanicsburg, N. Y., and will in the future operate the same. This makes five yards the Flurie Brothers now have in operation.

Col. R. W. Nelson, of Newport, Ky., is making an effort to reorganize the Hamilton (O.) Tile Works. Several new stockholders have been secured, and the company think they will be again running the plant to its full capacity in a very short time.

The Ironton Fire Brick Company placed 30,000 beveled-edge paving brick with the Ironton & Petersburg (O.) Street Railway, to be used in the lining up along the rails, that are to be changed for heavier material soon to allow use of electricity.

Blakely & Son have reopened the pottery works at Stockton, Cal., and burned their first kiln of "biscuit" last week and glazed it. The result was entirely satisfactory, and the company will henceforth continue to produce everything in the line.

Fire broke out in the carpenter shop at Wm. Fisher & Co.'s brickyard, South River, N. J., June 7, and before the flames could be extinguished the machine shop, foundry and blacksmith shop were consumed. The loss will amount to several thousand dollars.

Since the reorganization of the Catlettsburg (Ky.) Brick and Tile Company they have been in operation almost constantly, making at the rate of 15,000 a day an excellent red brick. Their work in tile has not been very extensive, owing to the very slack demand.

W. J. Colvin has opened up a fire clay bank at Slab Camp, one mile west of Gates, Ky., on the line of the C. & O. Railroad, and will dispose of his product to the works at Ashland, Ky., and Ironton and Portsmouth, O. Present output is about four carloads per day.

Some weeks ago Messrs. Hoff, Alden, Teitge and Bennett, members of the Terre Haute (Ind.) Brick Manufacturers' Association, served notice to their employes that a reduction of 50 cents would be made in the scale of wages on July 1. The men immediately notified their employers that they would not accept the cut. Accordingly, when the cut was made the employes in the various yards went out and the manufacturers immediately announced that they would not hire non-union

[CONTINUED ON PAGE 56.]

WANTED:

To Give Information About,

The "Monarch" Brick Machine, (Horizontal,)

It is big, strong and simple. Weighs almost 12,000 pounds.

Has double pug-mills giving 14 feet of tempering capacity; double presses, which produce the most powerful pressure of any machine, and being "all in the mud," don't wear a bit; bearings where clay **cannot** get into them.

It is the only "soft mud" machine put on the market for years that had a new **fundamental** idea in it. All others have been improvements or modifications only of fundamentally **wrong principles.** Fully explained in circular. Seventy-five in daily use.

The "Iron Quaker" Brick Machines, Horse and Steam Power.

For 15 years, the acknowledged leading Upright Machines. Comparitively low in price. List of hundreds in circular.

The "Wellington" Mould-Sanding Machine.

A new one. The simplest, best, and at same time, lowest priced.

Ball Bearing Brick Barrows.

These good things don't need even pushing along. Load them, balance them, and then a slight inclination carries them along. Wheelers increase their days work 20 to 30 per cent. Order a sample one.

Double-Deck Pallet Trucks. The best of all.

Moulds. All kinds. Machine; hand; shapes; lined, etc., etc.

Cast Iron Dryer Cars. The best pattern. Roller bearings. Low prices.

Kiln Castings. Doors and frames. Furnace fronts. All kinds grate bars.

FOR SALE.

Odd sizes of molds. Have not been used:

5 Molds, 8¾ x 4¼ x 2⅜.
12 Molds, 9¼ x 4½ x 2¾.
20 Molds, 8 13-16 x 4 3-16 x 2 7-16.

Second-hand, but used a few days only:

19 Molds, 9½ x 4⅝ x 2 9-16.
10 Molds, 9½ x 4⅝ x 2¾.
20 Molds, 9¼ x 4½ x 2¾.

All six-brick molds, with 9-16 partitions.

**Elevators, Dump Tables, Sand Barrows,
All Styles of Trucks, Dump Carts, Represses,
Disintegrators, Engines, Boilers,
Shafting, Pulleys, Hangers, Etc.**

◆

**The Wellington Machine Co.,
Wellington, Ohio.**

EDITORIAL NOTES and CLIPPINGS—Continued.

labor, but close the yards, as they have a large supply on hand, and simply sell what they have and wait for better times and an advance in the price of brick. W. Bergman, O'Mara Bros. and H. Aftinhoe refused to cut the scale and are running their yards as usual.

John O'Kelly has recently leased the red-brick yard of Geiger & Co., at Ashland, Ky., and will operate the plant to its full capacity this summer. The yard has been doing but little the past year, and considerable repairs will be necessary. Some new machinery may also be added.

John Crawford announces that he is now conducting the brick plant of the late Robert Crawford. Edw. C. Hulm is manager of the works, which is equipped with improved machinery, and "can furnish on short notice any quantity or quality of bricks, at prices as low as the lowest."

The body of Thomas Dewhurst, a member of the brick manufacturing firm of Dewhurst Bros., of New Brighton, Pa., was found in the river at Beaver Falls, beneath a railroad bridge. It is thought that while walking across the bridge he was struck by a train. The deceased was fifty years old.

The Rockwood Manufacturing Company, Indianapolis, Ind., advise us that they have recently shipped two of their largest sized machines, one to Gladding, McBean & Co., at Lincoln, Cal., and one to W. T. Campbell, Melbourne, Australia, and are accordingly feeling on pretty good terms with the Clay-Worker.

The J. M. Rumbaugh Brick Company, of Calumet, Pa., are running with a full force of men, and from present indications that happy condition of affairs will continue for some time, as they recently booked an order for 1,000,000 brick for a new glass plant and another for 300,000 for a new school building.

The Kentucky Fire Brick Company, of Portsmouth, has just completed the shipment of an order for 2,000,000 brick to New Orleans, La. The brick all went by river and required seven barges to handle them. This is the greatest shipment ever leaving that section, and by rail would have loaded 500 cars of twenty tons each.

The Royal Clay and Manufacturing Company, of Uhrichsville, O., assigned to Ross J. Alexander, June 24. A. J. Baggs, of that city, is general manager. The plant cost $200,000. The liabilities are estimated at $140,000, of which $100,000 is in first-mortgage bonds, mostly held by local banks. The failure was caused by dull trade.

M. E. Clark & Sons have lately made extensive additions to their works in Alameda, Cal., and have begun the manufacture of ornamental terra cotta, Roman brick, etc., of which they will henceforth make a specialty. They report business as quiet and prices as ruling very low. They have a large amount of sewer work on hand.

The Mountain State Brick and Tile Company, of Point Pleasant, W. Va., is a new concern that has but recently begun active operations, and are just now completing the burning of their first kiln of 250,000 red brick. It is backed by home capital and has extensive clay beds of the best quality. For the present they are giving no attention to tile.

On the night of June 14 the extensive plant of the Jamestown (N. Y.) Shale Paving Brick Company was burned to the ground, entailing a loss of $100,000, on which there is an insurance of only $4,000. The fire, which originated in the boiler room, was discovered by the night watchman, but had gained such headway before the fire department arrived that nothing was saved. The works will be rebuilt at once.

Fire broke out in the yards of the Merwin Brick Co., Berlin, Conn., July 10, and caused damage to the extent $2,000, which was fully covered by insurance.

H. E. Spillman, of Parkersburg, W. Va., one of the stockholders of the Consumers' Coal and Mining Company, at Spillman, Mason county, West Virginia, which mines were but recently abandoned, is preparing to start a fire brick, tile and coping works at that point that will employ about 125 men and have an extra large capacity. The fire clay of the region is of the highest quality, and the indications are very bright for the venture.

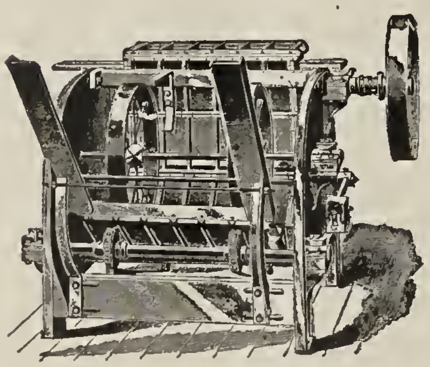
Among the firms who are not complaining of a dull season is the Wilford Patent Kiln Company, who say they have no cause to be dissatisfied with the amount of business they are doing, as they have recently built three large continuous kilns in Rochester, where they now have an office, and have orders ahead for months to come. Mr. Wilford is very much elated over the success of his kiln in Rochester, and says: "Nowhere else in the United States has one firm built three continuous kilns in one town."

J. W. Carson, Superintendent of the La Prairie (Canada) Pressed Brick and Terra Cotta Company, in a recent letter, says: "We are not saying much these days, but are 'sawing lots of wood.' We are running on an average of 55,000 per day, and are behind orders. We have booked orders for 3,000,000, 1,500,000 and 600,000, besides numerous medium-sized orders. The Clay-Worker is not exactly a visitor to our office; it is the 'star boarder' and confidential advisor. We hope to see you with us in the van of the 'army of prosperity.'"

Charles Field Haviland, one of the best known manufacturers of Limoges pottery, died at his country home, the Chateau Masmarvaut, near St. Victurnien, France, June 12, after a protracted illness of almost two years. Mr. Haviland was born Aug. 1, 1832, in North Castle, N. Y., and received his education in the Brooklyn public schools and Haverford (Pa.) College. In 1851 he left Haverford to enter into the French pottery business at Limoges, France. In 1859, with his uncle, Richard Haviland, he started in business for himself, the line taken up being chiefly that of decorated pottery, in which work he continued for nine years, when he took up the manufacture of French porcelain, and followed it successfully until his retirement from business in 1881. He leaves a widow, one son and one daughter.

A DISASTROUS FIRE.

The extensive brick works at York Corner, Me., owned by J. P. Norton, a well-known member of the N. B. M. A., were partially destroyed by fire Sunday afternoon, May 31. The engine house, blacksmith and carpenter shops, and a three-story tenement house and a large boarding house were consumed. Mr. Norton writes us that his total loss foots up about $8,000, with only $2,000 insurance. Although his loss is heavy, he is grateful that it is no worse, for it was only by hard fighting that the buildings containing the brick machinery, kiln sheds, pallets and racks, a large stable in which he had twenty-two horses, a sawmill and a double tenement house were saved. With characteristic energy, Mr. Norton at once set about rebuilding, and was able to start his machinery again on the 8th of June, turning out 90,000 brick that day.



Your Best Friends

Are to be Found in

The Only Sander,
That will sand any size of mold. No expense to keep in repair.

The Jumbo Barrow
Which holds 150 brick is the best and cheapest. Is perfectly balanced.

The Disintegrator
Which saves your more and costs you less than inferior machines, and our

First-Class Supplies
Such as Barrows, Trucks, Molds, Dump Tables, Dump Carts, Conveyors, Pug Mills, Brick Wagons, Grates, Doors, etc.

No expensive Belts to Wear out. Our Prices are away down to Rock Bottom. Give us a Trial. Send for Catalogues.

The HORTON M'F'G. CO., Painesville, Ohio.

WONDER-MACHINERY

FOR BRICK AND TILE MAKERS

SEND FOR ILLUSTRATED CATALOGUE No. 14

THE WALLACE MANFG. CO.

FRANKFORT IND. U.S.A.

SEE INSIDE BACK COVER PAGE

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE—One new six-mold, latest improved dry press at a bargain for cash. Address X.,
6 1 Care Clay-Worker.

FOR SALE—One second hand Little Giant re Press. Capacity, 6,000 brick per day. Press in good running order. $25 F. O B. Address JOSEPH, care Clay-Worker.
7 1 c

WANTED—Re-engagement as manager or superintendent of fire brick works. Advertiser has had a long practical experience in first class work. Address
6 2 d F. B. care Clay-Worker.

FOR SALE—One Henry-Martin Brick Machine, good as new; only used short time; cost $1,000; will sell for $500. Address,
ROME BRICK CO.,
4 4 d Rome, Ga.

NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
6 t f d Wellsburg, W. Va.

WANTED—To purchase 5 to 10 acres of good stiff clay land in or near town of 6,000 to 30,000. Give depth and color of clay, also price. G. D. STRAYER,
7 1 cm East Stroudsburg, Pa.

WANTED—A superintendent for a brick works using Simpson presses and other machinery manufactured by that firm. Must be first-class. Address
7 1 L BOX 415, Care Clay-Worker.

WANTED—Situation as manager of fire brick plant; several years' experience. Can give best of reference. Understand the business thoroughly and know how to manage men. Address
7 1 f M. E. X., Care Clay-Worker.

WANTED—A situation as burner. The plant where I have been employed burned down recently. Can manage up or down-draft kilns. Know how to burn paving brick. Best of references. Address
7 1 d BOX 475, Care Clay-Worker.

FOR SALE—170 acres of fine shale land adjoining Springfield Paving Brick Company, where the best shale brick are made. Railroad trackage.
EDWIN A. WILSON,
7 3 dm Springfield, Ill.

FOR SALE—1 Jonathan Creagor automatic soft-mud brick machine; 1 pug mill for same; 1 Potts disintegrator; 1 clay conveyor; 1 revolving table. All in first-class condition. Will sell cheap. Address BOX 100,
7 1 L Care Clay-Worker.

WANTED—Situation as superintendent, by a practical brickmaker; 22 years' experience in dry press, repress, etc. Worked in the business from a water boy. Well up in machinery, setting, burning, building and repairing of kilns. Will leave part of salary to guarantee a success. Best of reference. Address RAY,
7 1 c Care Clay-Worker.

WANTED — SUPERINTENDENT — Must understand the manufacture of terra cotta and conduits, and must be able to either invest or procure us $10,000. We own 100 acres of the finest clay deposit in the country and have a five-year contract from one of the largest firms in the country for our entire conduit production at a large profit. Satisfactory references given and required. Good salary and permanent position for the right man. Address PROSPERITY,
7 2 dm Care Clay-Worker.

FOR SALE—One second-hand Chambers Brick Machine, 25,000 daily capacity. Repaired by us and in good order.
CHAMBERS BROS. CO.,
53d and Media Sts.,
4 4 d Philadelphia, Pa.

FOR SALE—Second-hand clay working machinery in good order: One Cuyahoga Falls steam sewer pipe press, with dies; Centennial improved tile machine, with dies; set of double rolls and tracer mills, with steam drying system of pipes. One or all sold at a bargain. Address
6 2 d A. L. C., Care Clay-Worker.

FOR SALE OR RENT ON ROYALTY—Brickyard on James river, in Charles City County, Virginia, consisting of 16 acres, 25 feet depth of clay, formerly operated by Snead & Scott, of Lynchburg, Va.; in close proximity to Newport News, Richmond and Petersburg. Clay unsurpassed and will vitrify. Address
BALTIMORE,
7 2 d Care Clay-Worker.

MACHINERY BARGAINS—1 large, 3 medium and 2 small brick machines; 1 single and 1 double-power represses; 1 large dry pan; 3 pug mills; 1 iron winding drum, with cable; 2 dump cars; 3 automatic cutters. All good makes and in good order. Also a complete line of new machinery of our own make. Send for printed matter. LEADER MFG. CO.,
7 1 d Decatur, Ill.

FOR SALE—Two Simpson presses, one Plymouth brick and tile machine, Plymouth board delivery, brick cutting table, Plymouth tile cutting table, Freese "A Special" brick machine, Stevenson pug mill and Emens granulator. For description of this machinery see page 579, June Clay-Worker, or address
CLEVELAND VITRIFIED PRESSED BRICK CO., 809 Cuyahoga Bldg.,
7 tf d Cleveland, O.

WANTED—Position by man with nineteen years' experience in enameled brick, pottery and terra cotta. Is practical and thoroughly understands the compounding of bodies and glazes. Also competent to erect plants and kilns, and is a good burner. Can refer to buildings containing enameled brick and glazed terra cotta of his manufacture. Address
ENAMEL-TERRA COTTA,
7 tf d Care Clay-Worker.

A BRICKMAKER, with long practical experience and knowledge of every up-to-date method, especially on paving bricks, having patent kilns and dryer, can bricks, using patent kilns and dryer, can draw plans, test and analyze clays, with best refernces, is open for engagement with a good firm, where he can take charge of a plant or an equally responsible position. Address LAUZ,
Care Clay-Worker.

FOR SALE—The best equipped roofing tile plant in the United States. It is on a paying basis, and a party understanding the business can make big money out of it. The business is established and can sell its capacity easily every year. The right party can clear his investment the first year. He will have no reputation to make, as the goods have already the best reputation of any made in this country and have been on the market several years. Plant, machinery, kilns, etc., all new, most of them put in this past year, and are of the best and modern. The owner will sell an interest to a good, first-class clay man who understands the business thoroughly if he can't sell out complete. The heason for selling is simply owner is interested in other business and knows nothing about running a clay plant, and is not adapted to the business. After getting into it he finds it will take all his time and more clay knowledge than he possesses to make a success of it such as the business is possible of attaining, and for that reason wishes to sell out cheap, part cash, balance long time, or will sell interest to desirable party. Located in Illinois near Chicago. Address
3 tf d ARTHUR, care Clay-Worker.

FOR SALE AT A BARGAIN.

A complete brick plant, including nine acres of finest clay land, one good engine and one Henry Martin Soft-mud Machine, with crusher and disintegrator; also stone and earthenware and drain-tile plant, including two large kilns and good engine. For information address
STONEWARE MFG. CO.,
Or EDWARD ZEA, Sec'y,
7 2 c Strasburg, Va.

FOR SALE AT A BARGAIN!

A new and complete dry-press brick plant in vicinity of Baltimore. Plenty of finest of clays for red, buff and other colored bricks, also vitrified brick. Reason for selling, the failing health of principal owner. Address GREAT BARGAIN,
7 1 c m Care Clay-Worker.

BRICK WORKS WITH CLAY DEPOSIT.

Cost, $63,000. Will Sell for $15,000.

On the line of two railroads in Virginia. Plant used a short time; inexhaustible deposit of clay. Will make fire brick, vitrified, pressed, beautiful buff, cream, gray, drab and red colors. Clay rights said to be worth four times the price asked for the property. For sale by HENRY W. ROGERS, 230 N. Charles Street, Baltimore, Md. 5 3 cm

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PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
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EXPERT IN ROOFING TILE.

Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address,
CHARLES STOLP, Box 166,
3 tf 1 5p Chicago Heights, Ill.

NOTICE.

Parties wishing formulas for the manufacture of enameled or glaze brick (once or twice burning), either on clay or burnt brick, with full instructions; also, pure white dull enamel, or other colors, for terra cotta, new process, can obtain same by inclosing five dollars. Parties ordering must state nature and quality of clay they wish to enamel or glaze. In such cases, if instructions sent are strictly followed, a guarantee given that results will be obtained equal to anything manufactured, or money refunded. Address,
4 tf L EUREKA, care Clay-Worker.

TO ST. PAUL AND MINNEAPOLIS VIA BURLINGTON ROUTE.

Two splendid through trains daily from St. Louis, Chicago or Kansas City to the North, with free chair cars, dining cars and sleepers. Trains from St. Louis and Chicago are via the Mississippi River scenic route; from Kansas City via Burlington Route and Sioux City line. Consult ticket agent.
L. W. WAKELEY, Gen'l Pass. Agt.,
St. Louis, Mo.

FAST TIME AND THROUGH SERVICE TO SOUTH BEND.

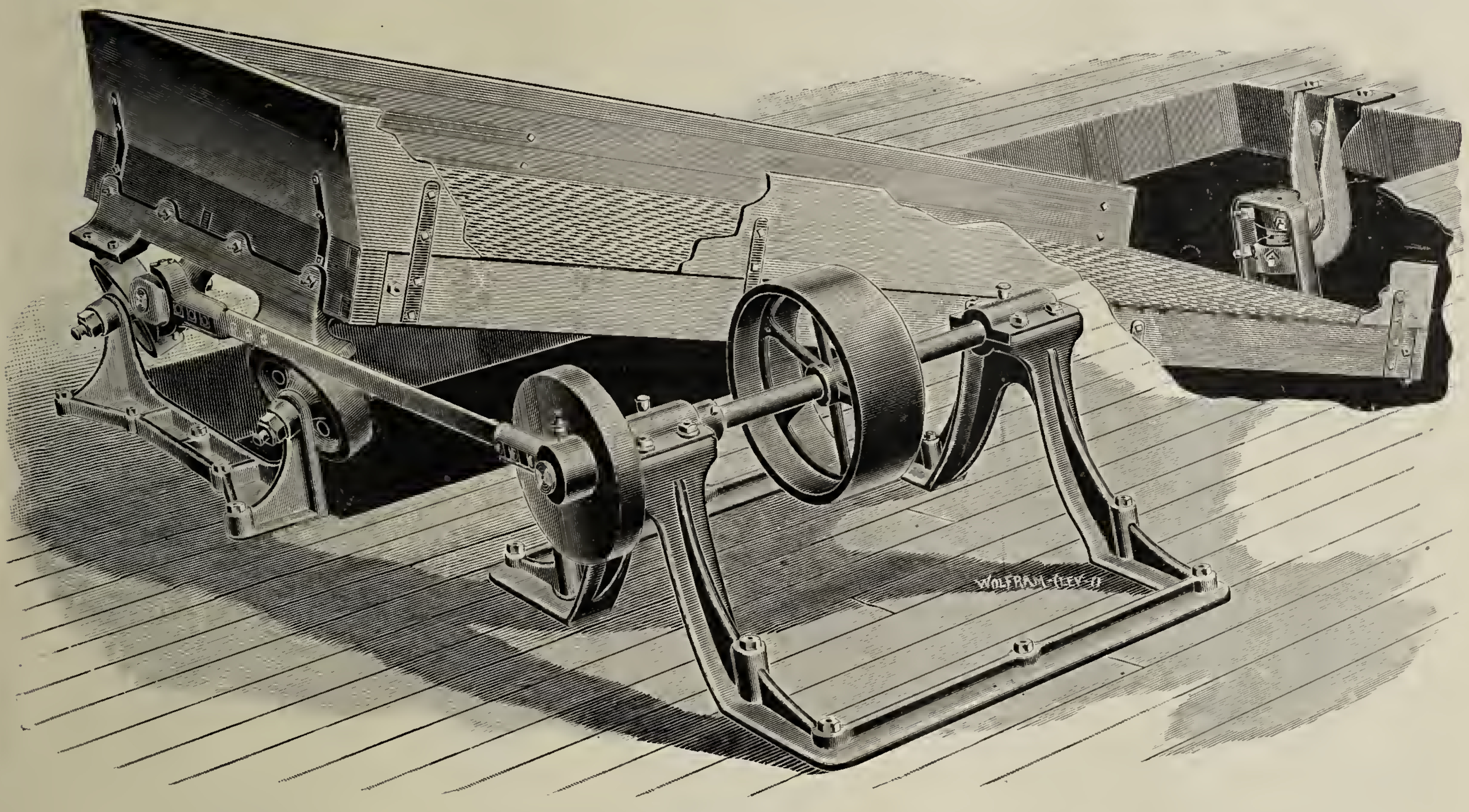
Commencing June 22, through parlor cars will be operated between Indianapolis and South Bend daily, except Sunday, on Big Four train No. 3, leaving Indianapolis at 5 p. m., making immediate connection with Vandalia line fast train at Colfax, which passes through Frankfort, Logansport, Lake Maxinkuckee and Plymouth, arriving at South Bend at 10:45 p. m. G. E. ROCKWELL, D. P. A., for details.

FROM ST. LOUIS, CHICAGO AND PEORIA TO THE WEST VIA BURLINGTON ROUTE.

The traveling public is sure to find the best equipped fast vestibuled trains from the East to the Missouri river, Nebraska, Colorado and Montana via the Burlington Route. Elaborate compartment sleepers (same rate as standard sleepers), free chair cars of luxurious pattern, St. Louis to Kansas City; standard sleepers, free chair cars and dining car from Chicago.

Ask ticket agent for tickets via BURLINGTON ROUTE LIMITED TRAINS.
L. W. WAKELEY, Gen'l Pass. Agt.,
St. Louis, Mo.

The Richardson Shaking Screen.



PATENTED.

The best and the cheapest screen for clayworkers.

Is guaranteed to screen more fine clay with less cost for repairs and attention than any Screen ever offered for sale in this country.

Send for prices and testimonials of prominent brickmakers using this Screen.

W. D. Richardson & Co.,

Engineers and Manufacturers of
Improved Clayworking Machinery,

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FOR SALE—One No. 4 Cummer Dryer, been in use about a year; is practically as good as new. Object in selling, wish to put in a larger one. Address, BOX 99,
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ENGINES FOR SALE.

One 200-horse-power Corliss engine.
One 150-horse-power Corliss engine.
One 125-horse-power cut-off engine.
One 100-horse-power slide-valve engine.
One 80-horse-power slide-valve engine.
One 75-horse-power automatic cut-off engine.
One 60-horse-power center-crank engine.
One 55-horse-power self-contained engine.
One 50-horse-power self-contained engine.
One 40-horse-power self-contained engine
One 35-horse-power slide-valve engine.
One 30-horse-power slide-valve engine.
One 25-horse-power slide-valve engine.
One 20-horse-power slide-valve engine.
One 15-horse-power slide-valve engine.
One 12-horse-power upright engine.
One 10-horse-power upright engine.
One 8-horse-power upright engine.
One 12-horse-power engine and boiler combined.
One 10-horse-power engine and boiler combined.
One 8-horse-power engine and boiler combined.
Two hoisting engines.
Three steam elevator engines.
Four pair of mining engines.
One Ingersol steam drill.

SCHOELLHORN-ALBRECHT MACH. CO.,
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Take the shortest line, with the best through train service, to the far West. Free reclining chair cars and sleepers to Missouri river, and from Missouri river to Billings, Mont., connecting with Northern Pacific Transcontinental train to Montana and Puget Sound. Time from St. Louis several hours shorter than any other line. Sleepers and free chair cars to Denver. Rio Grande scenic line beyond for Colorado, Utah and California.

Ask agent for tickets over the established lines of the BURLINGTON ROUTE.

L. W. WAKELEY, Gen'l Pass. Agt.,
St. Louis, Mo.

NIAGARA FALLS EXCURSION.

THURSDAY, AUG. 6, 1896,

—Via The—

LAKE ERIE & WESTERN R. R.

(Natural Gas Route.)

On Thursday, Aug. 6, 1896, the Lake Erie & Western R. R. will run their popular annual excursion to Cleveland, Buffalo and Niagara Falls at the following very low rates, viz:

Peoria	$8.75
Bloomington	8.25
Lafayette	7.85
Michigan City	7.25
Indianapolis	6.25
Tipton	6.25

Rate from all stations to Put-in-Bay and return, $4.00,

With corresponding reductions from intermediate points.

In addition to the above, the purchasers of these tickets will be given privilege of special excursion side trips to Lewiston-on-the-Lake, including a steamboat ride on Lake Ontario, for 25 cents. To Toronto and return, by lake, from Lewiston, $1.

Tickets of admission to places of special interest at or near Niagara Falls, but outside the reservation, including toll over the international bridge to the Canadian side, elevators to the water's edge at Whirlpool Rapids, on the Canadian side, will be offered on train at a reduction from prices charged after reaching the Falls.

DO NOT MISS

This opportunity of spending Sunday at the greatest historical spot in the United States. Excursion will arrive at Niagara Falls at 8 a. m., Friday, Aug. 7, 1896. Returning, passengers can leave the Falls any day within the limit of their tickets, connecting with steamer at Buffalo, which leaves there every day at 8:30 p. m. Passengers can have stopover privileges on return trip at Cleveland, Sandusky, Put-in-Bay, etc.

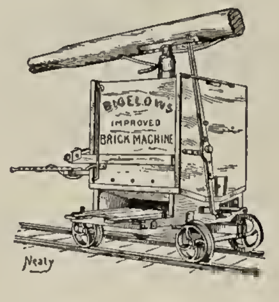
For pamphlet giving full detailed information call on any agent Lake Erie & Western R. R., or address

C. F. DALY, Gen'l Pass. Agt.,
Indianapolis, Ind.

WANTED—To serve somebody who is in need of a vigorous man, capable of assuming full control of soft or stiff-mud brick plant. Drilled in every department. Twelve years' experience. Best of references as to character and ability. Address,
YOUNG GRIMES,
43 L Care Clay-Worker.

WANTED—Situation as superintendent, foreman, or charge of setting, burning, repair and erection of kilns, either dry clay, stiff clay or vitrified street paver works. Can superintend erection of works. Practical in every branch. Also a kiln builder. Good references. Address, SUCCESS,
6 t f, 75 p Care Clay-Worker.

BRICK MACHINERY.



One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

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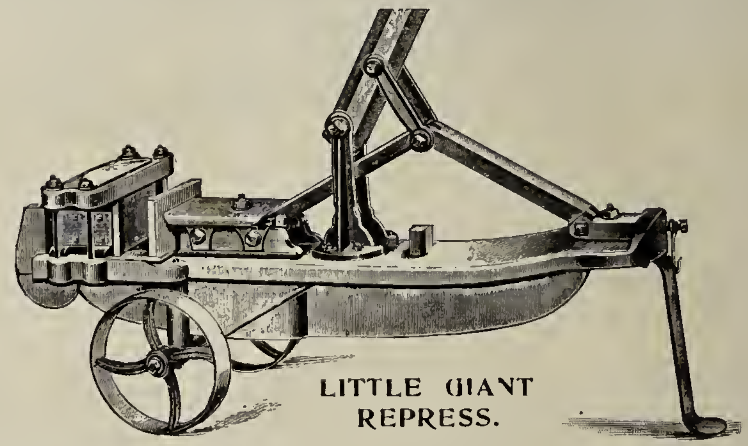

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ELI Auger Machine, Capacity 45,000 to 70,000.

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No. 1 A, Auger Machine, Capacity 25,000 to 35,000.

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THE No. 1 A and No. 2 B Machines furnished with Square Hopper in place of Upright Pug Mill if desired.

DISINTEGRATORS, HORIZONTAL CONVEYORS,
GRANULATORS—SINGLE AND DOUBLE SHAFT,
UP-RIGHT PUG-MILLS, WINDING DRUMS,
BRICK TILE AND HOLLOW BLOCK TABLES.
TRUCKS, WHEELBARROWS, ETC.

Manufactured and fully warranted by

Michigan Brick and Tile Machine Co.,

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FIRE BRICK, FIRE CLAY and FIRE CLAY TILES.

Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years. Write for prices.

EVENS & HOWARD,
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INCORPORATED 1896. CAPITAL $100,000

National Fire Clay ··· Mining & Mfg. Co.,

F. X. BARADA, *President.*
A. S. TAYLOR, *V. P. and Manager.*
A. S. BARADA, *Secretary.*

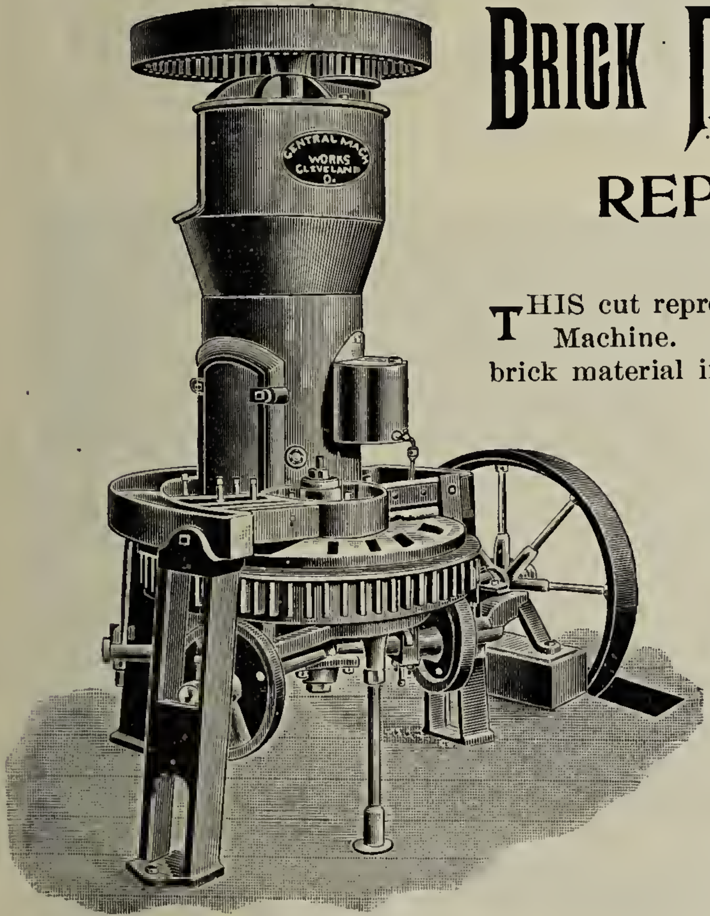
915 Chestnut St., ST. LOUIS, MO.

THE highest quality of Clay for Glass House Pots, Fire Brick, Tank and Furnace Blocks and all articles of Fire Clay used in the construction of Glass and Metallurgical Furnaces.

Read the analysis carefully and note that our clay is the superior of the imported article.

Silica	45.24
Alumina	39.31
Oxide Iron	.37
Lime	.29
Magnesia	.10
Alkalies	.27
Water	14.54
Total	100.12

BRICK MACHINES AND REPRESSES.


CENTRAL MACH. WORKS CLEVELAND O.

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THIS cut represents our Stiff Mud Brick Machine. It will work any kind of brick material including fire clay, shale or common clay right from bank without the use of a pug mill. Each brick is pressed separately and can be haked 7 or 8 high, or repressed right from machine.

Over 5' 0 in operation.

Send for price and circulars

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CENTRAL MACHINE WORKS,
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Cleveland, Ohio.

NOTICE—We furnish all supplies and repairs for any make of the "Sword" Brick Machine.

BRICK MACHINERY FOR SALE.

One 2-mold Whittaker dry-press brick machine.
One 2-mold Whittaker semi-dry-press brick machine.
One 1-mold ornamental Whittaker brick machine.
One 4-mold dry-press brick machine, Simpson make.
One 4-mold dry-press Eureka brick machine.
Two repress brick machines.
One stiff-mud brick machine.
One brick and tile machine combined.
One dryer.
Also disintegrators, breakers, screens, trucks, etc.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

Davis's Brick, Tiles and Terra-Cotta. Third Edition. Revised, Improved and Enlarged.

RECENTLY PUBLISHED.

A Practical Treatise on the Manufacture of

BRICK, TILES AND TERRA-COTTA,

Including Stiff Clay, Dry Clay, Hand Made, Pressed or Front, and Roadway Paving Brick, Enameled Brick, with Glazes and Colors, Fire Brick and Blocks, Silica Brick, Carbon Brick, Glass Pots, Retorts, Architectural Terra Cotta, Drain Tile, Glazed and Unglazed Roofing Tile, Art Tile, Mosaics and Imitation of Intarsia or Inlaid Surfaces. Comprising every product of Clay employed in Architecture, Engineering and the Blast Furnace. With a detailed description of the different Clays employed, the Most Modern Machinery, Tools and Kilns used, and the Processes for Handling, Disintegrating, Tempering and Molding the Clay into Shape. Drying, Setting and Burning. By Charles Thomas Davis. Third Edition. Revised and in great part rewritten. Illustrated by 261 engravings, 662 pages, 8 vo.

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This volume will be sent by mail to any address in the world, or delivered by express, C. O. D., freight paid, to any address in the United States for $5.

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Mechanics; Mechanical and Architectural Drawing; Plumbing; Architecture: Mining; Civil Engineering in all Branches; Steam Engineering (Stat'y., Loco. and Marine).

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Besides making Vitrified Stone sewer Pipe we manufacture and keep in stock a full line of

Fire Brick

— FOR —

Kiln Building & Boiler Setting.

Also Headquarters For

Cement, Lime, Plaster, Stoneware, Etc.

OFFICE & FACTORY: Cor. Elm & Water Sts.
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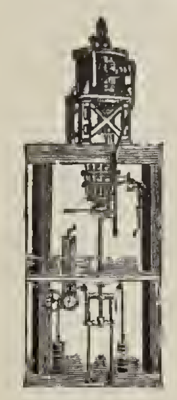
Steubenville Foundry & Machine Works,

Established in 1820.

—Manufacturers of—



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Making From 2 to 30-Inch Pipe Inclusive.

Pipe, Brick, Tile, Coping, Fire Proofing, and Building Block Dies.

Clay Grinding and Tempering Pans and Pug Mills.

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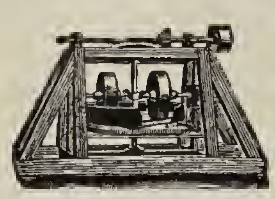

STEAM ENGINES

—AND—

Every Variety of Iron and Brass Castings Shafting and Pulleys.

Send for Circulars and Estimates.

JAS. MEANS & CO.,
Steubenville, Ohio.

NEW DISCOVERY KILN

Patented April 13, 1886, June 1888 Nov. 7 1891.

More Than 1,000 Now Stand as Monuments of Fame to its Inventor

It is neat, compact, durable, easy to handle, constructed on scientific principles. Has been improved and now burning almost everything made from clay, such as Sewer Pipe, Vitrified Pavers, Etc., to Pottery and finer wares. Built any size up to 100,000. In short it leads the way.

Reward For Information of Infringements.

To know more and what they say of it, address,

E. M. PIKE, Patentee

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Elevators

For handling
CLAY,
COAL,
SAND,
BRICK,
TILE,
PACKAGES.

Also Furnish
RUBBER,
LEATHER,
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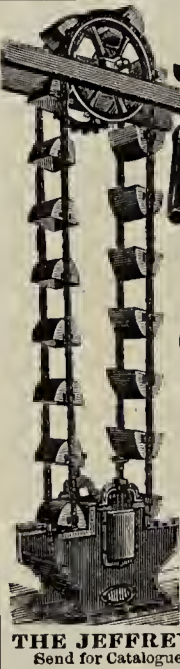
BELTING.



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Roller, Steel and Special CHAINS
—FOR—
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CONVEYING MACHINERY
FOR HANDLING MATERIAL OF ALL KINDS.

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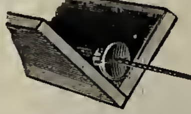
COAL MINING MACHINERY.

WIRE CABLE CONVEYORS.
For long and short distance conveying.



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SHAFTING,
PULLEYS,
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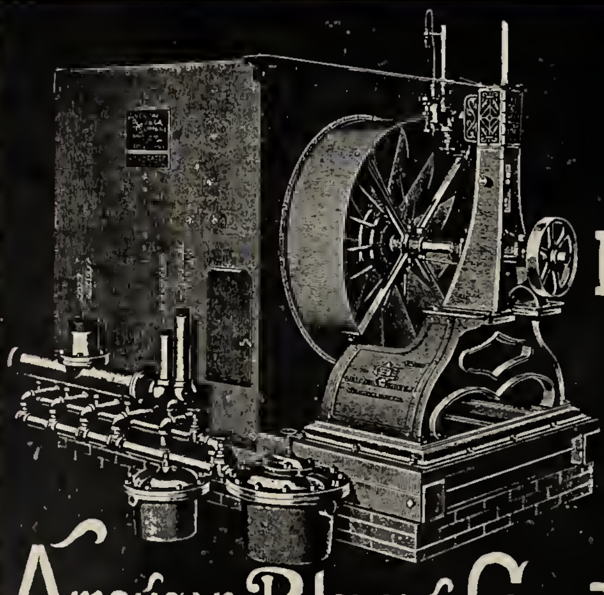
Brick-Glazes
ready prepared
to burn successfully
in all kiln-systems,
we furnish for every
kind of material.

In general use
in Germany!

W. KATZ & Co.,
MANNHEIM
Germany.

Theo. Zwermann & Co., American Agents,
Cor. Allen and Clement Sts.,
BALTIMORE, MD.



THE
HOT BLAST APPARATUS
FOR DRYING BRICK TILE AND TERRA COTTA

American Blower Co
SUCCESSOR TO
HUYETT & SMITH MFG CO
DETROIT MICH

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SOFT CLAY BRICK MACHINE

Until You Have Investigated Ours.

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NEW AND NOVEL,

No waste of fuel, labor or time.

All perfect goods.

Thorough Regulation of heat.

Output uniform as to time and quality.

The Columbian Pottery and Brick Kiln.

The fires remain in one division ONLY and are continuous. Goods move on a ROTATING FLOOR to and from the fires. Radiating heat and spare heat are used for drying and heating air for combustion.

A perfect and reliable factory Winter and Summer. Kiln and dryer combined. The best kiln for vitrifying Paving brick and glazing

Full information on application.

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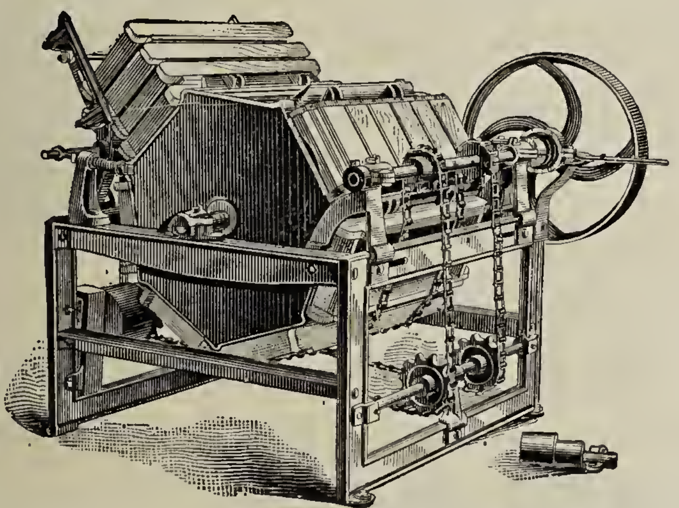
CHAMPION Brick Mould SANDING MACHINES.



This cut represents the latest improved Champion. No belts, apron or gearing. Simple, strong, and Serviceable.

A. H. NEWTON,
Manager and Sole Agent,
HAVERSTRAW. N. Y.

THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

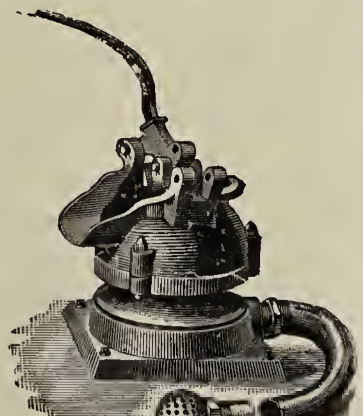
An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

4000 TO 5500

(Gallons of Water per hour.)

BY HAND-POWER.



Pumps, Hand-power Pumps,

(LOUD'S PATENT.)

These Pumps are simple, durable and low-priced.

A large capacity and easy working pump for **Brick Yards, Water Works, Sewer Contractors, Foundation Builders, Miners, Quarries** or wherever it is desired to raise a *large quantity* of water by *Hand-power.* The pump has large valves (*accessible by hand*) and will pump water containing *sand, gravel, mud, sewage matter, etc.,* without *choking* or any *perceptible wear.*

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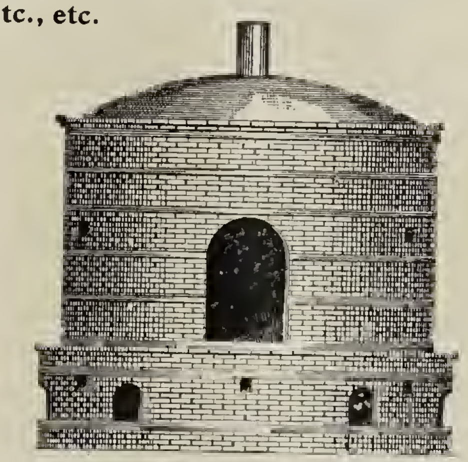
For Burning Terra Cotta, Fine Front Brick, Enameled Brick, Encaustic Tile, etc., etc.



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Especially Prepared

BRICK MAKERS

Manganese,

POWDERED OR GRAIN.

For making colored and spotted brick and also for mortar color.

SAMPLES AND PRICES ON REQUEST.

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PRODUCERS AND GRINDERS.
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We have a large bank of a superior quality of SLIP CLAY. Price very low by barrel or carload. Best of reference as to quality.

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Established 1852.

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Plans furnished for kilns and complete manufacturing plants, also system of bookkeeping to ascertain daily cost of manufacture.

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PUMPS, WIND MILLS with large pumps specially adapted for keeping clay pits clear of water.

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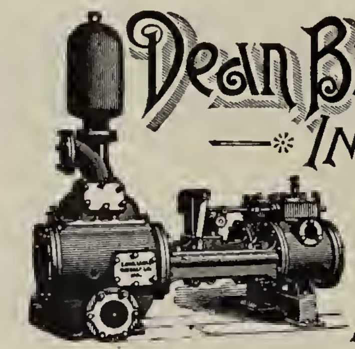

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HORIZONTAL AND VERTICAL PUMPS.
Best Design & Workmanship.
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OUR NEW 9 Ft. IRON FRAME DRY PAN

SEND for catalogue and read up on our patented features of this machine. Our motto in its construction and design is

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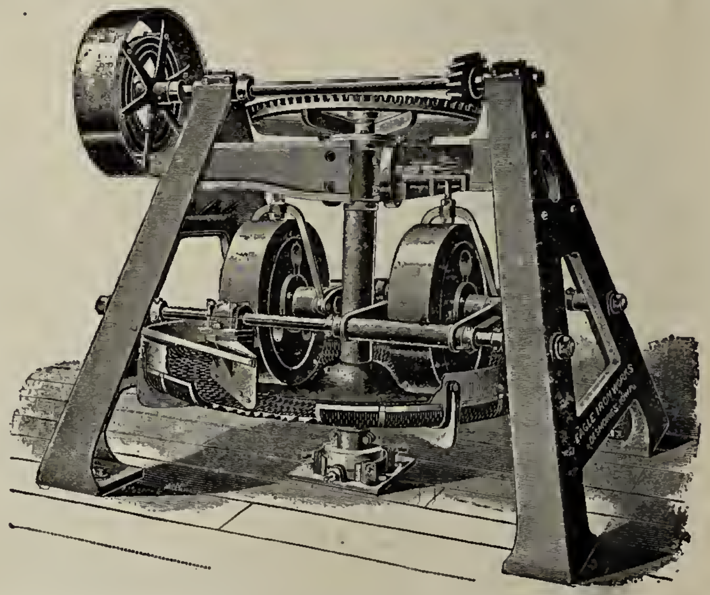

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Steam and Horsepower.

THE BEST MACHINE IN THE MARKET.

The Horsepower Machine will make 17,000 to 20,000 brick per day; the Steampower Machine, 25,000 to 30,000.

These machines are sold on their merits, guaranteed to do first-class work.

Brick moulds for hand and machine a specialty.

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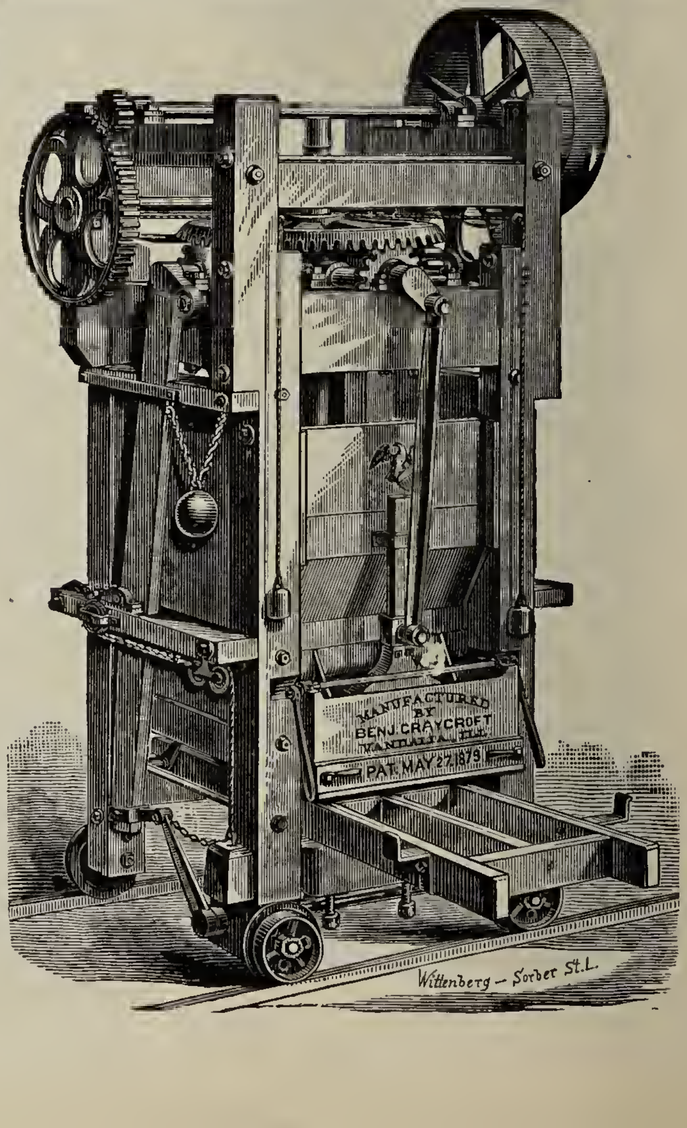
Manufacturer,
Vandalia, Ills.

C. J. CRAYCROFT, Fresno City, Cal., Gen'l Agent for Pacific Coast.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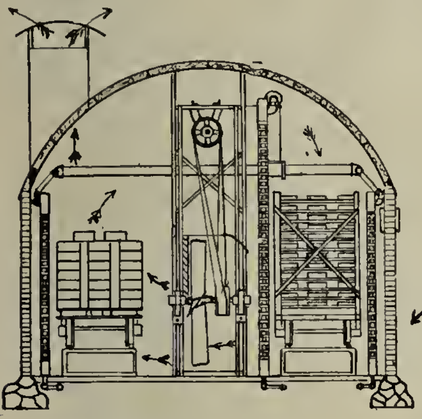
PAT. MAY 27 1879
Wittenberg – Sorber St. L.

The Safety Dryer,

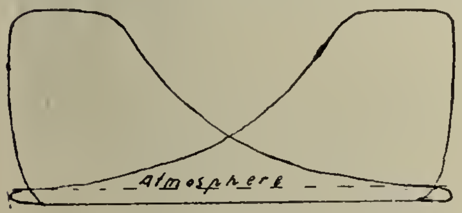
Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.

U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



Samuel Ross, President. John Miller, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.

WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

Washington, D. C., June 7th, 1895.

S. G. Phillips, Esq., Rahway, N. J.

Dear Sir—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our —— You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

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Mr. S. G. Phillips,

Dear Sir—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. Raabe, M. E.

"And Met the Requirements in Every Case."

Philadelphia, December 14, 1892.

Mr. S. G Phillips, Woodbridge, N. J.

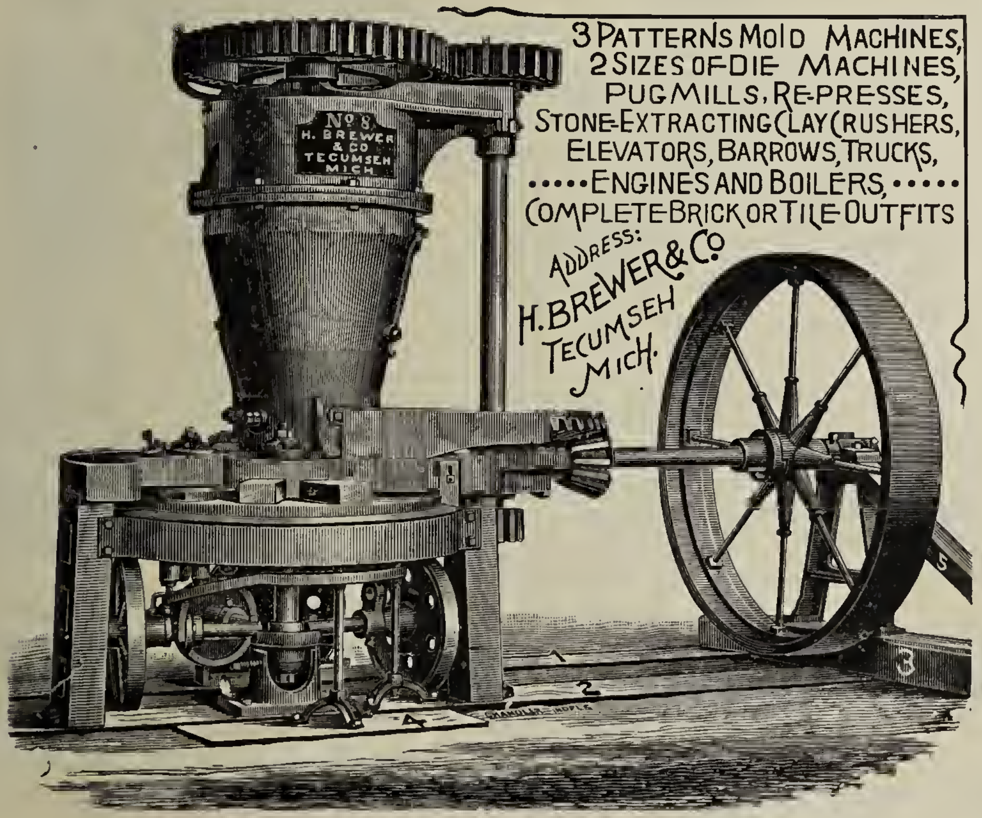
Dear Sir—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformily without cracks.

Yours respectfully,
Chambers Brothers Co.,
J. H. Chambers, Gen'l Mgr.

S. G. PHILLIPS

Agent and Patentee,

161 Grand Street.
Rahway, N. J.



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This will give you the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries, desired, etc.

To sound industries, which will bear investigation, substantial inducements will be given by many of the places on the lines of the Illinois Central R. R., which is the only road under one management running through from the Northwestern States to the Gulf of Mexico. GEO. C. POWER, Industrial Commissioner I. C. R. R. Co., 506 Central Station, Chicago.

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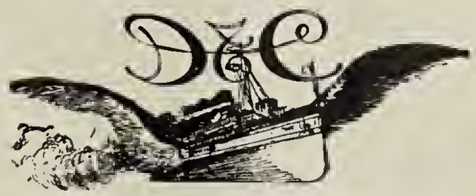

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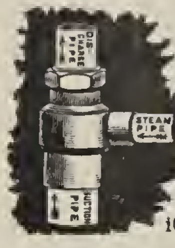
The Detroit and Cleveland Steam Nav. Co.



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200 to 12000 Gallons per Hour.
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SLIP CLAY { For Glazing of Pottery } WORKS

ESTABLISHED 1845.

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TO CALIFORNIA via the BURLINGTON ROUTE.

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INCORPORATED 1870. MANUFACTURERS OF
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Unexcelled for Kiln Purposes
44 Mercantile Bank Bldg., Cleveland, Ohio.

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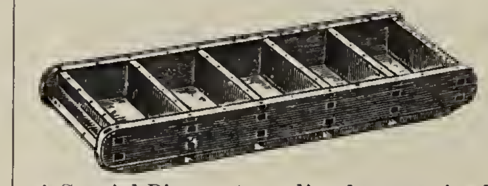

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We manufacture the the most substantial Moulds known, and guarantee every Mould to be first-class in material and workmanship.

A Special Discount on all orders received on or before March 1st.

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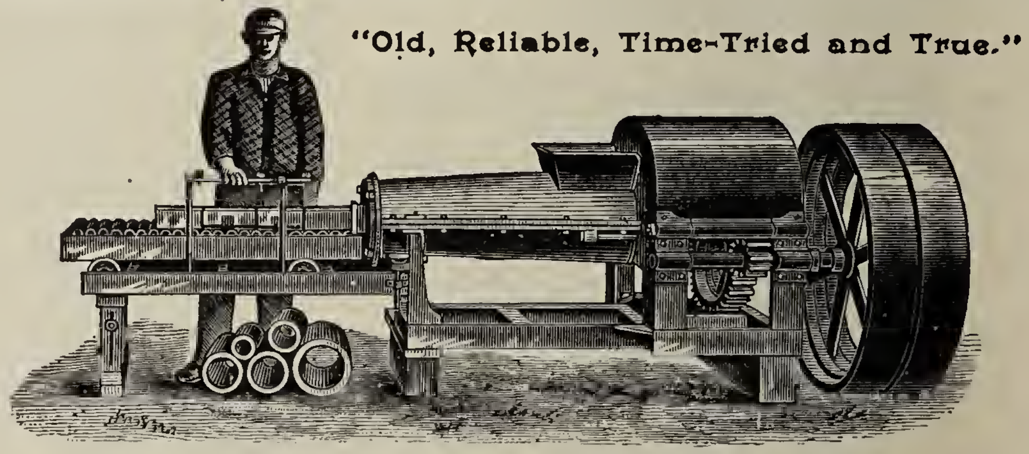
IMPROVED BRICK AND .... TILE MACHINES.

"Old, Reliable, Time-Tried and True."



P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,

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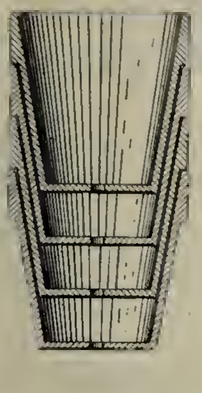
Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.



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WITH THE ONLY SUCCESSFUL

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(PATENTED.)

No expert workmen required.
Capacity in 10 hours:
6,000 two-inch Pots; 3,500 five-inch Pots;
4,000 four-inch " 2,000 seven-inch "
Write for Circular and prices.

The Rockwood Mfg. Co.,

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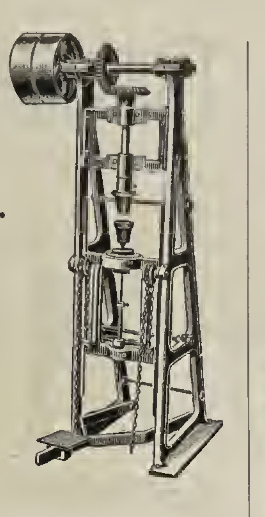

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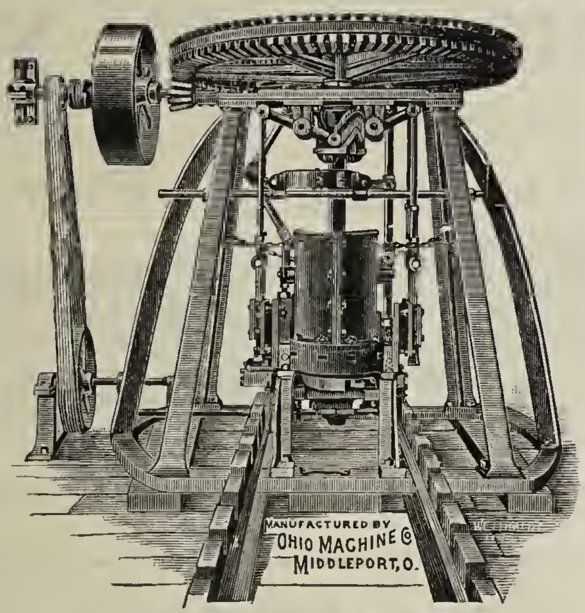
MANUFACTURED BY

Ohio Machine Co.,

Middleport, Ohio.

Under the very Latest Improved Grant-Murray Patent.

This machine is constructed with the object of giving to purchasers the very best results obtainable for the money invested. It is at once Simple, Durable, Convenient, and Easily operated. We claim these machines make the strongest brick in the market, a brick that is very superior for Street Paving and building purposes. Their superior quality as pavers may be ascertained by reference to some of the leading cities of Ohio and West Virginia. This machine works the clay very stiff, pressing all the clay into each brick that it will possibly contain, thus imparting the quality requisite to a No. 1 Paving Brick. We guarantee these machines to our customers, and solicit investigation as to their merits. For further particulars please correspond with



OHIO MACHINE CO.,

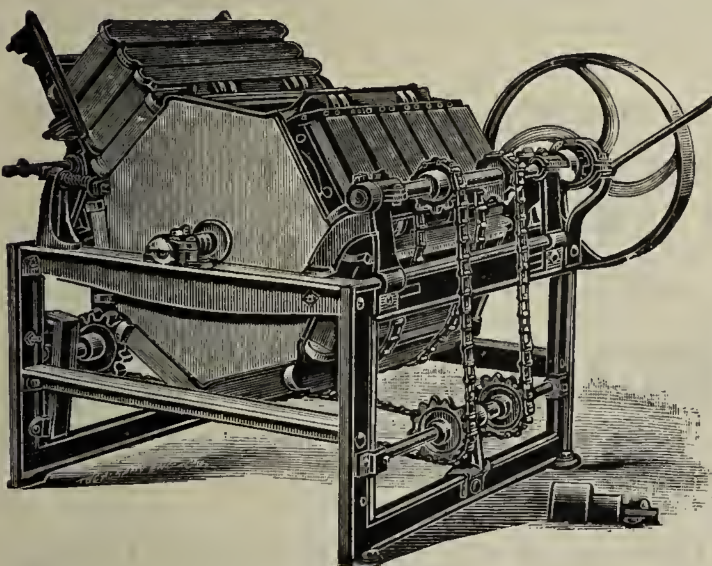
MANUFACTURERS.

We manufacture the Grant & Murray Patent Repress Brick Machine, pressing 4 brick each revolution and 40,000 per 10 hour day.

Middleport, Ohio

BUCK'S NEW CHAMPION

Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similiar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.

WHITEHEAD BROS. & CO., General Agents, 517 West 15th St., New York City.

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No. 23 Passenger	2:50 p. m.
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*Daily.

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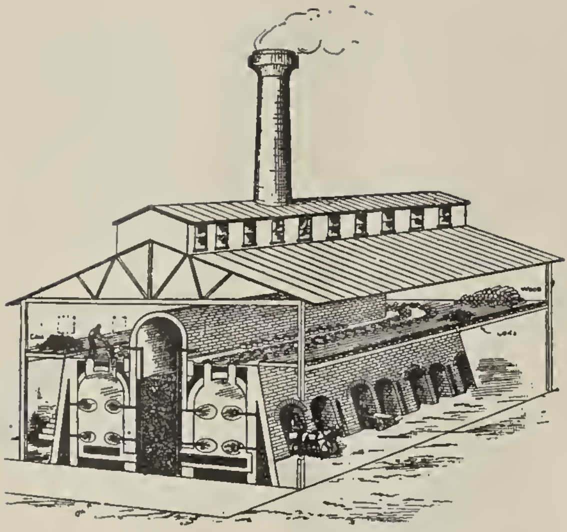
JNO. S. LAZARUS, Gen. Pass. Agent.

TAKE THE BIG 4 TO ST LOUIS



Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

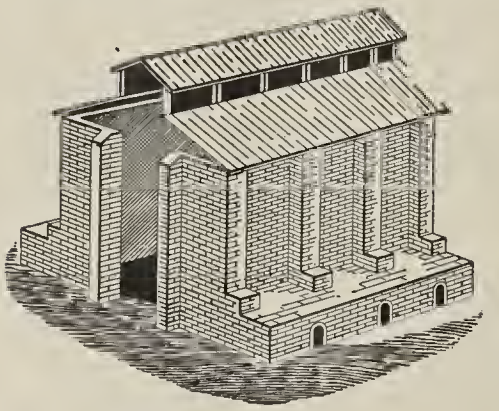
All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., *Minneapolis, Minn.*

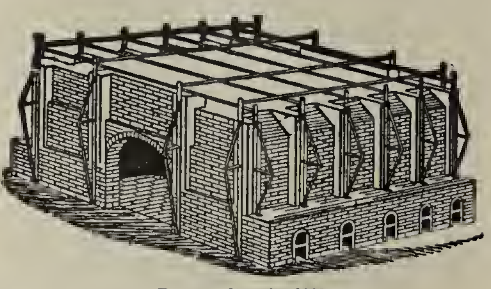


Up-Draft Kiln.

LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



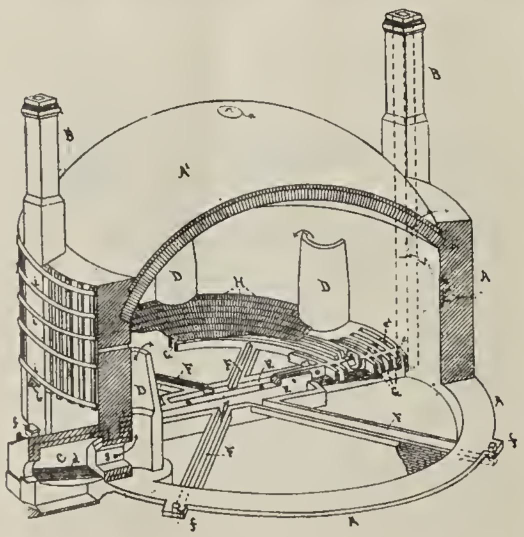
Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., *Kansas City, Mo.*



BURNING MADE EASY

BY USING

Holman's Down Draft Kiln.

Cheaply and easily built, and Fully demonstrated to be one of the most perfect kilns on the market.

.... All Parts of the Kiln Fully Under Control.

SEND FOR ILLUSTRATED CIRCULAR.

C. J. HOLMAN, Sargeant's Bluff, Iowa.

VITRIFIED PAVING BRICK

Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Mailed free on receipt of price, $1.00.

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6 Krupp Street, BERLIN, GERMANY,

CHEMICAL LABORATORY FOR THE CLAY INDUSTRY.

Raw materials and products of the Brick, Stoneware, China, Lime and Cement industries examined and advice given.

Flaws in the methods of manufacture corrected.

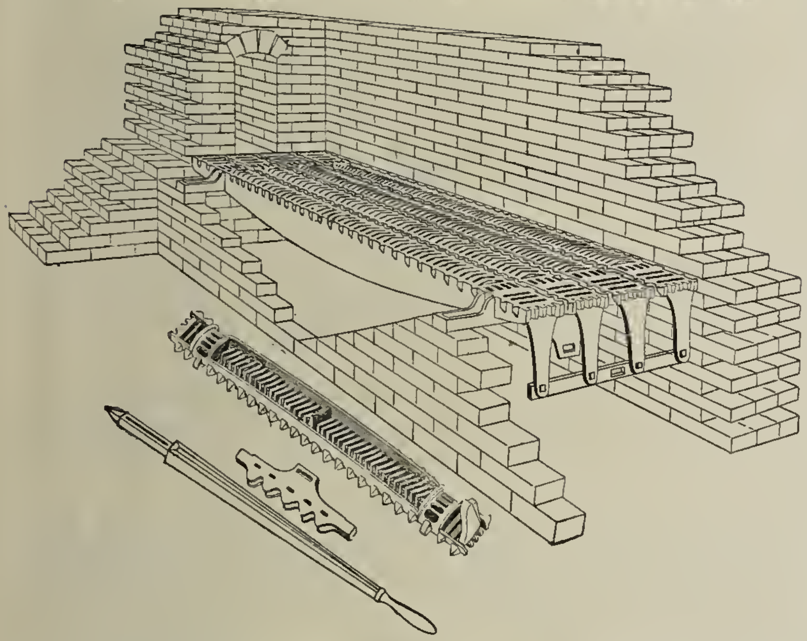
Many years experience.

Laboratory for the German Association of Refractory Clay Ware Manufacturers.

Manufacturers of the Seger pyrometrical cones.

Publishers of **Die Thonindustrie Zeitung,** the leading Ceramic weekly of Germany.

Organ of the German Association of Brick, Clay Ware, Lime and Cement Manufacturers; of the German Association of Refractory Clay Ware Manufacturers; of the Association of German Portland Cement Manufacturers, and of the Brick Trade Assembly.



A Rocking Grate for the Clayworker.

Our Grates give greatest economy of fuel. Cold drafts through furnace are greatly reduced. Why not make cheaper brick?

A good thing: Our Art Catalogue.

Write us.

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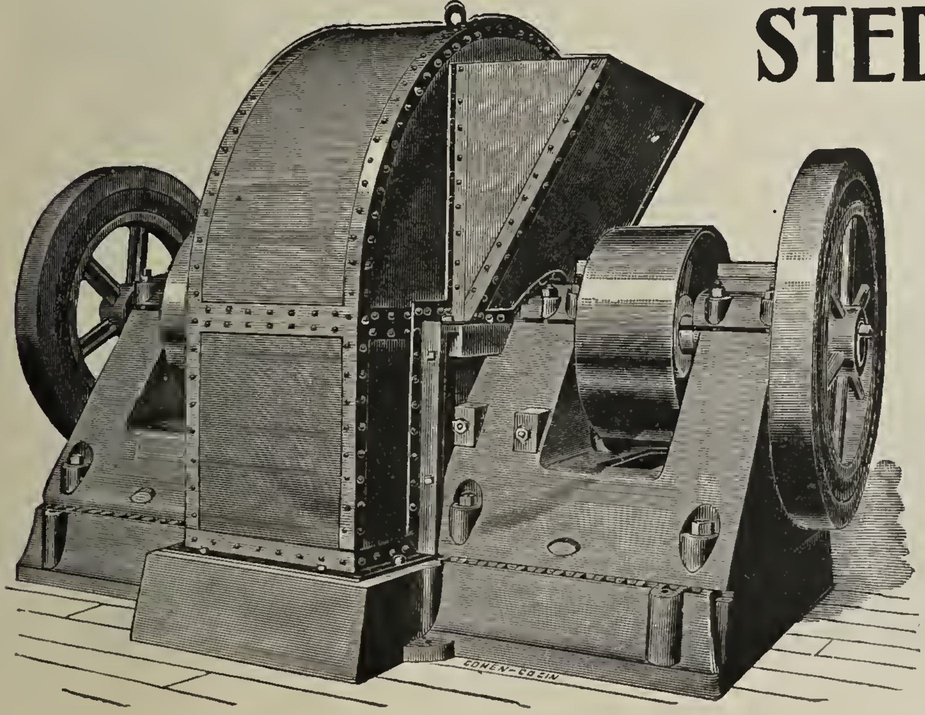

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For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it will not clog in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

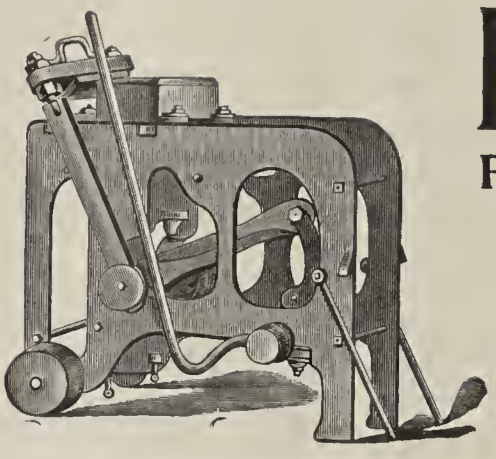
Stedman's Foundry & Machine Works,
Aurora, Ind.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.



RED BRICK PRESS.

GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
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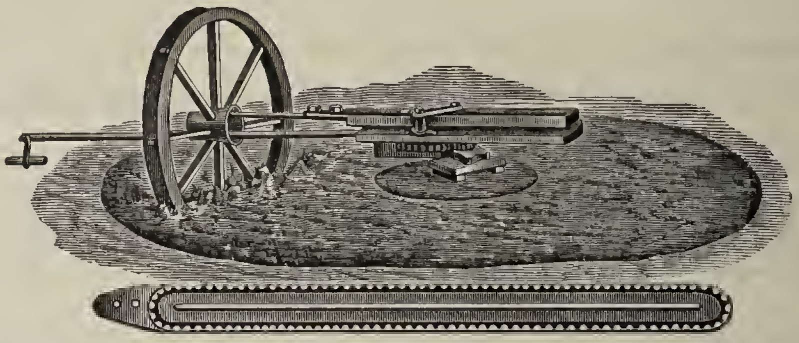
☞Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

F. H. C. MEY,

Chain Belting Engineering Works,

Approved Appliances for
Elevating, Conveying and Transmission of Power.

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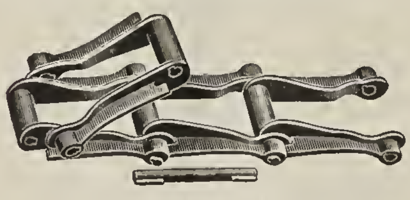
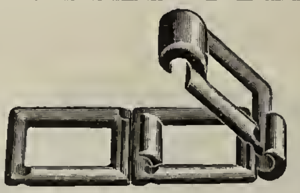


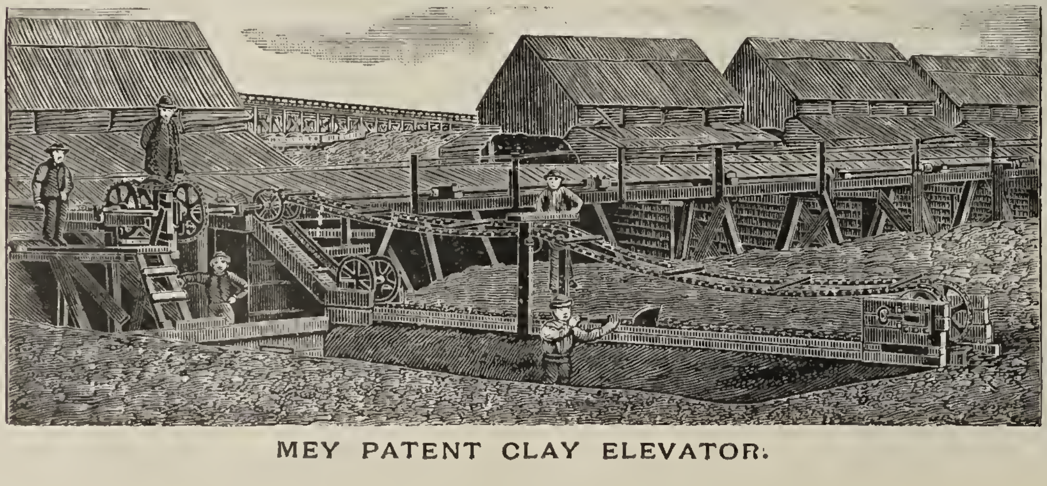
Mey Detachable Chain Belt, Pat. Feb. 7, 1888.



THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.



MEY PATENT CLAY ELEVATOR.

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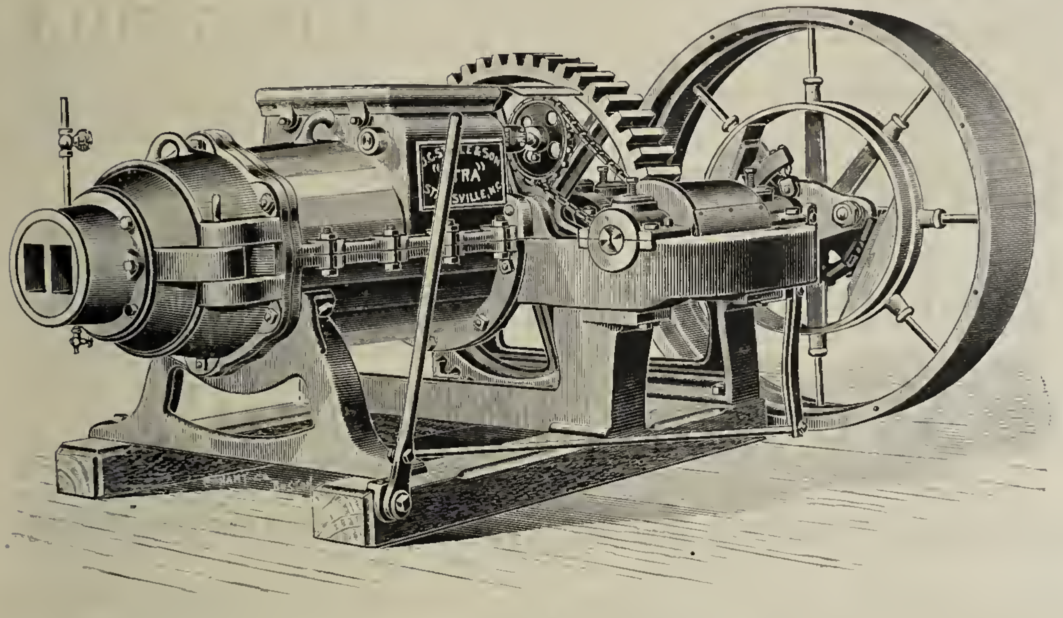
The New South Brick Machinery



X-tra Machine. Capacity 25,000.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with indigestion or constipation. No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

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Gentlemen:—I have just started the X-tra machine and it works finely, I think the Automatic Cutter perfect.

I have just closed my first kiln of brick.

Yours truly.

H. G. DRIGG.

Strictly modern machinery at the lowest price.

Send for Catalogue.

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15 New Machines.

Brick Machines, Represses, Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

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12 Second Hand Machines.

Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

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MANUFACTURERS OF
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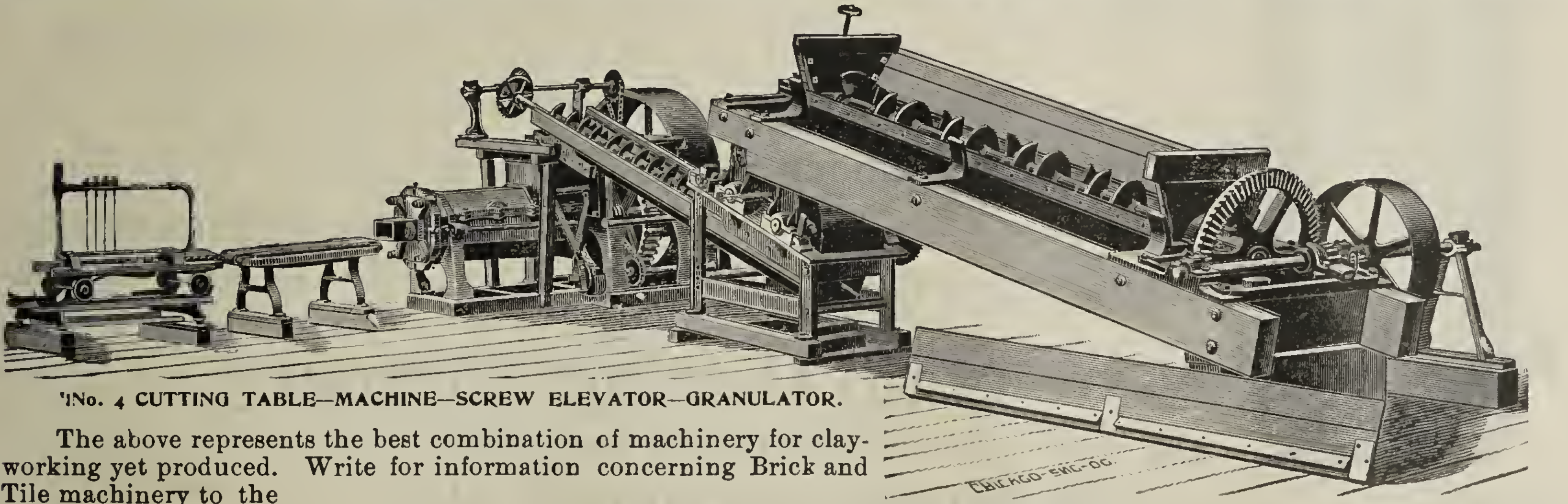
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No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

Would You Buy

A BRICK MACHINE
.....A DRY PAN
....A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King

A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

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All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
...AND...
SLIP PRESSES

For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

LEVIATHAN BELT.

"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

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THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
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Manufactured under Special Process.
....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

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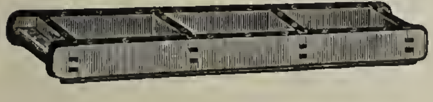
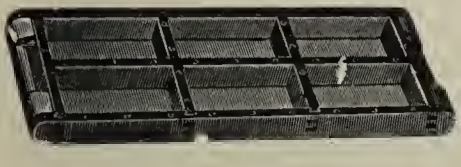
ARNOLD'S BRICKYARD SUPPLIES.

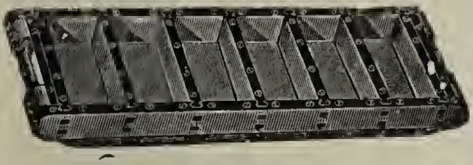
They are the BEST that are Made.



3 Brick Hand Mold.



6 Brick Hand Mold



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Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

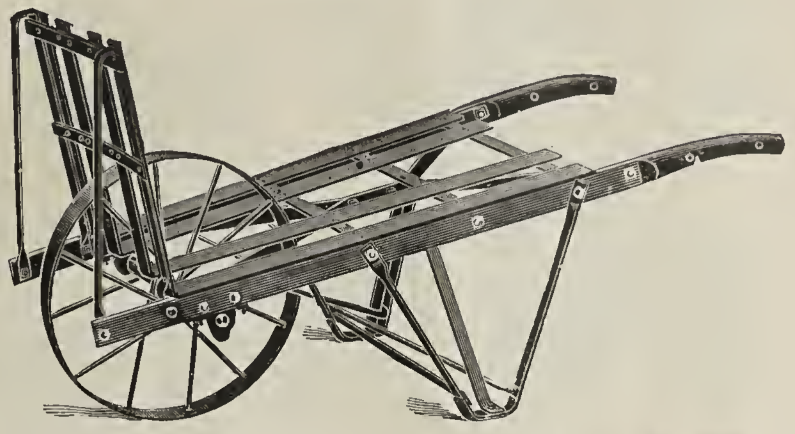
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

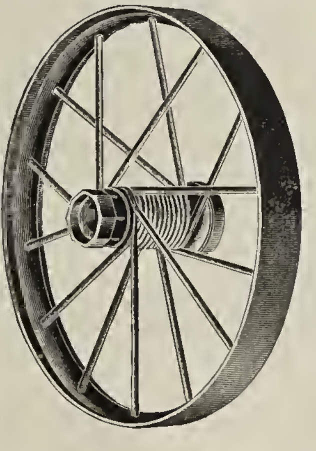
All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.





METAL WAGON WHEELS

MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The **strongest** wheels made in proportion to weight. Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced.

Circular and prices sent on application. Address

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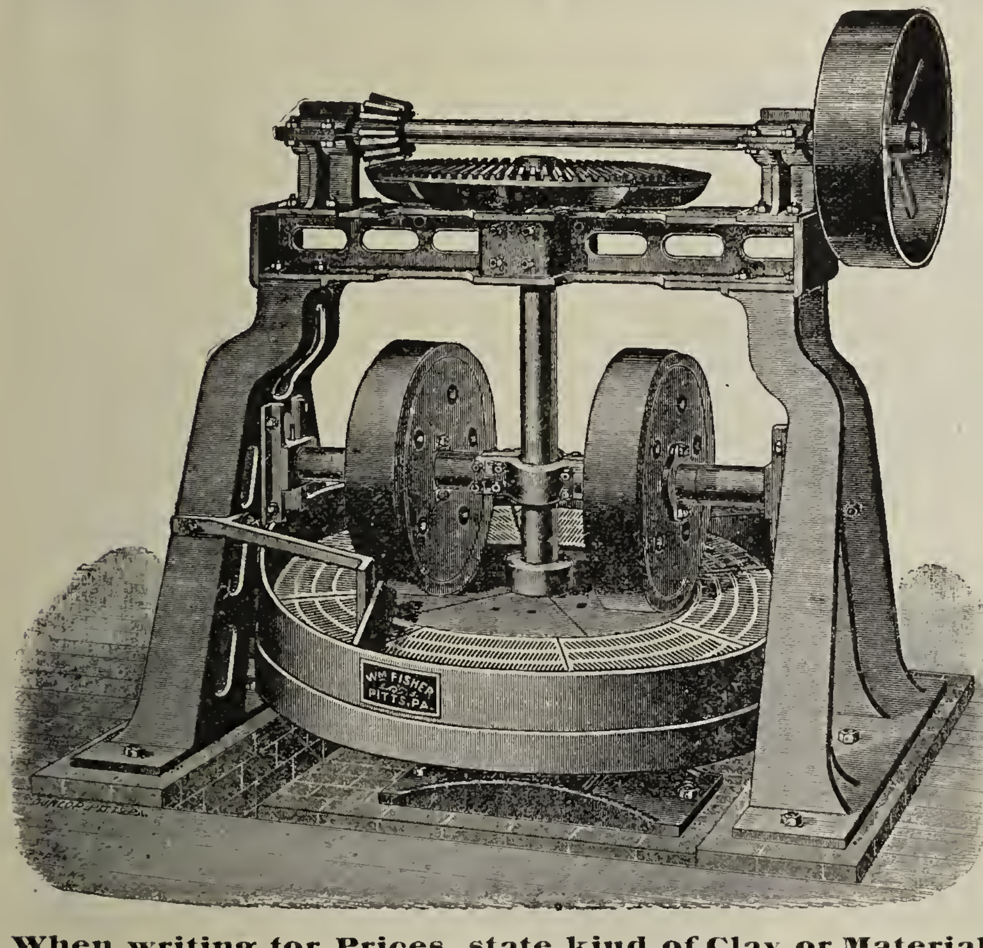
Metal Wheel Co.,
NEW LONDON, OHIO.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Wm FISHER PITTS. PA.

Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Successors,

23rd, 24th and Smallman Streets.
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FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers. Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

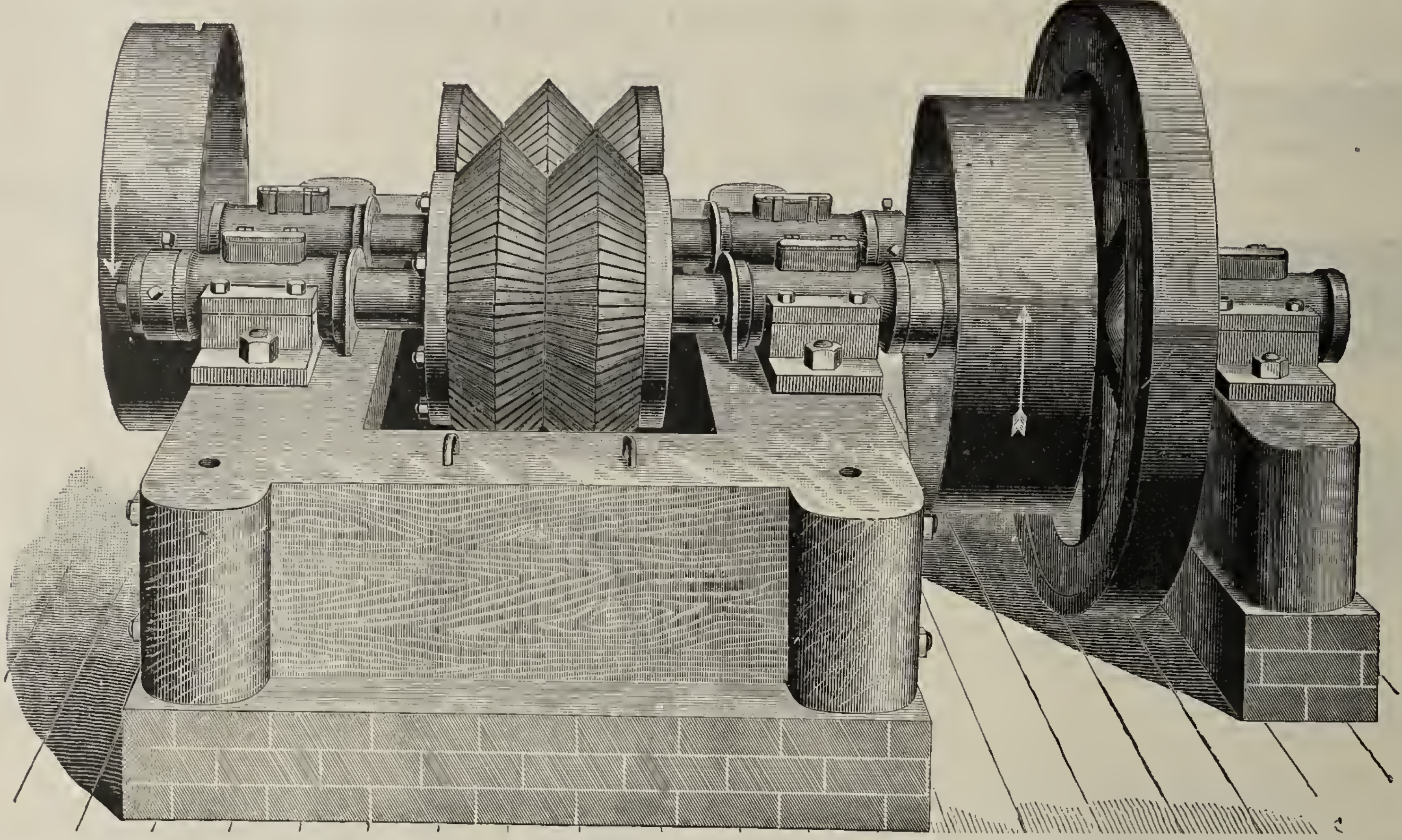
We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

NEWELL IMPROVED CLAY PULVERIZER

Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
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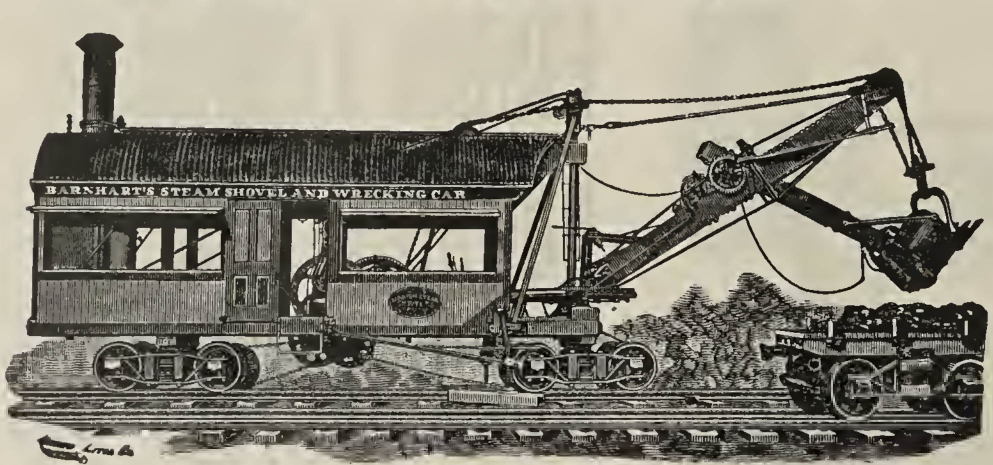
Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

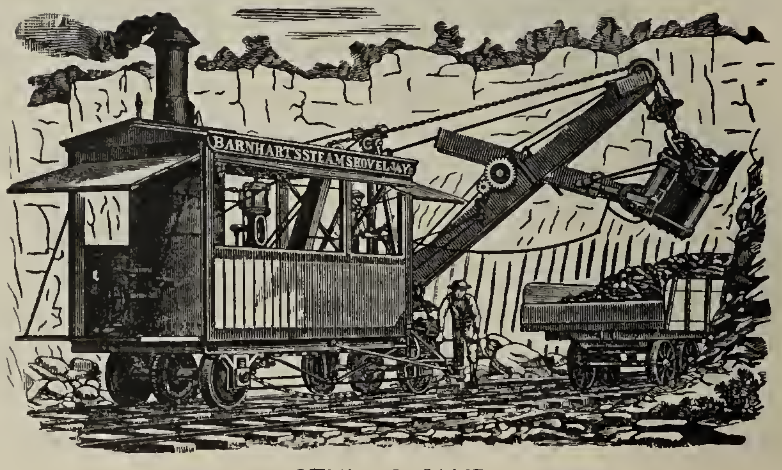
OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

603 West Center Street, - **MARION, OHIO.**



STYLE C—¾ YD.

The FERNHOLTZ MOLD BOX.

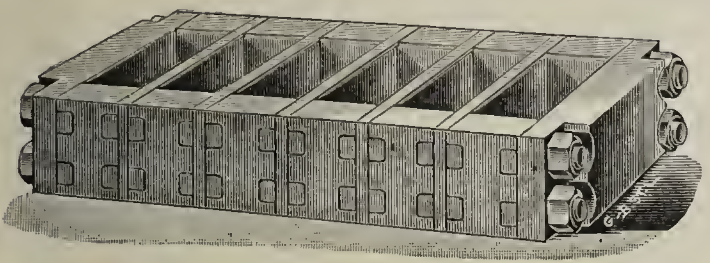


Figure 1. Patented April 10th, 1894. No. 518,185.

The most practical, durable and economical Mold Box that has ever been invented It insures square corners and edges on the Brick and positively does not spring.

Every Brick is perfect, if the clay is in proper condition. It is made entirely of specially prepared chilled iron.

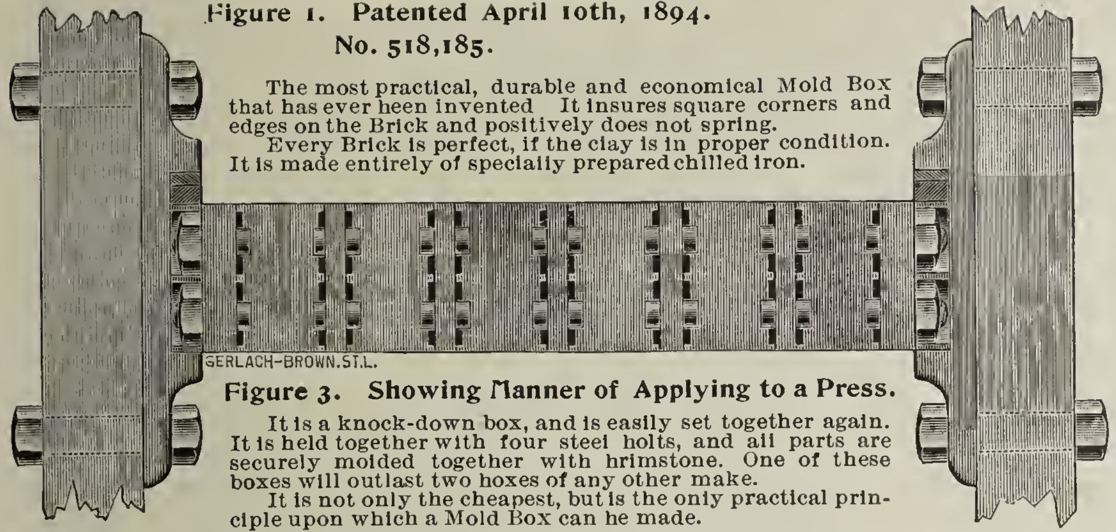
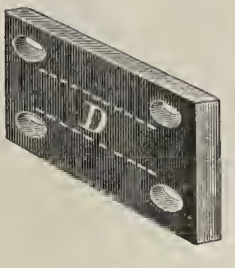


Figure 3. Showing Manner of Applying to a Press.

It is a knock-down box, and is easily set together again. It is held together with four steel bolts, and all parts are securely molded together with brimstone. One of these boxes will outlast two boxes of any other make.

It is not only the cheapest, but is the only practical principle upon which a Mold Box can be made.



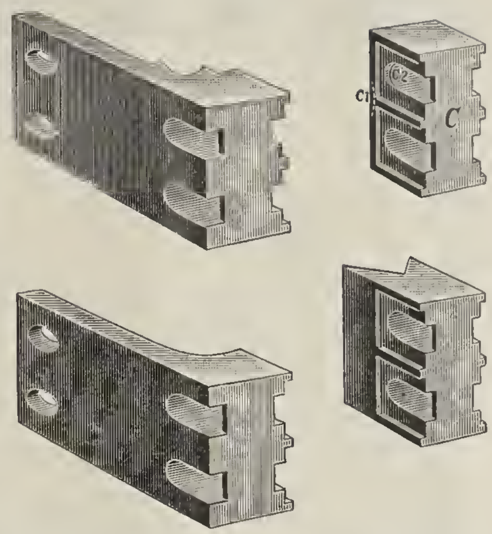


Figure 2. Showing Combination of Any Desired Kind.

It will outlast the hardest Mushert steel and when worn can be knocked down by building a small fire under it and melting the brimstone, at which time it can be reground, if necessary, and set up again, and is as good as new.

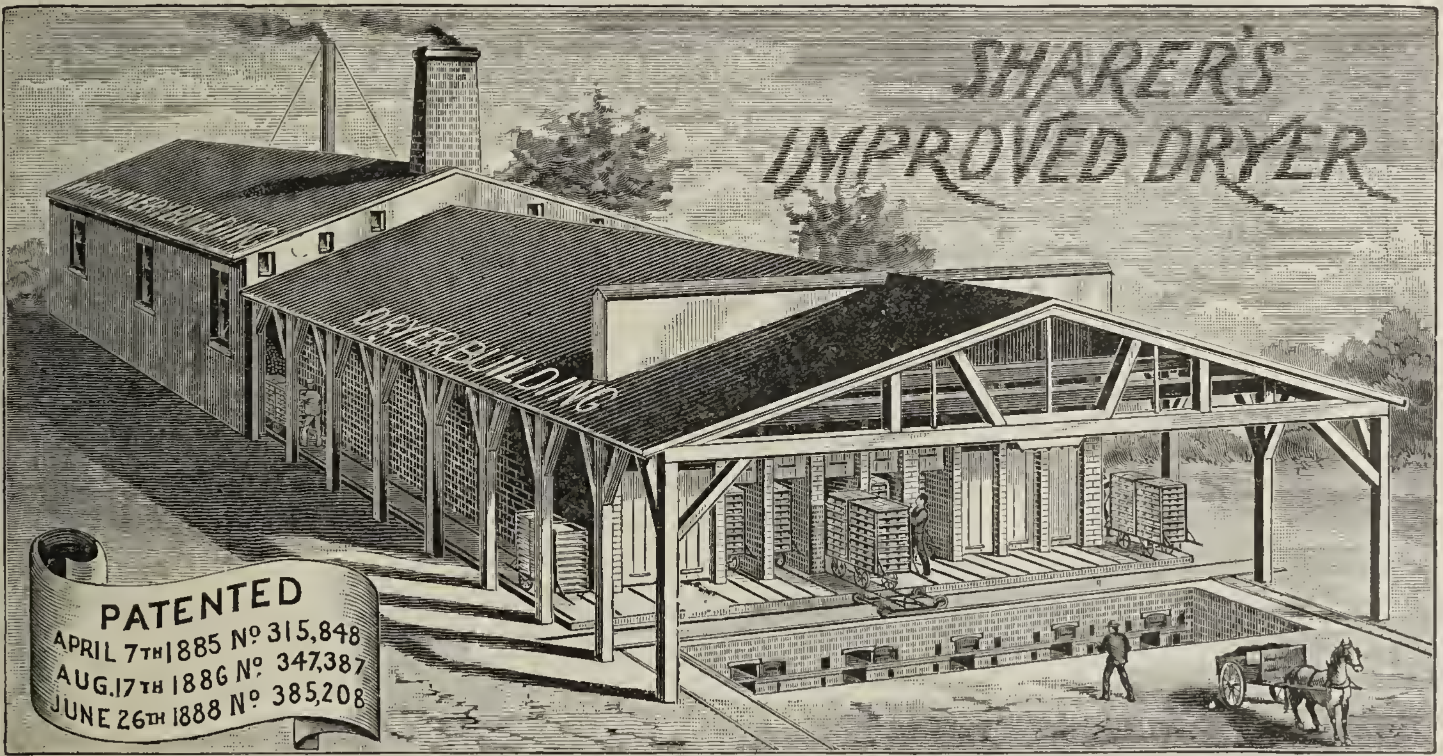
One of these boxes is good for 40,000,000 of brick. It can also be made a combination mold, as represented in Figure 2.

It can be made to fit any Dry Press Brick Machine, as represented by Figure 3. Our plan for attaching to a machine is also the simplest method known to the trade, which consists in bolting two iron brackets to the side-housings of the Press. Slip the mold box on to the lugs, adjust it, and drive in two reversible keys, and the work is done. A new mold box can be placed in any machine, after the brackets are set, in 30 minutes. One of the essential features of this Mold is that it never varies in size by re-grinding. Figure 3 shows the manner of attaching to a Press, as described above. We make them in two, three, four, five and six molds, and they are for sale to the public. For further information, write to

MILTON F. WILLIAMS & CO., 2705 and 2707 North Broadway, St. Louis, Mo.

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.


SHARER'S IMPROVED DRYER
DRYER BUILDING
PATENTED
APRIL 7TH 1885 Nº 315,848
AUG. 17TH 1886 Nº 347,387
JUNE 26TH 1888 Nº 385,208

COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address **GEO. W. SHARER,** 2224 Tioga St., **Philadelphia, Pa.**

ALSIP'S LATEST IMPROVED
Down and Up-draft Kiln.

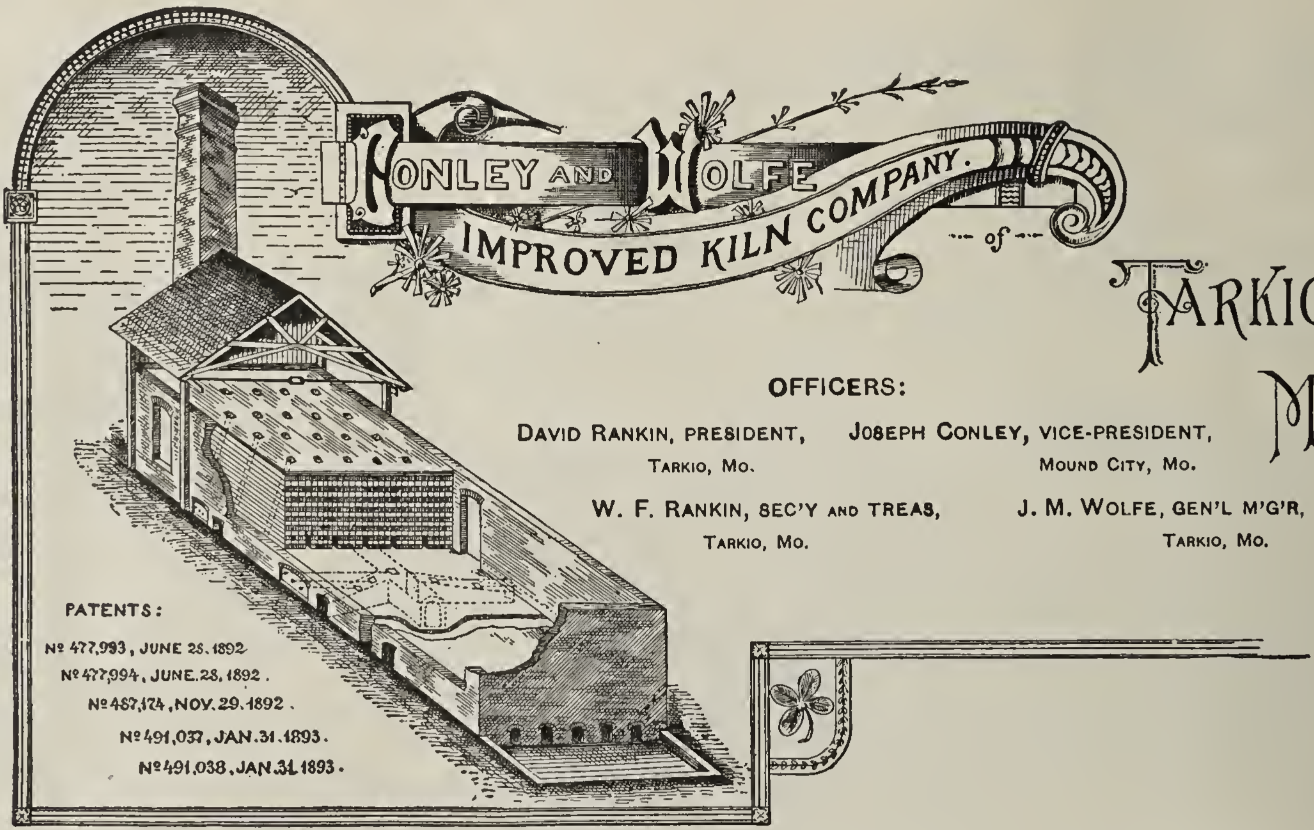
The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**


CONLEY AND WOLFE IMPROVED KILN COMPANY. —of— TARKIO, MO.

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J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

PATENTS:
Nº 477,993, JUNE 28, 1892.
Nº 477,994, JUNE 28, 1892.
Nº 487,174, NOV. 29, 1892.
Nº 491,037, JAN. 31, 1893.
Nº 491,038, JAN. 31, 1893.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

Price, $85.

Outing
BICYCLES.

Price, $85.

NONE BETTER AT ANY PRICE.

We refer by permission to the entire staff of the "CLAY-WORKER" they all ride Outing BICYCLES.

In elegance of finish and fine workmanship Outing BICYCLES easily distance all others.

Good Agents Wanted. Send for Catalogue.

HAY & WILLITS MF'G. CO.

76 North Pennsylvania St., - - - INDIANAPOLIS, IND.

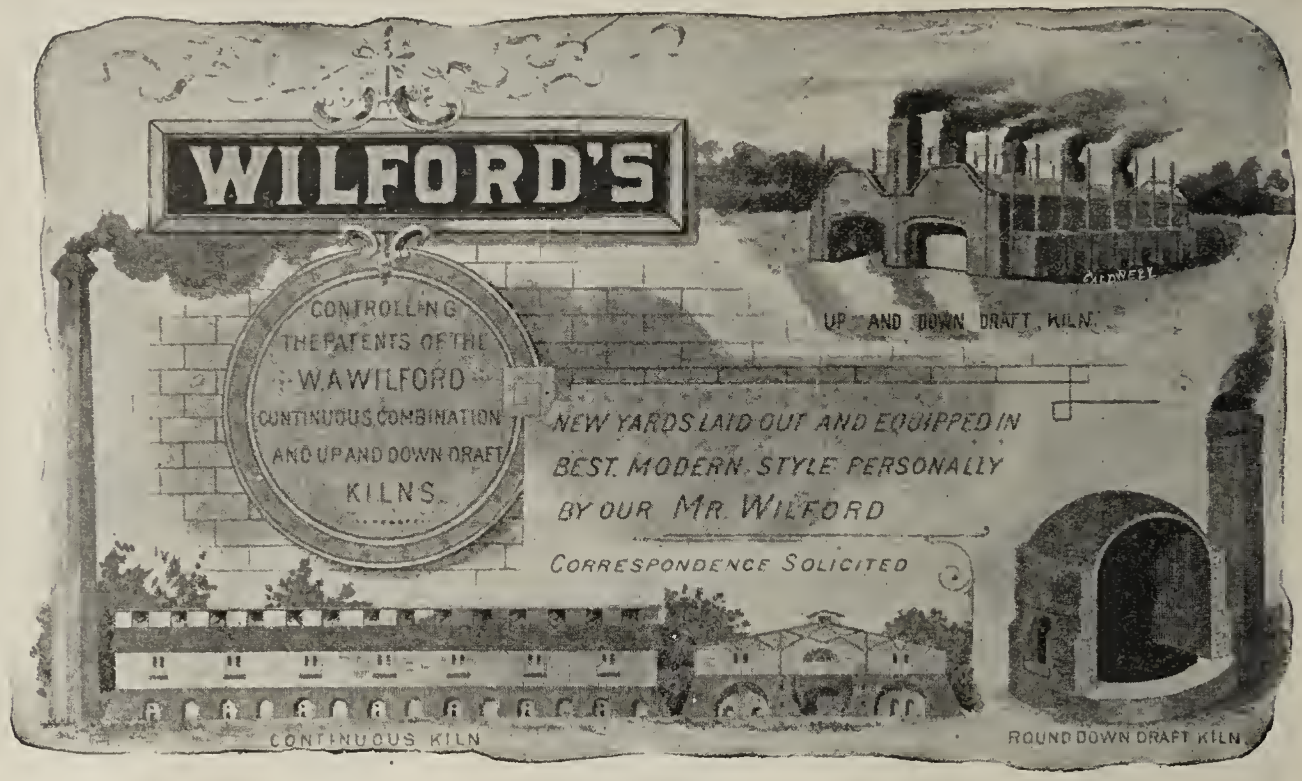
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS COMBINATION AND UP AND DOWN DRAFT KILNS.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
UP AND DOWN DRAFT KILN
CONTINUOUS KILN
ROUND DOWN DRAFT KILN

TESTIMONIALS:

ROCHESTER BRICK & TILE M'F'G. CO.,
Brick and Drain Tiles, Hollow Brick, Etc.
243 *Power's Block.*

Rochester, N. Y., June 19, 1896.

Wilford Patent Kiln Co.

Dear Sir:—In answer to your inquiry as to what we can say in reference to your kiln recently constructed on our yard, we are very much pleased with it.

At the present time we have burned once and a half round, and we not only find it to be very economical in fuel, but the brick are coming out well burned, in first-class condition and very little waste.

After a little longer use we hope to make a still better showing.

Truly yours,
ROCHESTER BRICK & TILE M'F'G. CO.,
Per Ira L. Otis, Pres.

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

Toronto, July 21st, 1895.

Wilford Patent Kiln Co.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

Toronto, August 7th, 1895.

W. A. Wilford, Esq.,
Wilford Patent Kiln Co.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

Elmira, N. Y., August 30th, 1895.

Wilford Patent Kiln Co.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and 2 Builders Exchange.*

Wilford Patent Kiln Co.

Buffalo, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

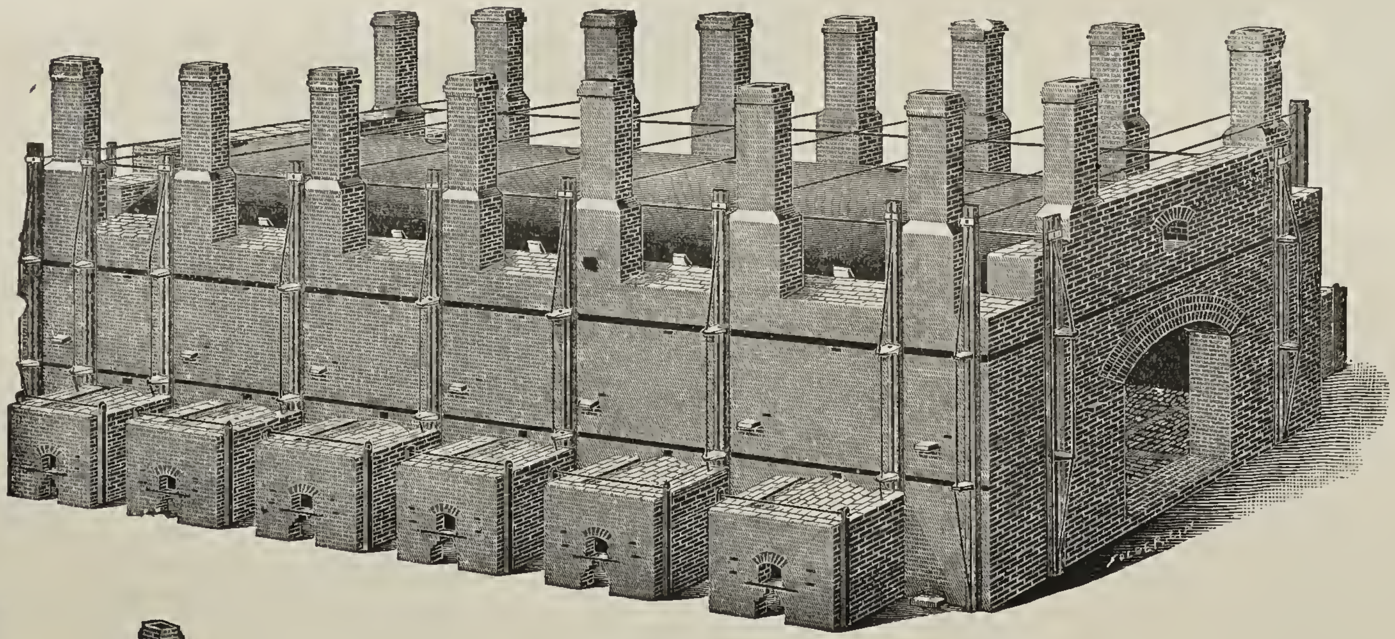
Let us give you full Particulars.

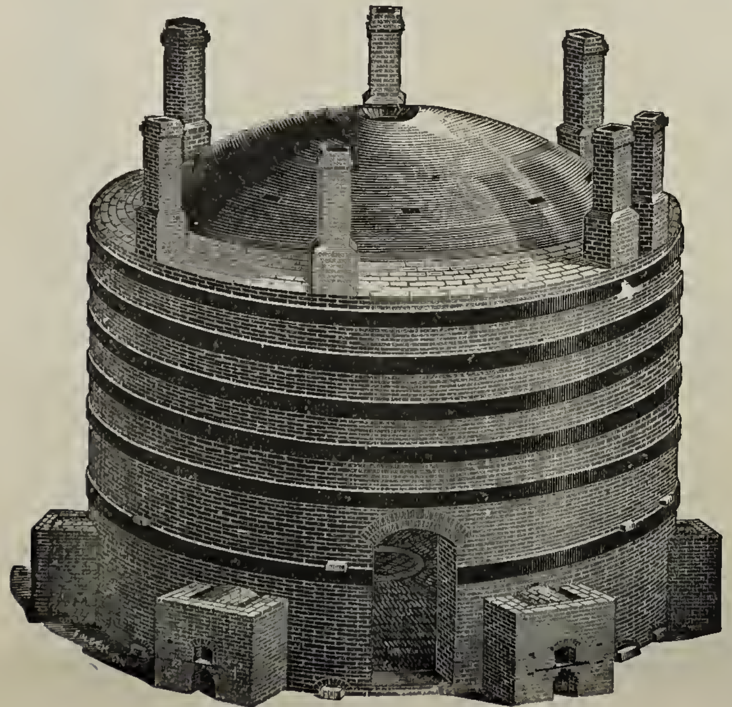
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy in cost** of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, Cincinnati, Ohio.

Any Draft So Its Up-Draft.

WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost. .

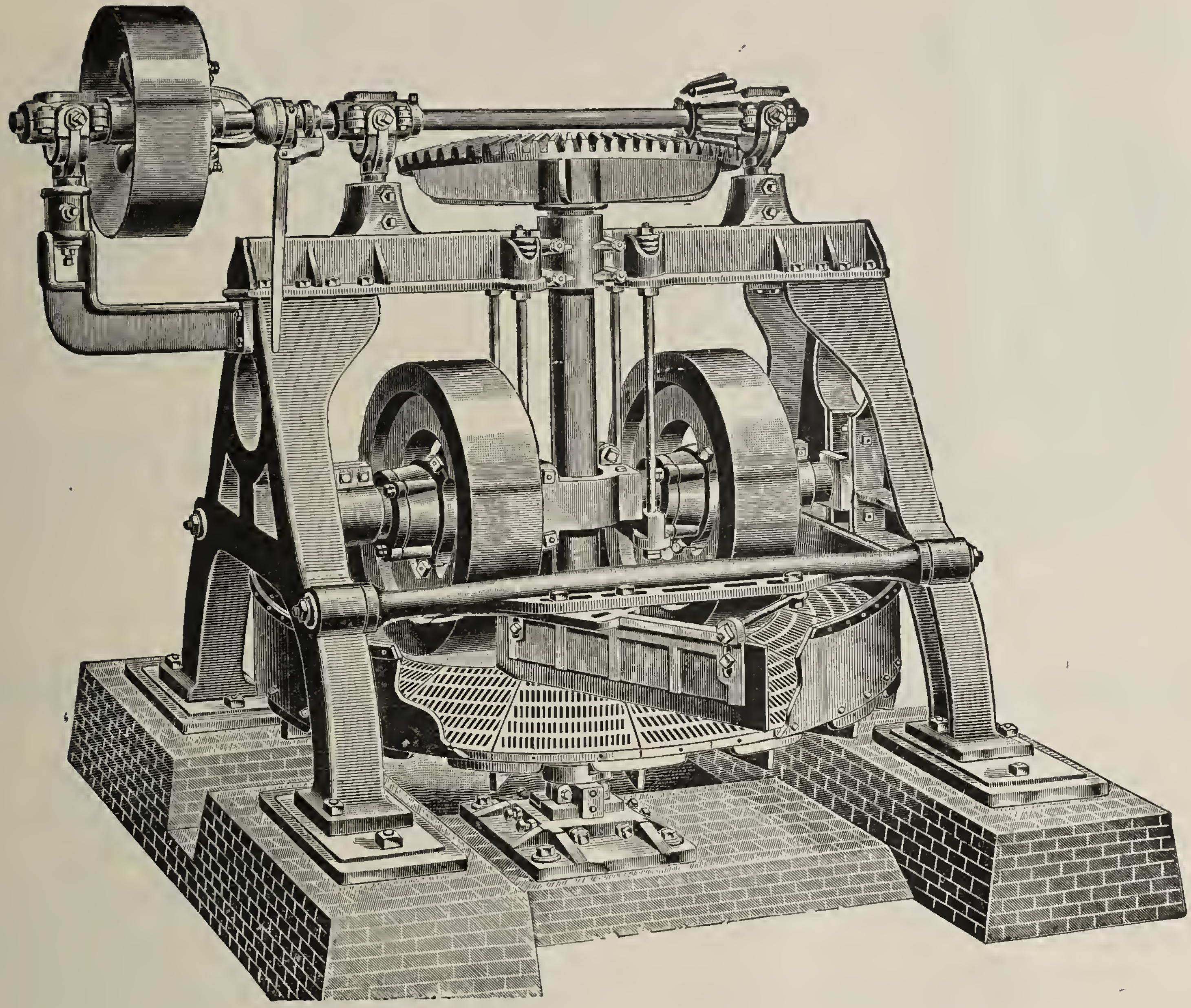
Manufacturers of Building Brick can get nothing better. . . . .

For all information desired address

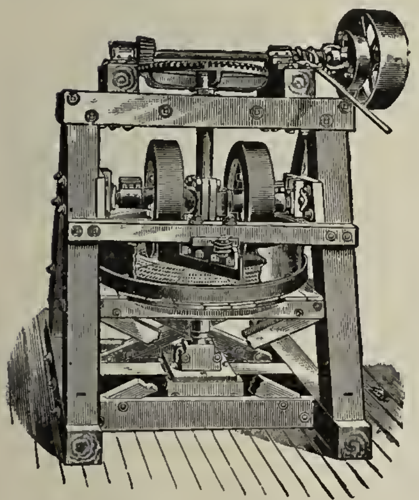
R. B. MORRISON & CO.,
P. O. Box 335,
Rome, Ga., U. S. A.

PROPRIETORS

Morrison's Latest Improved Kilns.

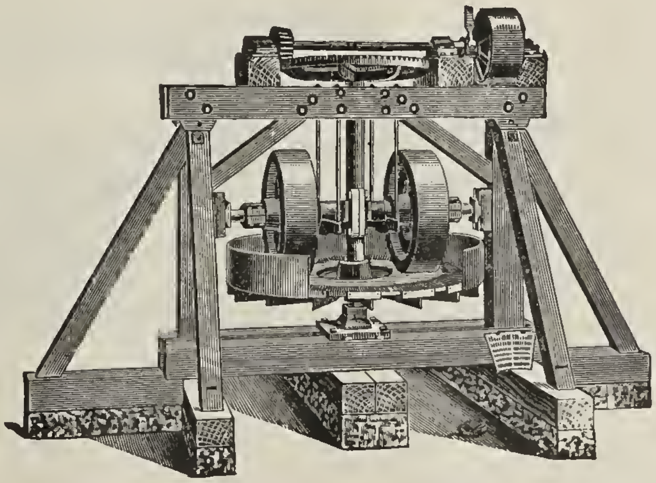


OUR SPECIALTY IS DRY PANS.



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



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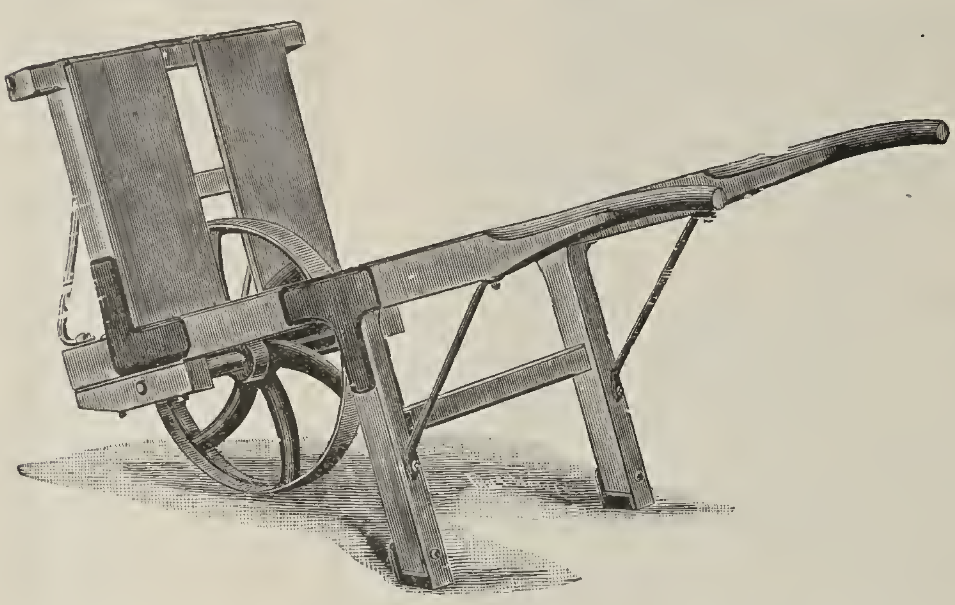
U. S. A.

Use "Martin's" White Oak

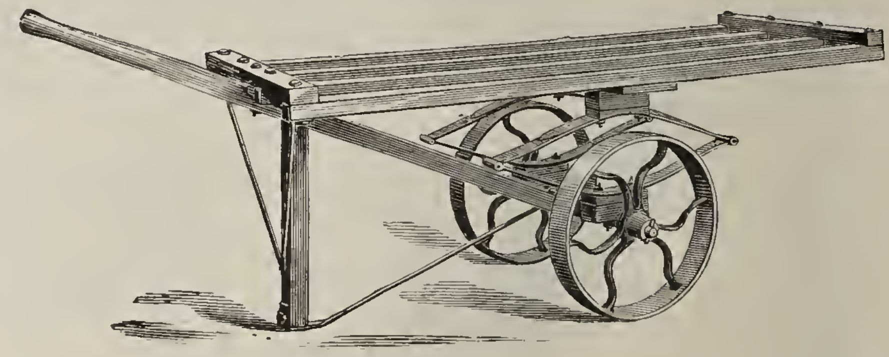


Barrows

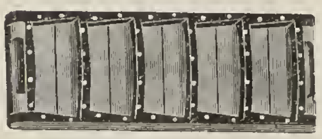
..and..

Trucks.

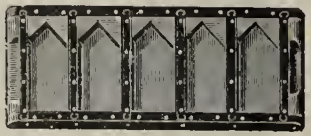
We respectfully solicit a trial order. . . . . . .

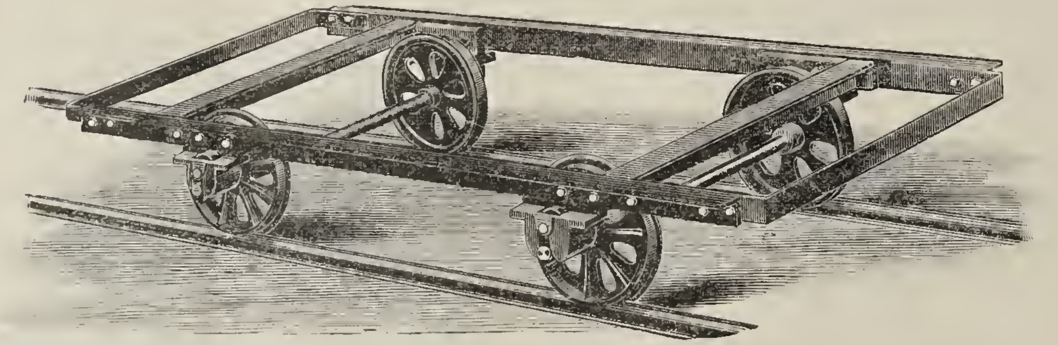


BRICK MOULDS.



ALL SHAPES AND SIZES,
With or without Panel Bottoms and Name Plates.





DRYER CARS

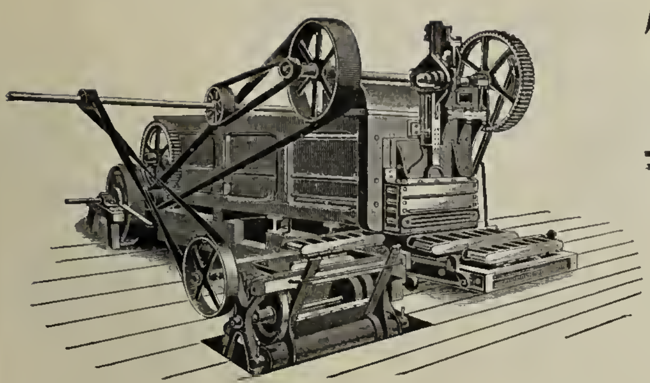
Of all Kinds
A Specialty.

The Henry Martin Brick Machine Mfg. Co.,

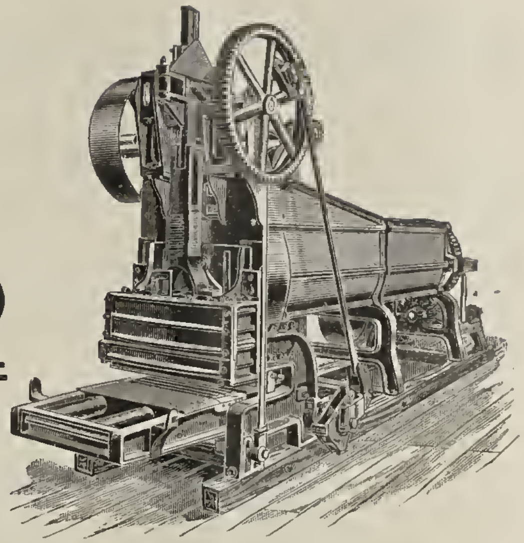
Incorporated.

Manufacturers of the Famous "Henry Martin"
Brick Machines and Brickyard Supplies. . .

Lancaster, Penna., U. S. A.



THE POTTS

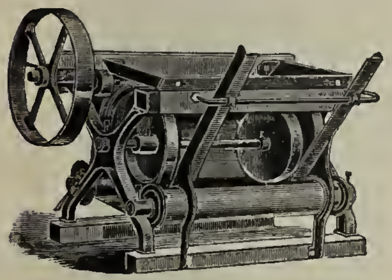


Horizontal Stock Brick Machines

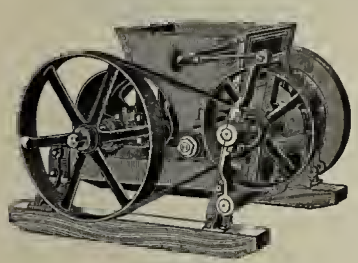
Either Wood Pug Mills
. . . . . . or All Iron.

These are the the leaders of Soft Mud Machines, they are well built of good manterial, and guaranteed to do the work claimed.

The Potts Mould Sander,



Sands the Moulds perfectly, never strikes or quits work, has no **Sprocket Chains** or gear to wear or break. Every machine guaranteed and sent on trial.



Disintegrators,

Any size and capacity desired. Rolls chilled. Will work any clay direct from the bank. Hundreds of them in use and giving entire satisfaction.

If in need of yard supplies of any kind we can save you money, as we are manufacturers and not agents.

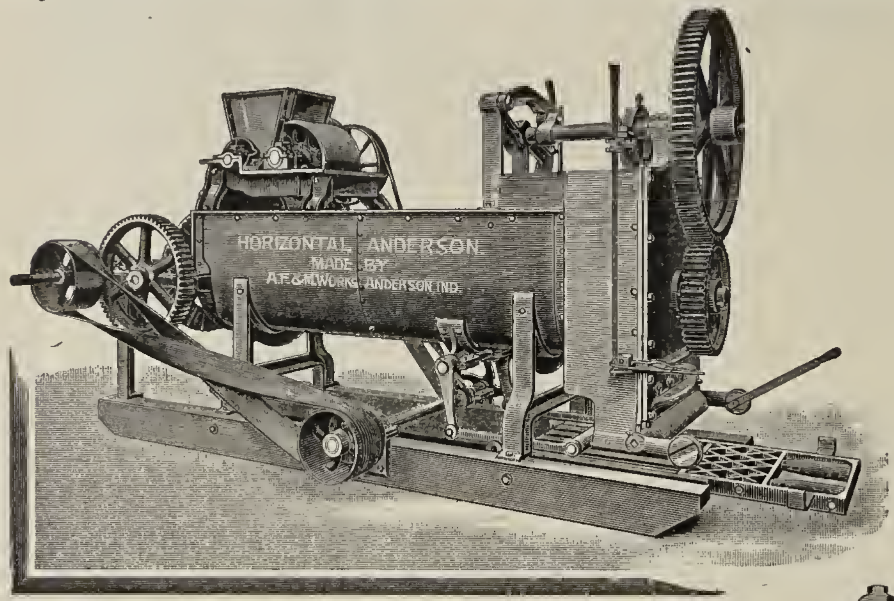
C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.

A New Departure in Brick Machinery

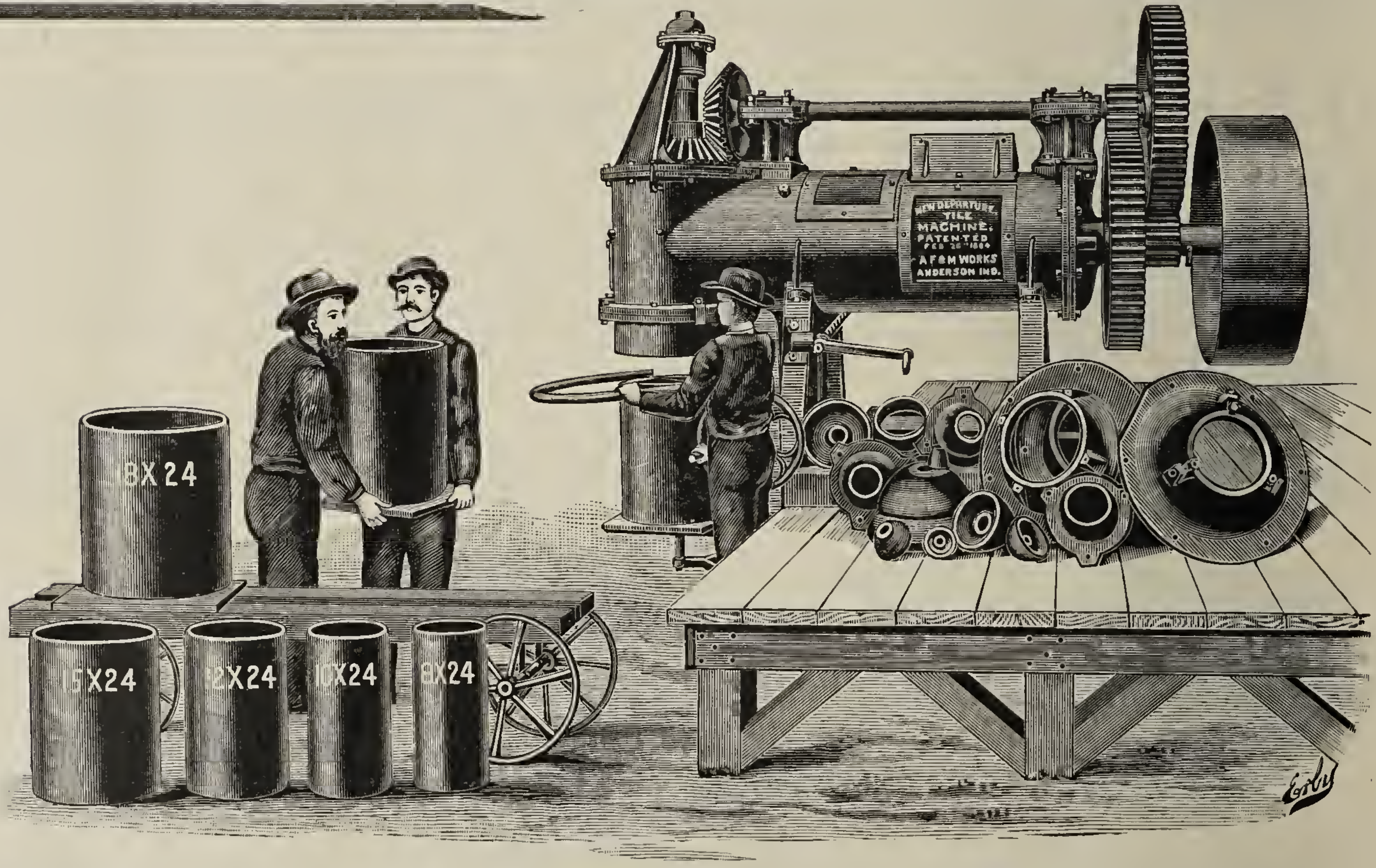
THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY;** simple in construction and durable.


HORIZONTAL ANDERSON.
MADE BY
A.F.&M.WORKS ANDERSON IND.

This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.

◆

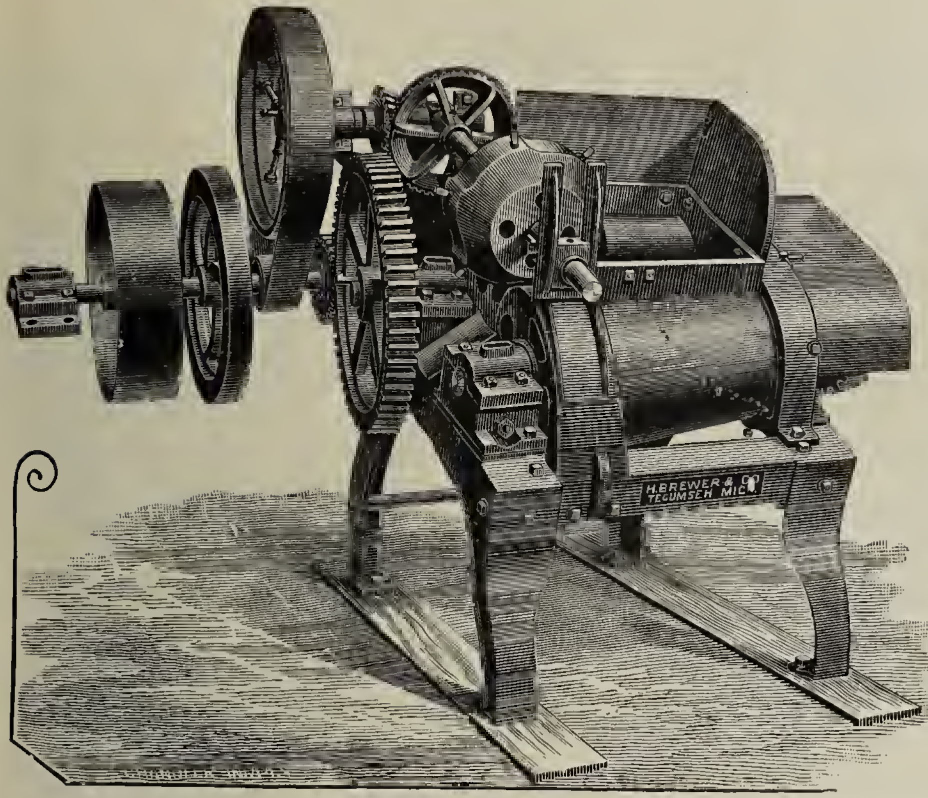


THE GREATEST ON EARTH.

We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.

DOWN DELIVERY FOR LARGE TILE. SIDE DELIVERY FOR SMALL TILE.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.



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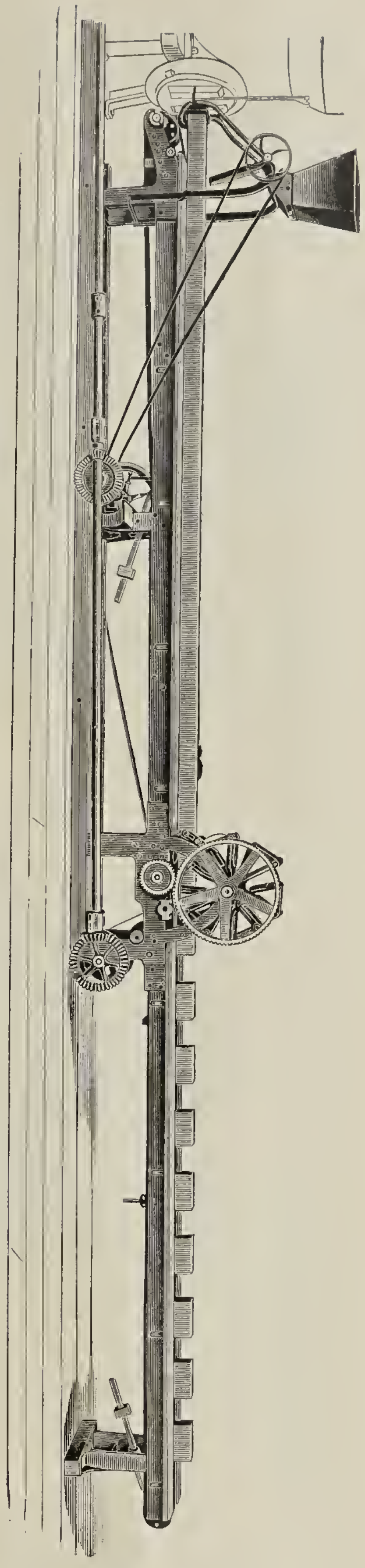

AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

Manufactured by

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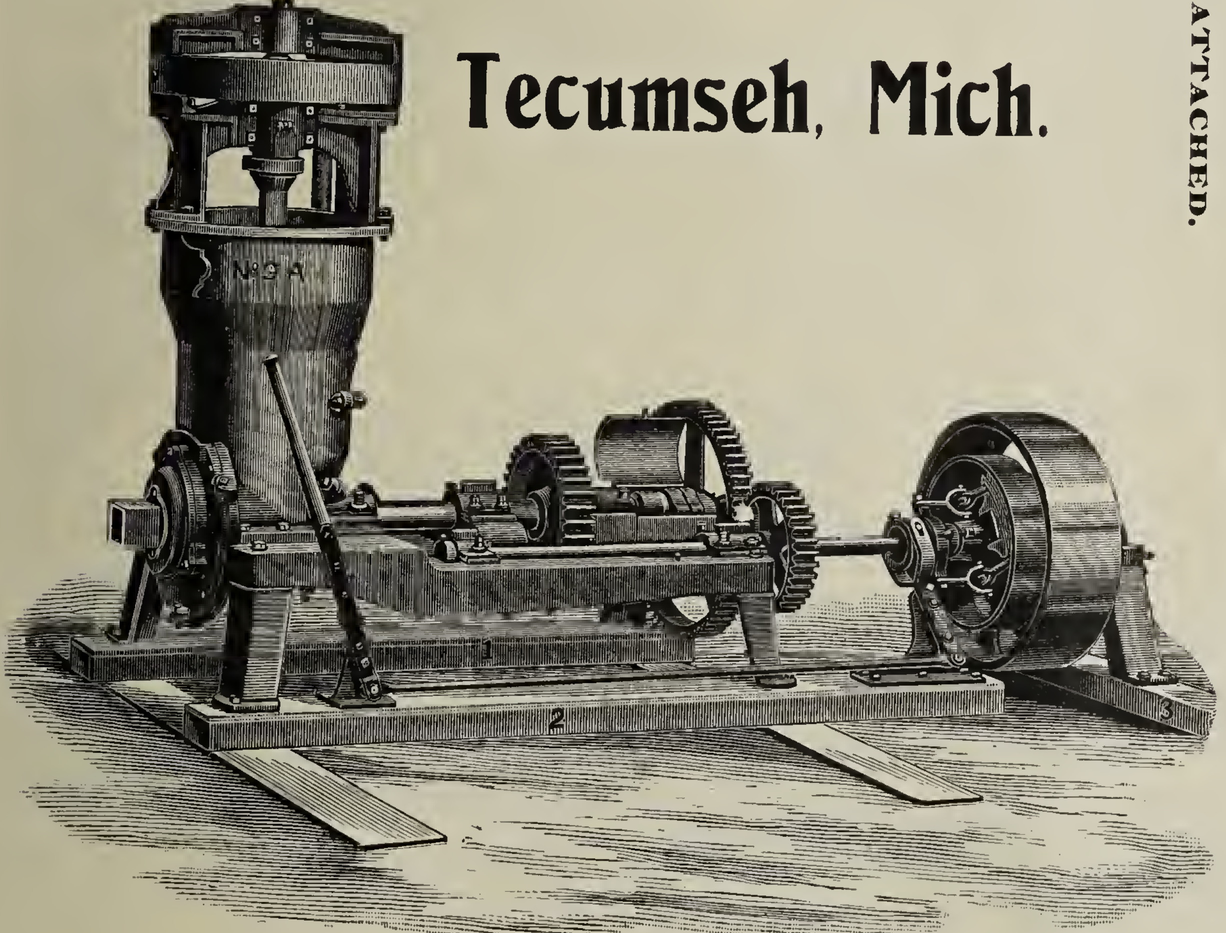
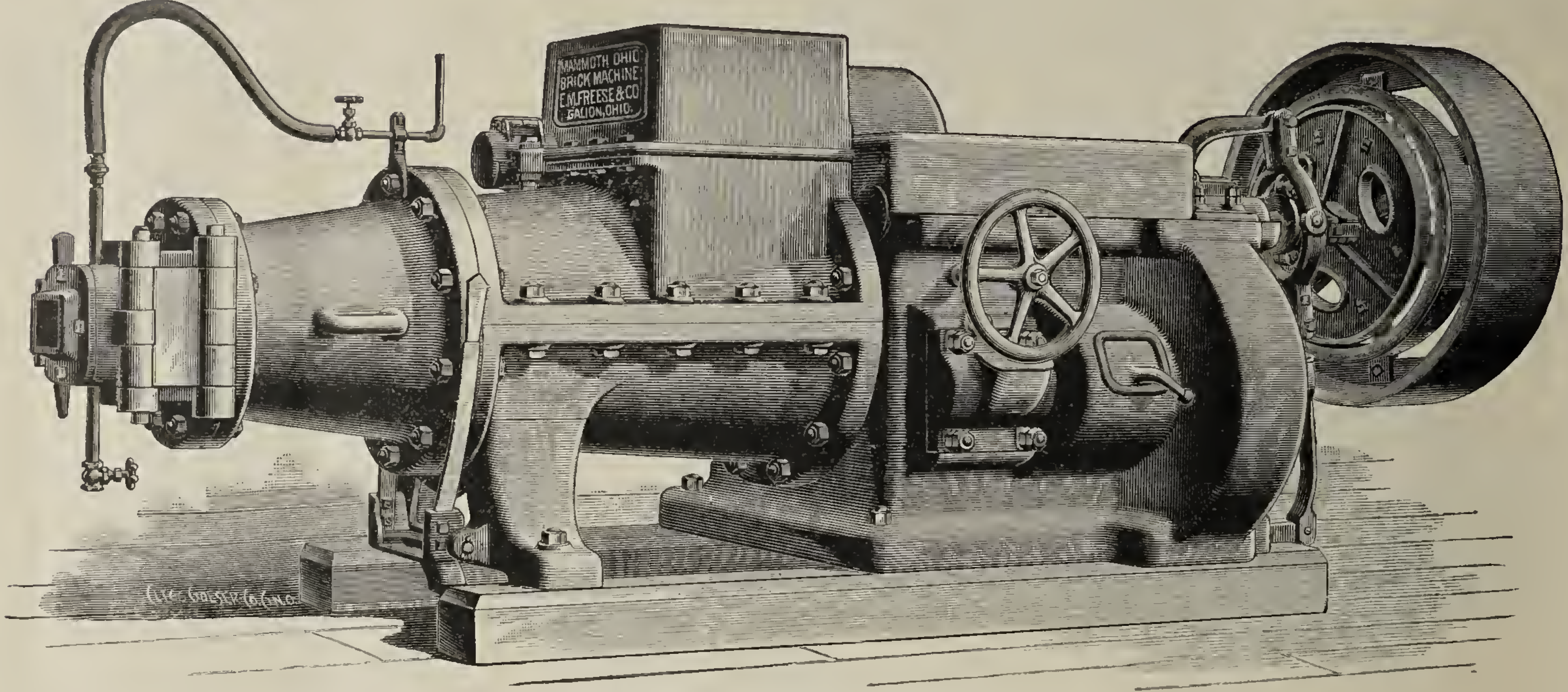
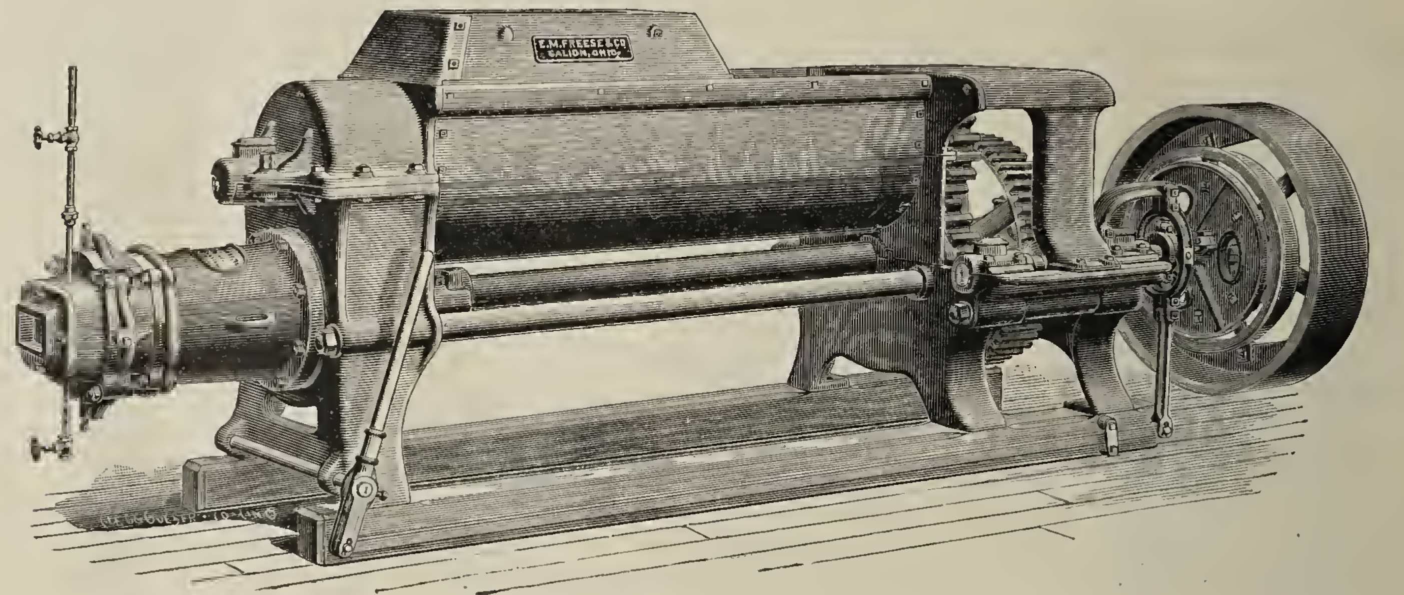


No. 9 "A" BRICK MACHINE.

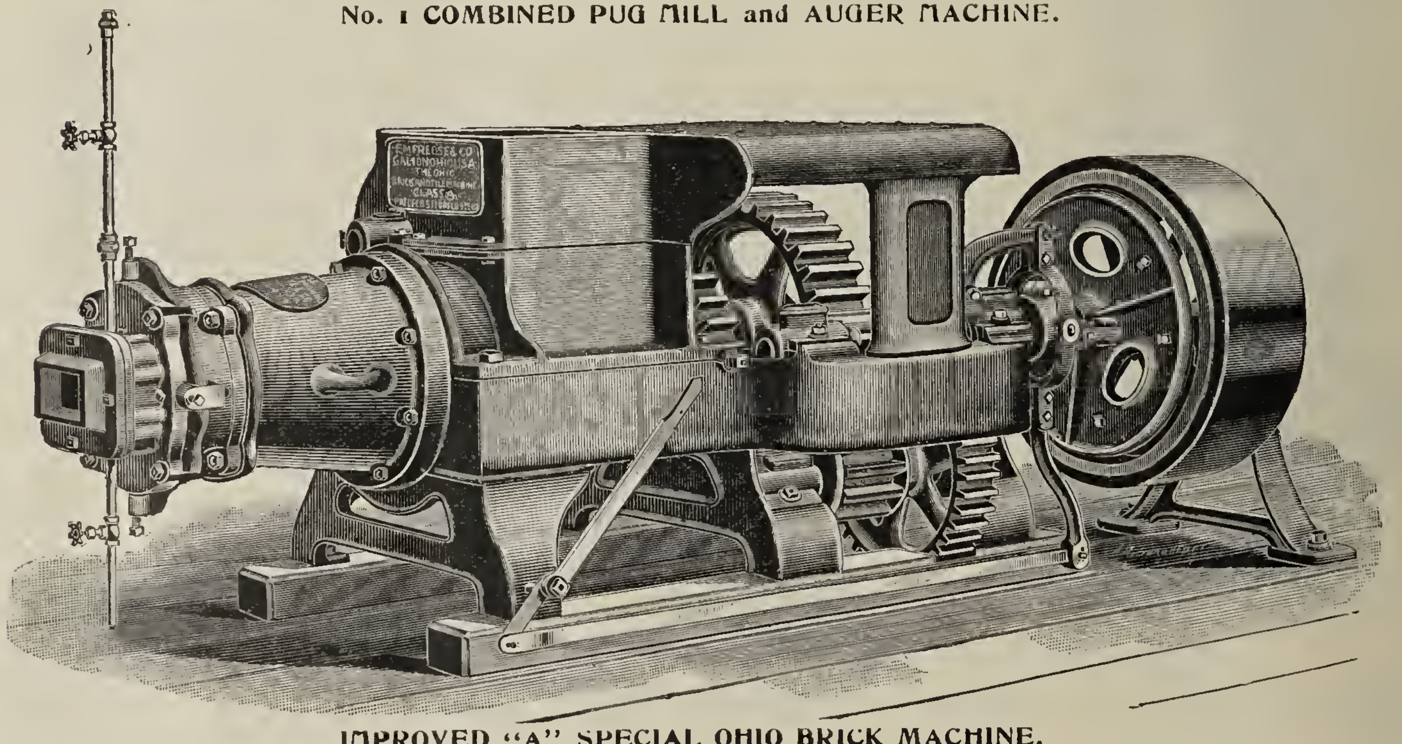
E. M. FREESE & CO., GALION, OHIO.



MAMMOTH BRICK MACHINE.



No. 1 COMBINED PUG MILL and AUGER MACHINE.



IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.

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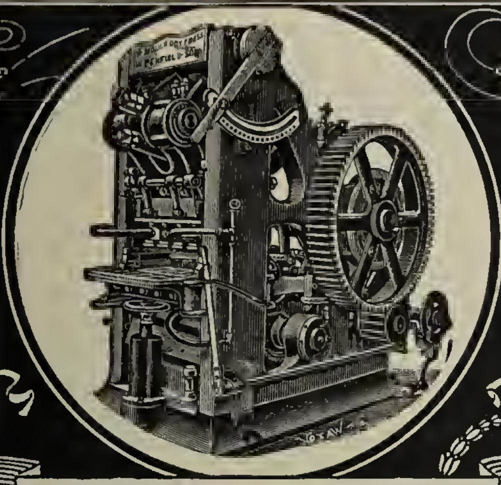
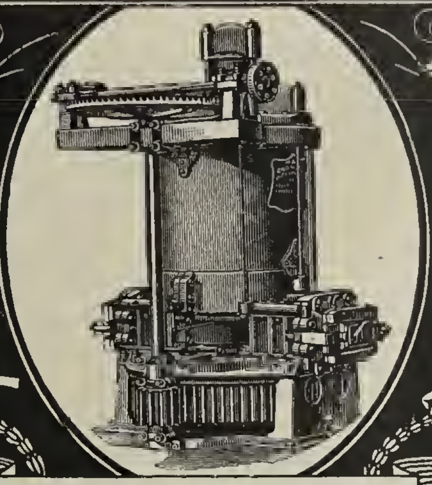
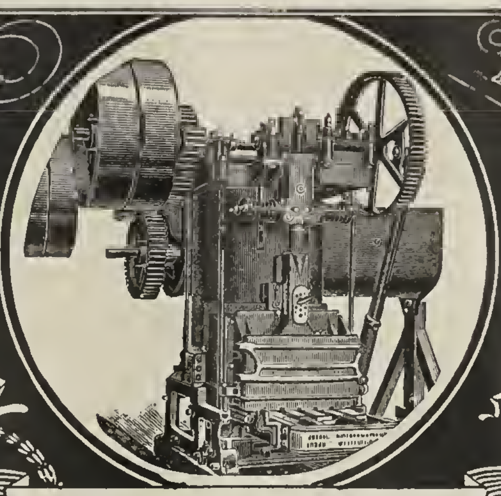
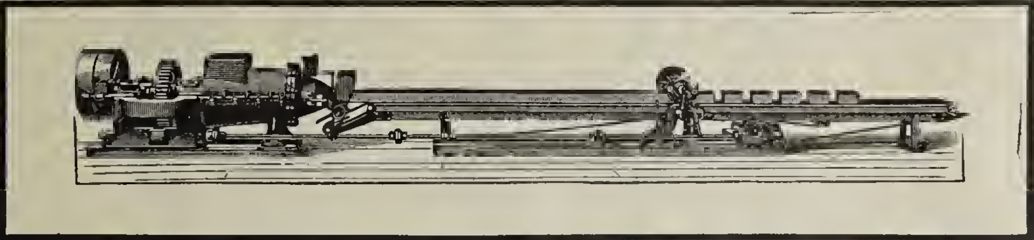
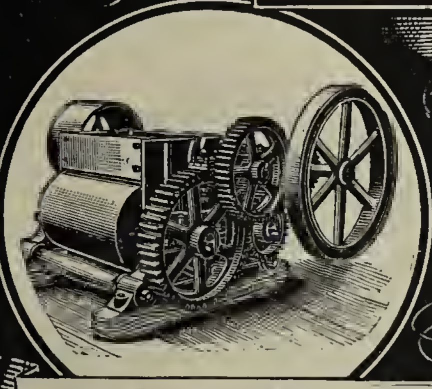
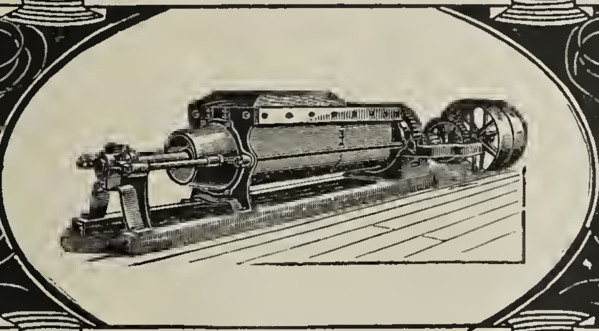

DRY PRESS BRICK MACHINES

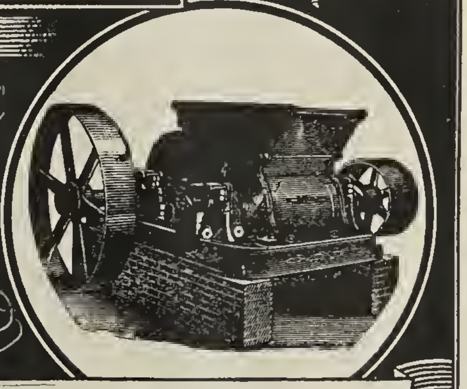

PLUNGER BRICK MACHINES

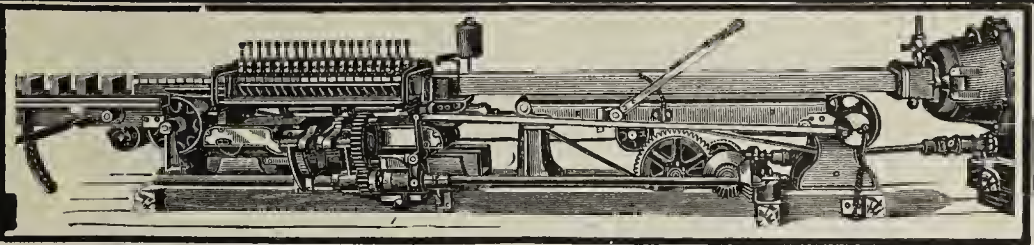

SAND-MOLDING BRICK MACHINES


AUGER BRICK MACHINES


CLAY CRUSHERS


PUG MILLS


DISINTEGRATORS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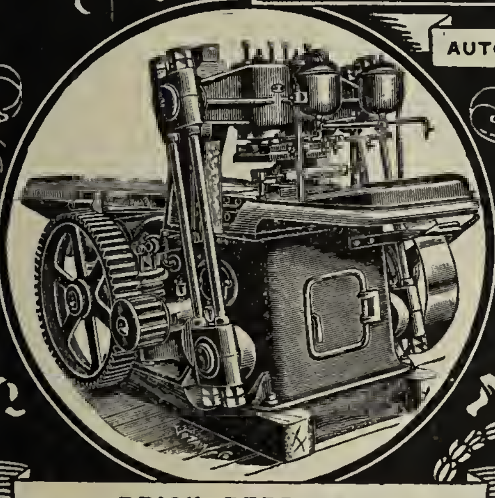
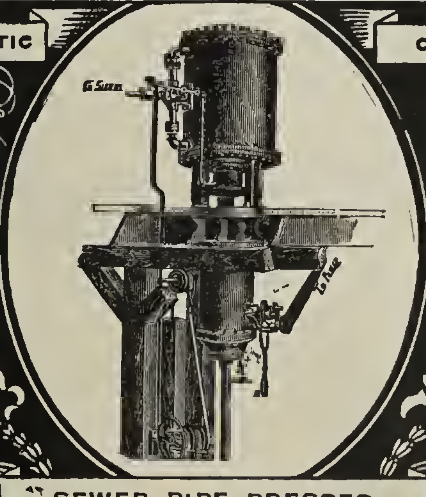
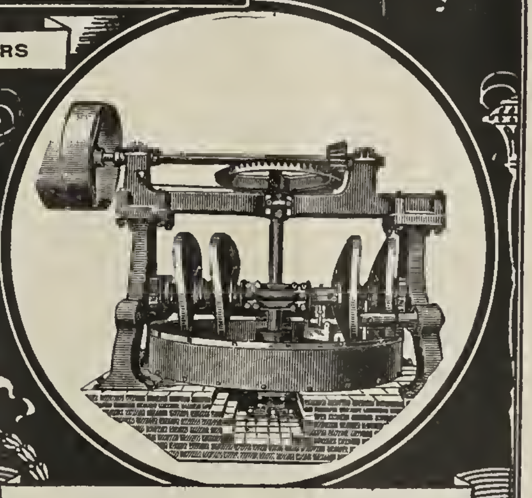
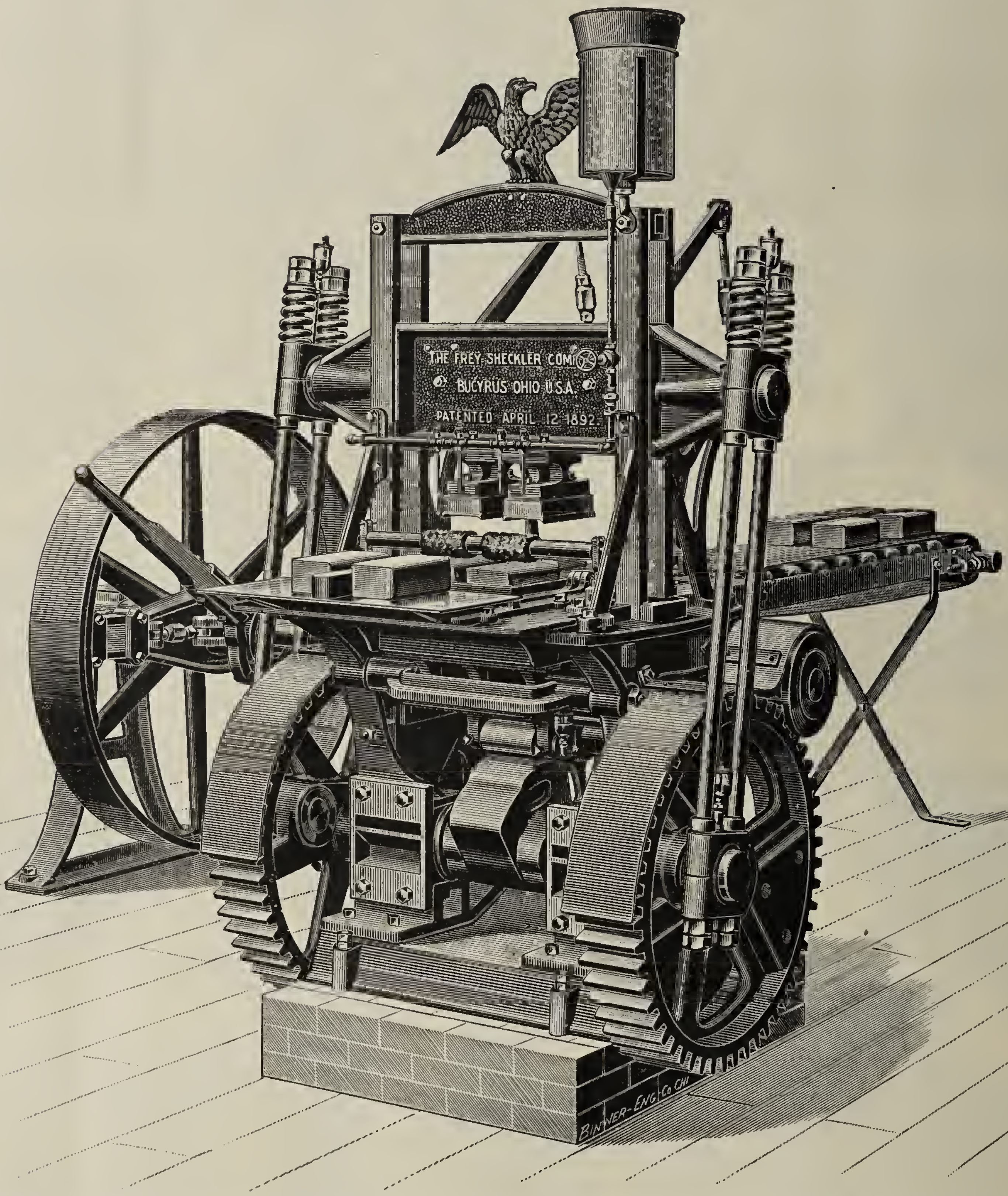

BRICK REPRESSES


SEWER PIPE PRESSES


DRY PANS, WET PANS, ETC.

J.W. PENFIELD & SON, WILLOUGHBY, O. U·S·A·

Purington HAS TRIED AND APPROVED The Eagle Repress.


THE FREY-SHECKLER COM
BUCYRUS OHIO U.S.A.
PATENTED APRIL 12 1892.
BINNER-ENG.CO.CHI

At Galesburg, Ill., The Purington Paving Brick Company worked the **EAGLE REPRESS** side by side with a Repress built by one of our neighbors. After constant trial for more than three months, please listen to what Mr. Purington says concerning it:

> "We are very much pleased with the Press, and have never as yet spent one cent on it since it was put in. Please ship the three Represses ordered from you."

Such encouraging words of approbation from one of the largest, most reputable and capable brick manufacturers in the world is a prize worth working for, and proves the standard quality of our Repress.

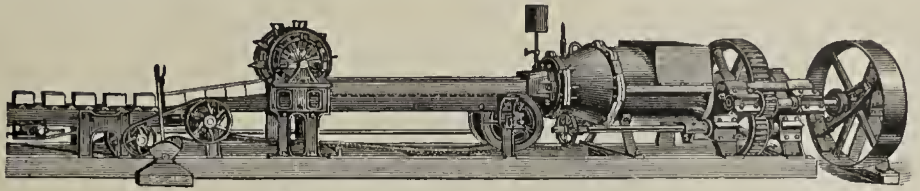
It will last four times as long as any other Repress, and will not cost one-tenth as much for repairs.

THE FREY-SHECKLER CO., - Bucyrus, Ohio, U. S. A.

Manufacturers of Clayworking Machinery, and Builders of the Bucyrus Steam Tunnel Dryer.

BRICK MACHINERY FOR 1896.

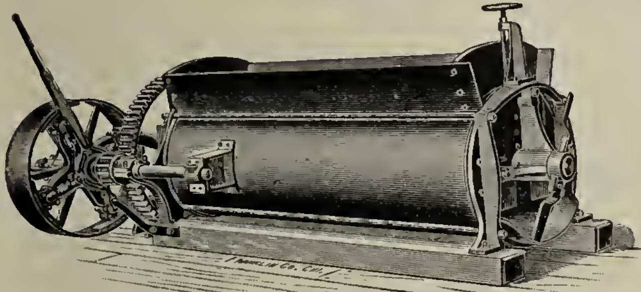
Write for Catalogue.



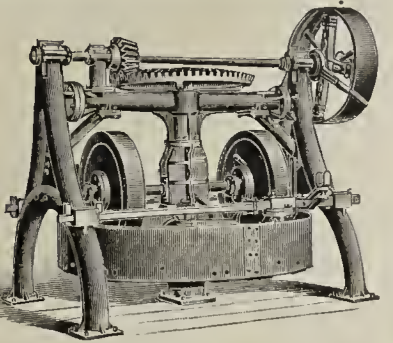
No. 1 Giant Machine and Automatic End Cut Table.

Before Buying

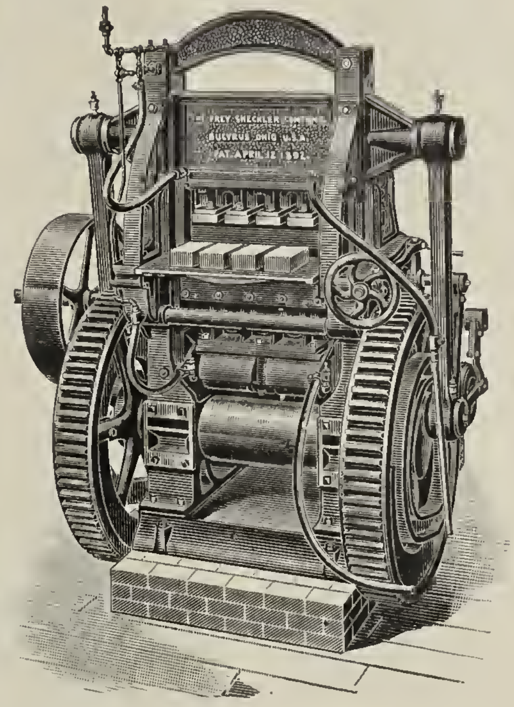
Write for our Prices.



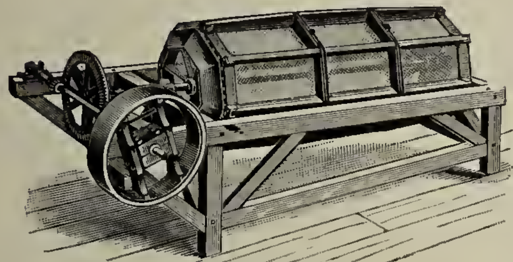
Pug Mills and Granulators.



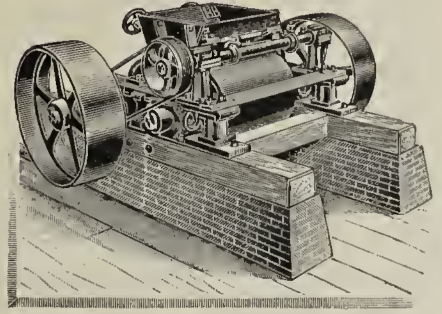
Dry and Wet Pans.


THE FREY-SHECKLER CO.
BUCYRUS OHIO U.S.A.
PAT. APRIL 12 1892

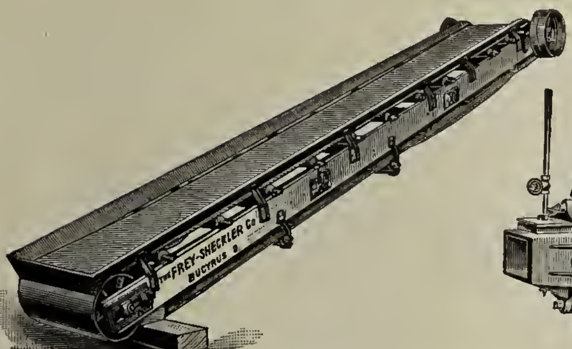
4-Mould Semi-Plastic Brick Press.



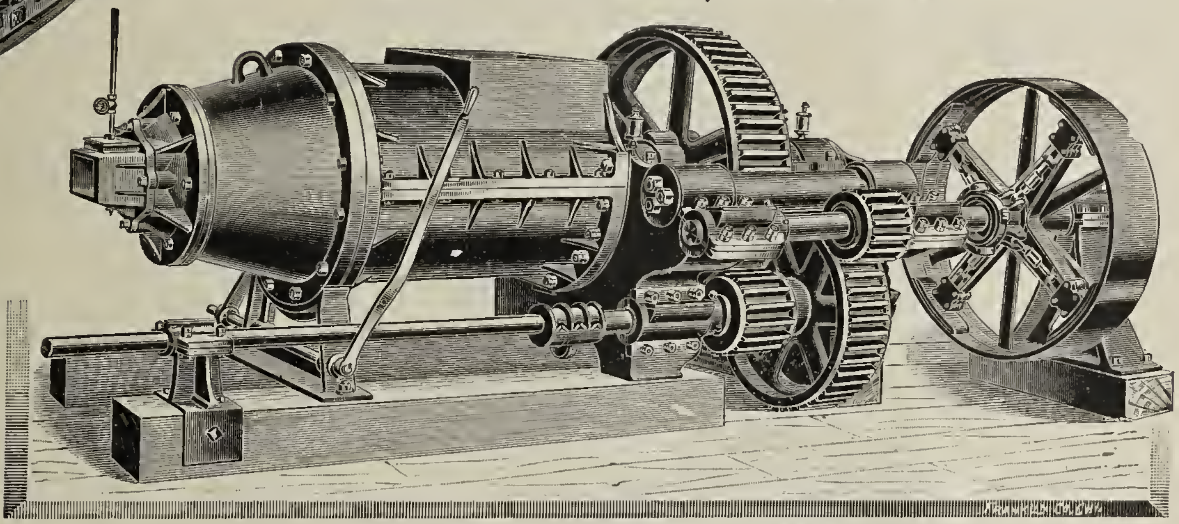
Clay Screens.



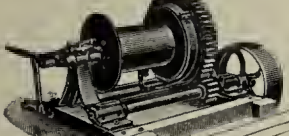
Crushers.



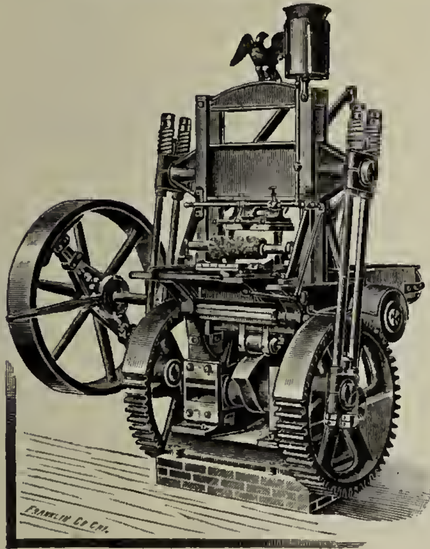
Clay Conveyors.



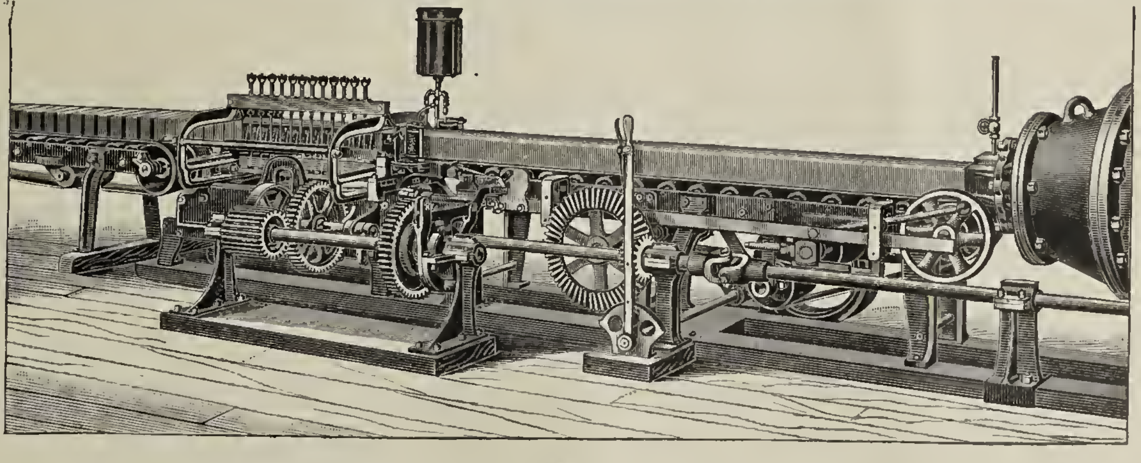
Special Bucyrus Giant Brick Machine.



Winding Drums.



Brick Re-Press.

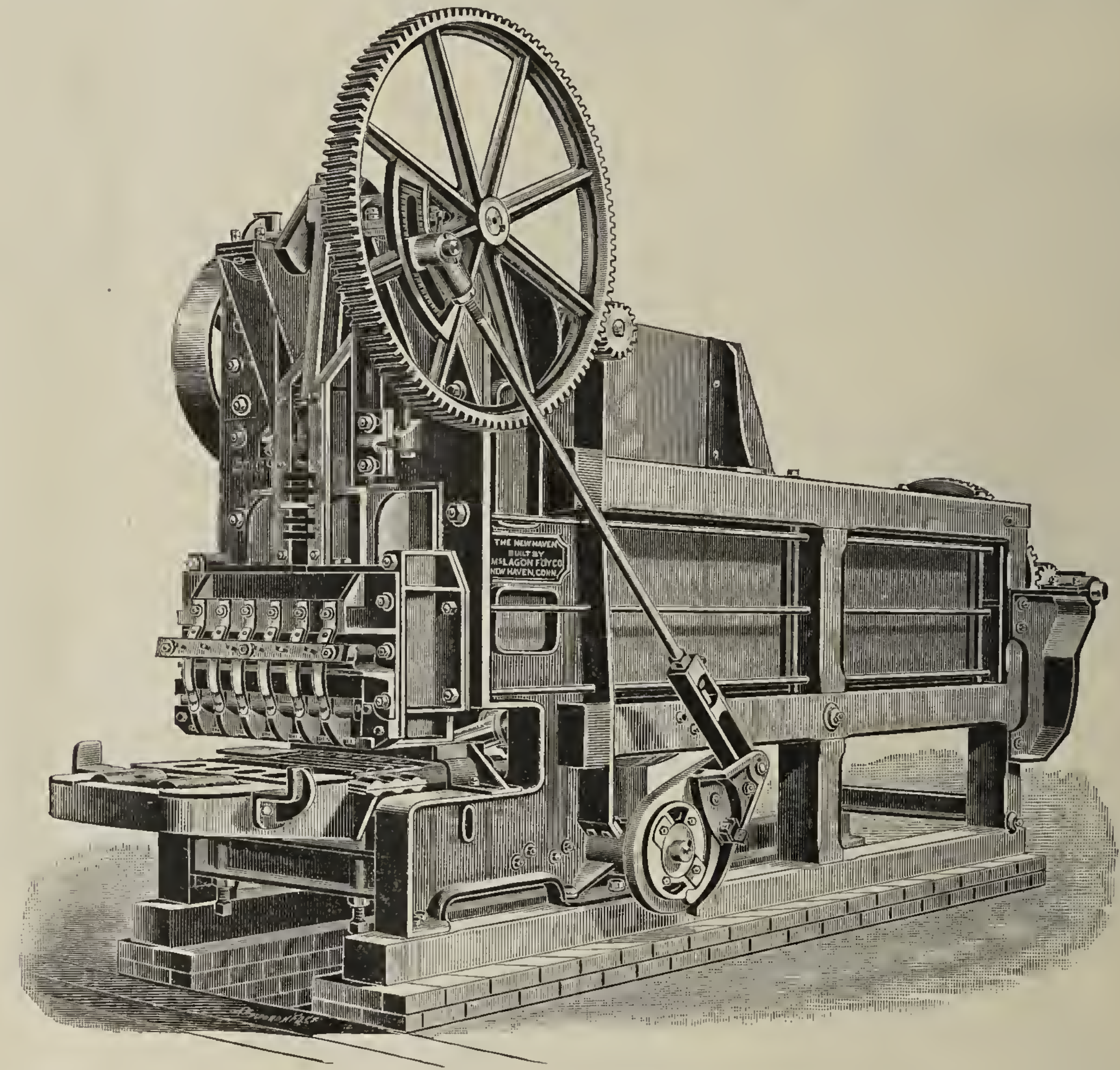


Bucyrus Automatic Table for Side Cut Brick.

The Frey-Sheckler Co., BUCYRUS,
OHIO, U. S. A.

More "New Haven" Brick Machines

In use in New England than any other kind. This shows the approval of our Home Trade.



We have sold more **"New Haven" Machinery** this spring than in any previous season both at home and abroad.

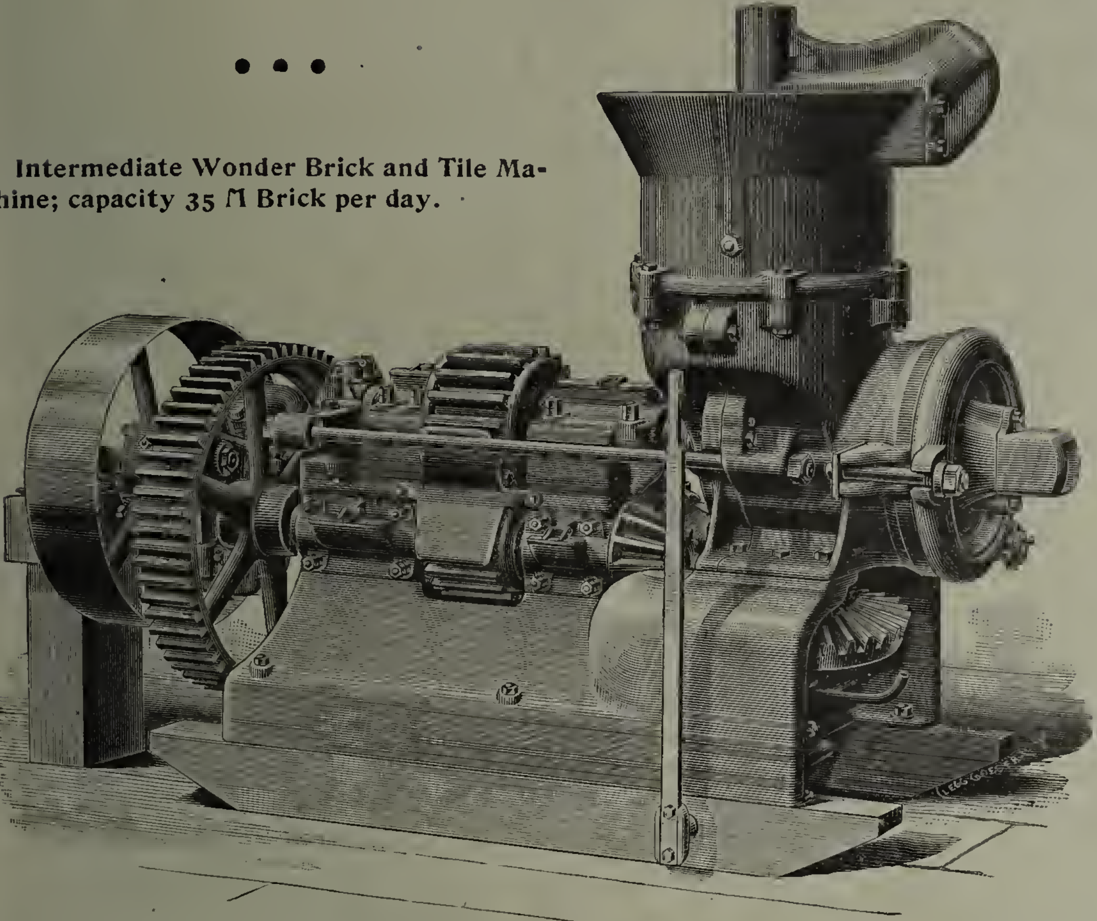
For information about our machinery, address

The Eastern Machinery Co.,

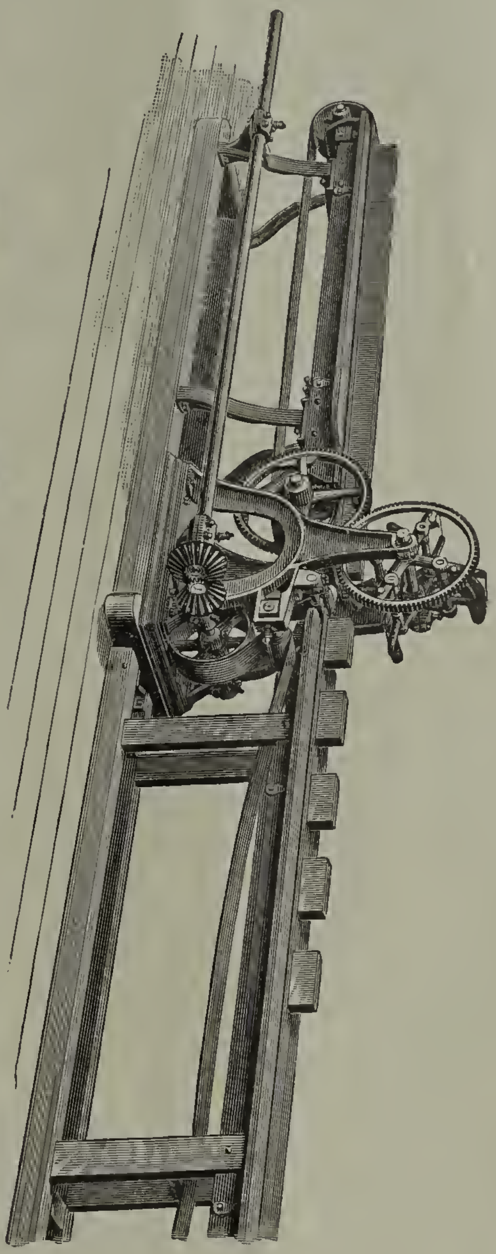
NEW HAVEN, CONN.

WONDER MACHINERY,

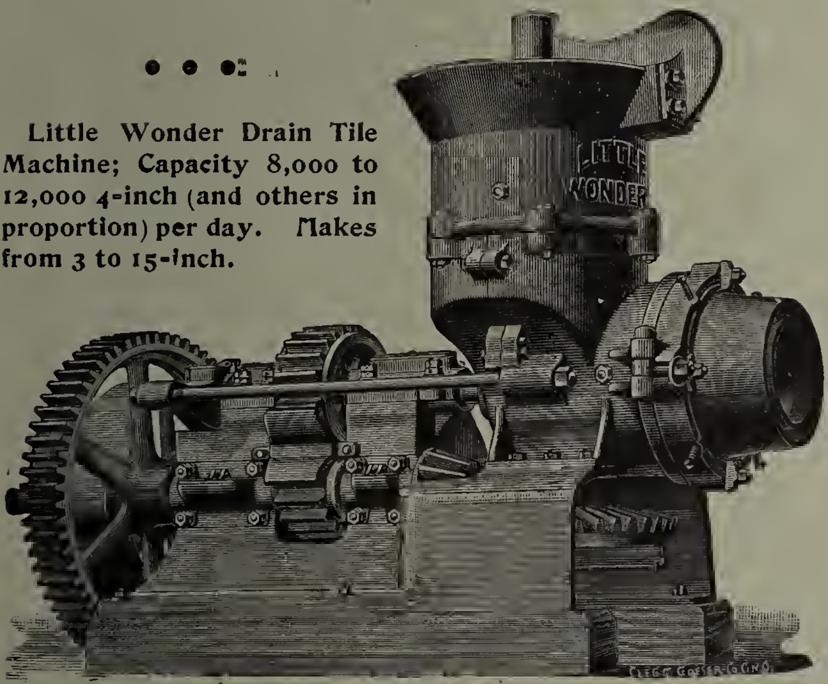
For Brick and Tile.



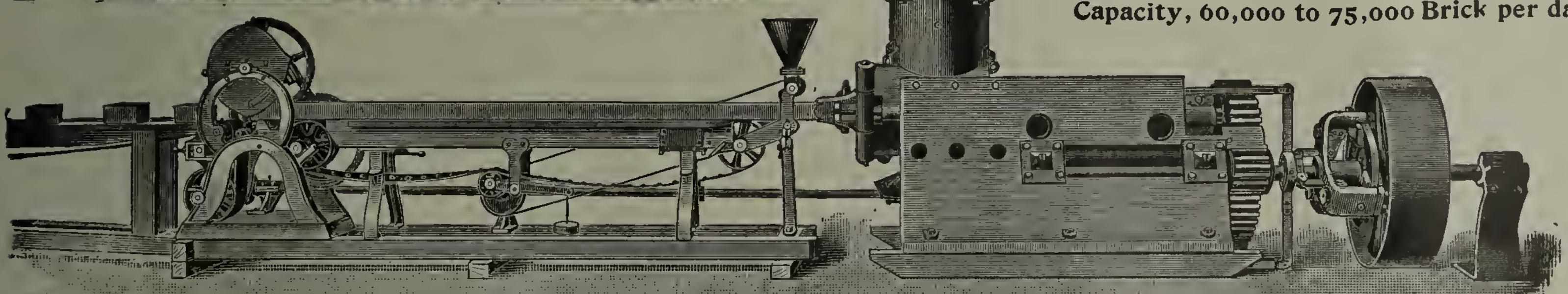
Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



Cunningham's Single Stream Automatic End Cut Brick Cutter.



Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.

AS MANUFACTURED BY

The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

DRY YOUR

Pressed Brick in the **Iron Clad Dryer**

S. M. GRANDY, President. F. J. PRAIL, Vice-President. E. B. GOODWIN, Sec'y-Treas. A. M. KAY, Supt.

THE DuBOIS PRESSED BRICK CO.,

MANUFACTURERS OF

HIGH GRADE, PLAIN and ORNAMENTAL Red, Buff AND Granite Pressed Brick.

Office and Showrooms:
WIGGER BLOCK, MARION, INDIANA.
P. O. BOX 784.

WORKS:
GREENTOWN, INDIANA.

Marion, Ind., May 30, 1896.

The Wolff Dryer Co., Chicago, Ill.

Gentlemen:——Replying to your favor of the 27th inst., as to how the dryer recently erected by you at our plant is working, we take great pleasure in answering as follows:

While the dryer has not been in operation more than a month we have thoroughly tested it drying our pressed brick, and the results accomplished have been so gratifying, that we have no hesitancy in recommending it to the brickmaking craft, as the most perfect system of brick drying. We can dry readily from 25,000 to 30,000 every twenty-fours, ours being a one tunnel, three track dryer, your guarantee for this size dryer being but 20,000 however. It not only makes the brick in the finest possible condition for setting, as they come from the dryer perfectly dry and free from any checks or warp, but is a time saver in burning, as we feel confident that we can save from seven to eight days in burning a kiln, it doing away with the greater part of that tedious water smoking period.

We then noted the amount of vaporization, in our second days test, our green buff brick weighed 7 lbs. 9 oz., after passing through the dryer in twenty-fours, we noted that the same brick weighed 7 lbs. 2 oz., a loss of 7 ounces by vaporization, in twenty-four hours, which is remarkable for dry pressed brick. The one regret we have is, that we did not adopt your dryer long ago, as we had always been troubled with the brick checking and sticking, after burning them, when they were taken directly from the press and set in kilns. All this your dryer will overcome, and final results will be, nice uniform brick, free from any marks of imperfection.

In justice to yourselves and Mr. Johnson, whom you sent to erect the dryer, we would say, that the work was all done in a first-class workmanship manner, and fully up to your guarantee, and satisfactory in every respect.

Your dryer fully merits the reputation it has, and deserves the patronage of brickmakers in general. Hoping you increased success in the introduction of dryers.

Very truly yours,
DuBOIS PRESSED BRICK CO.,
E. B. GOODWIN, Sec. and Treas

Write for prices and illustrated catalogue to

WOLFF DRYER COMPANY,

358 Dearborn St., Room 303, CHICAGO, ILL.

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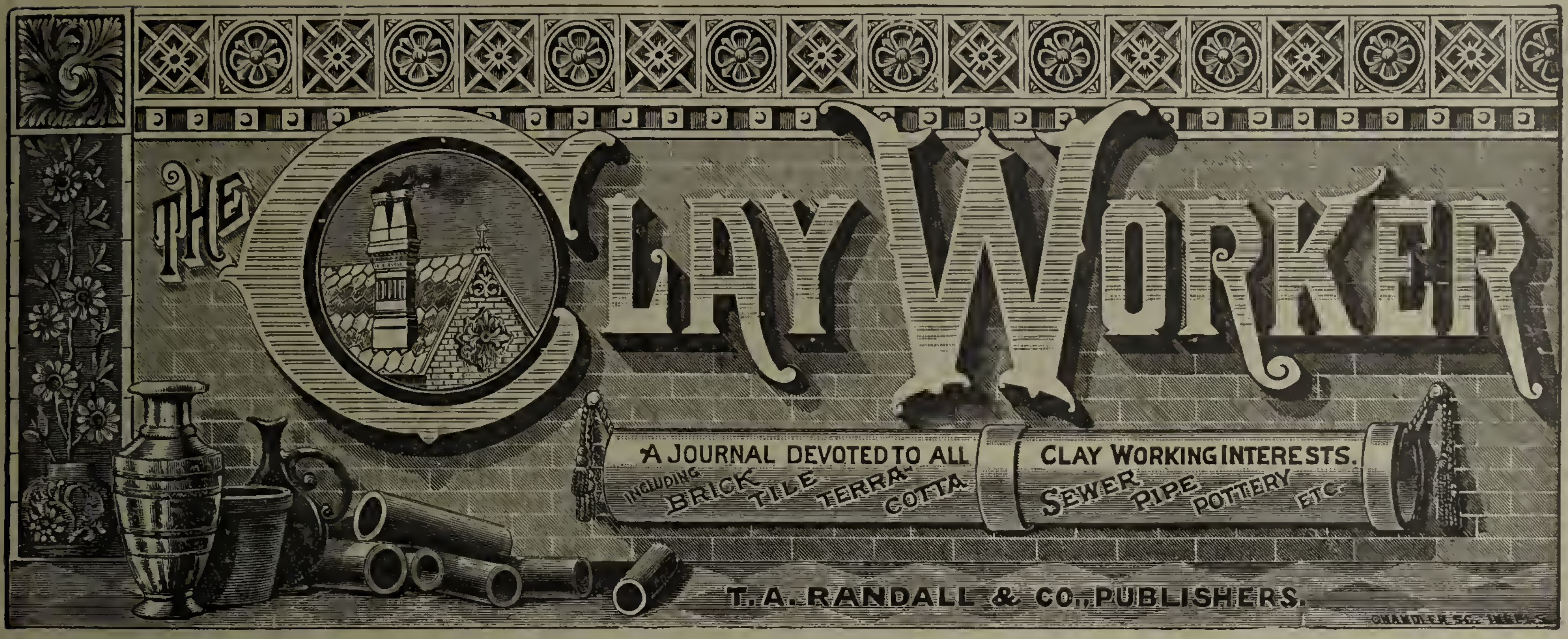

CHANDLER SC. INDPLS.

THE CLAY WORKER

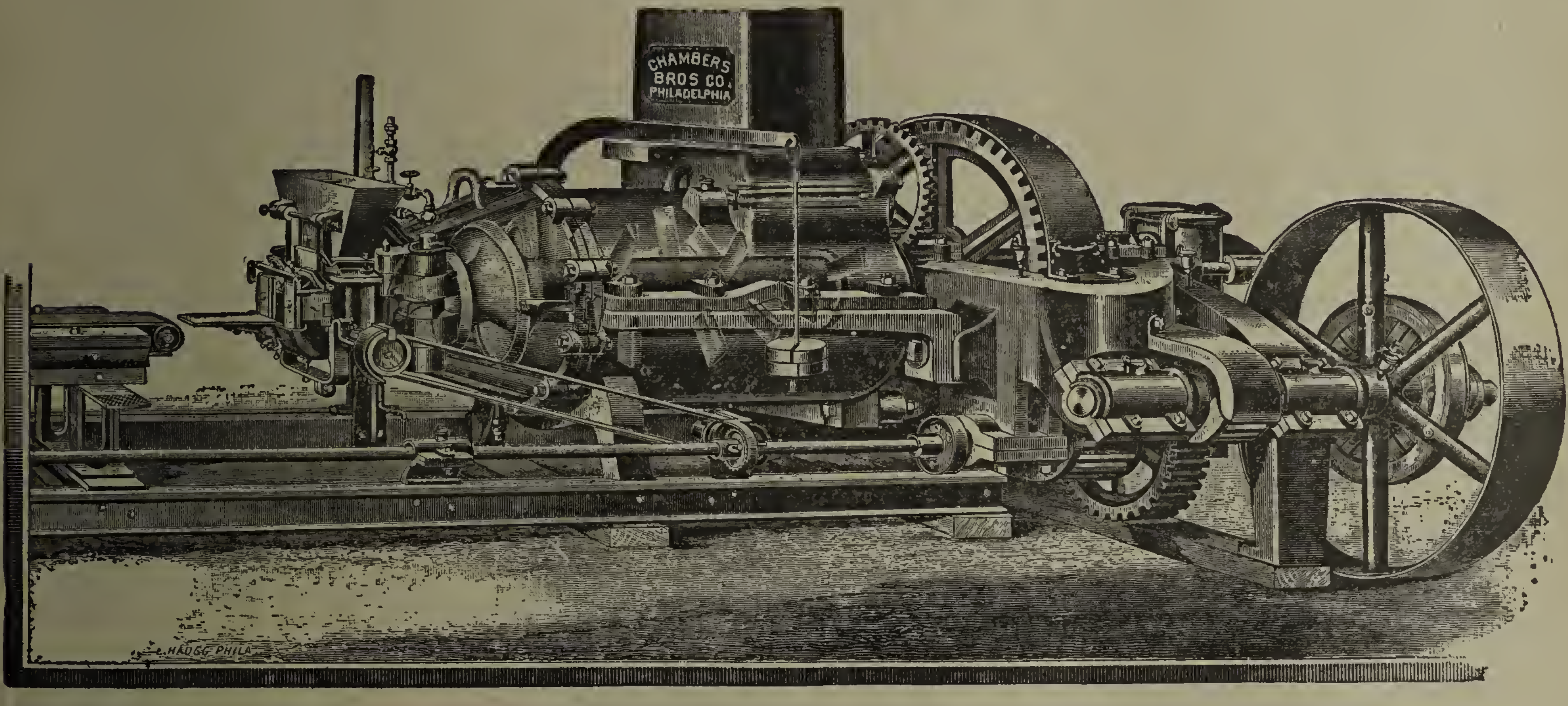
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA-COTTA SEWER PIPE POTTERY ETC.

T. A. RANDALL & CO., PUBLISHERS.

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXVI, No. 2. INDIANAPOLIS, IND., AUGUST, 1896. $2.00 a Year in Advance.

Brick Making Machinery.



Chambers Brothers Company,

FIFTY-SECOND STREET, BELOW LANCASTER AVE.,

PHILADELPHIA, PA.

J. E. EASTES, Chicago Agent,
174 South Clinton Street.

AN ANTIDOTE FOR HARD TIMES.

The Cummer Dryer

THE CUMMER DRYERS

Will make lots of money for you over any other dryer or system of drying you may employ.

Of course, if you have

The CUMMER DRYER

You are happy even with the low prices and hard times because you are drying your brick so cheaply.

No use talking

The CUMMER DRYER

Is the only dryer on the market. The Royal Brick Co., of Canton, write about it as follows:

◆

Canton, Ohio, June 20th, 1896.

The F. D. Cummer & Son Co., Cleveland.

Dear Sirs:--Replying to yours of the 19th inst., we are more than pleased with the Cummer Dryer.

It saves us 10 car loads of coal per month over the steam dryers we had, and causes no trouble whatever. We make paving blocks, size 9 1-2" x 4" x 4 5-8"; green weight, 13 lbs. 6 oz.; dry, 11 lbs.

We evaporate daily 78,000 pounds of water, and have nice dry blocks.

We have only 10 tracks; had 15 before, and were not able to dry brick as well as we can now dry them.

We can conscientiously recommend your dryer, and we will cheerfully give you any further details for which you may ask.

Yours truly,
Otto Giessen, Sec'y and Treas.,
THE ROYAL BRICK COMPANY.

◆

Write for new catalogue.

The F. D. Cummer & Son Co.,

CLEVELAND, OHIO.

THE
HARRINGTON AND KING PERFORATING CO.
CHICAGO, ILL.
THE H. & K. P. Co.
PERFORATED SHEET STEEL
FOR
CLAY SCREENS
SEWER PIPE.
BRICK.
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FOR CHUTE SCREENS.
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DRY PAN SCREENS.
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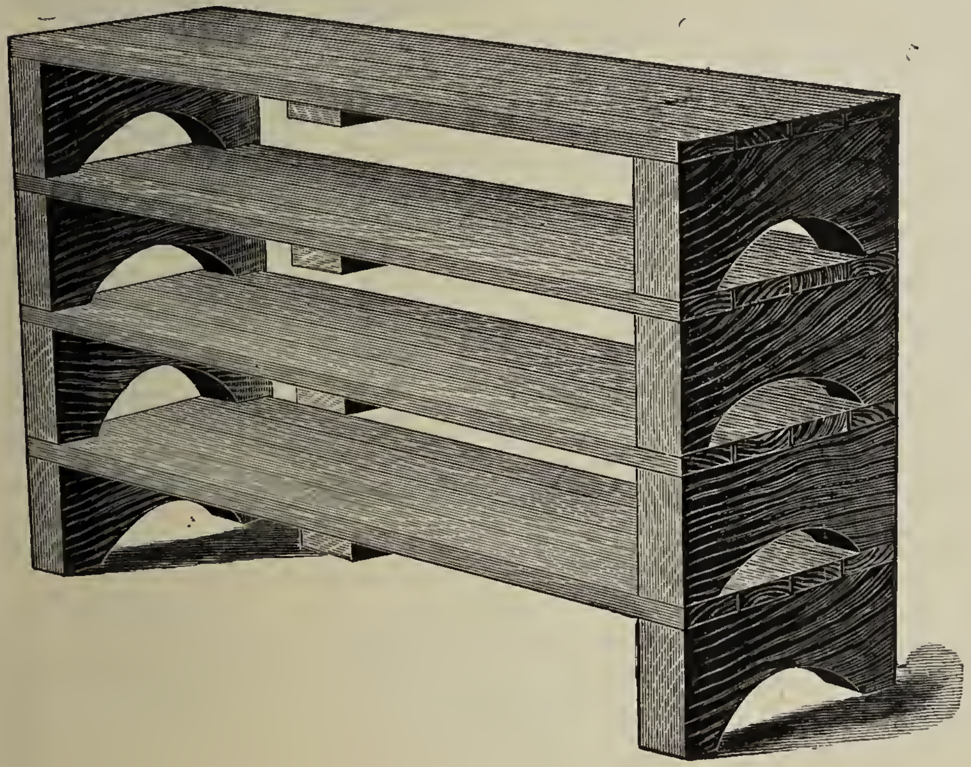
Eastern Office: No. 284 Pearl Street, NEW YORK. General Office and Works: No. 231 North Union St. CHICAGO, ILL., U. S. A.



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Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

- *Rack Pallets,*
- *Hacking Pallets,*
- *Pallets for Dryers,*
- Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

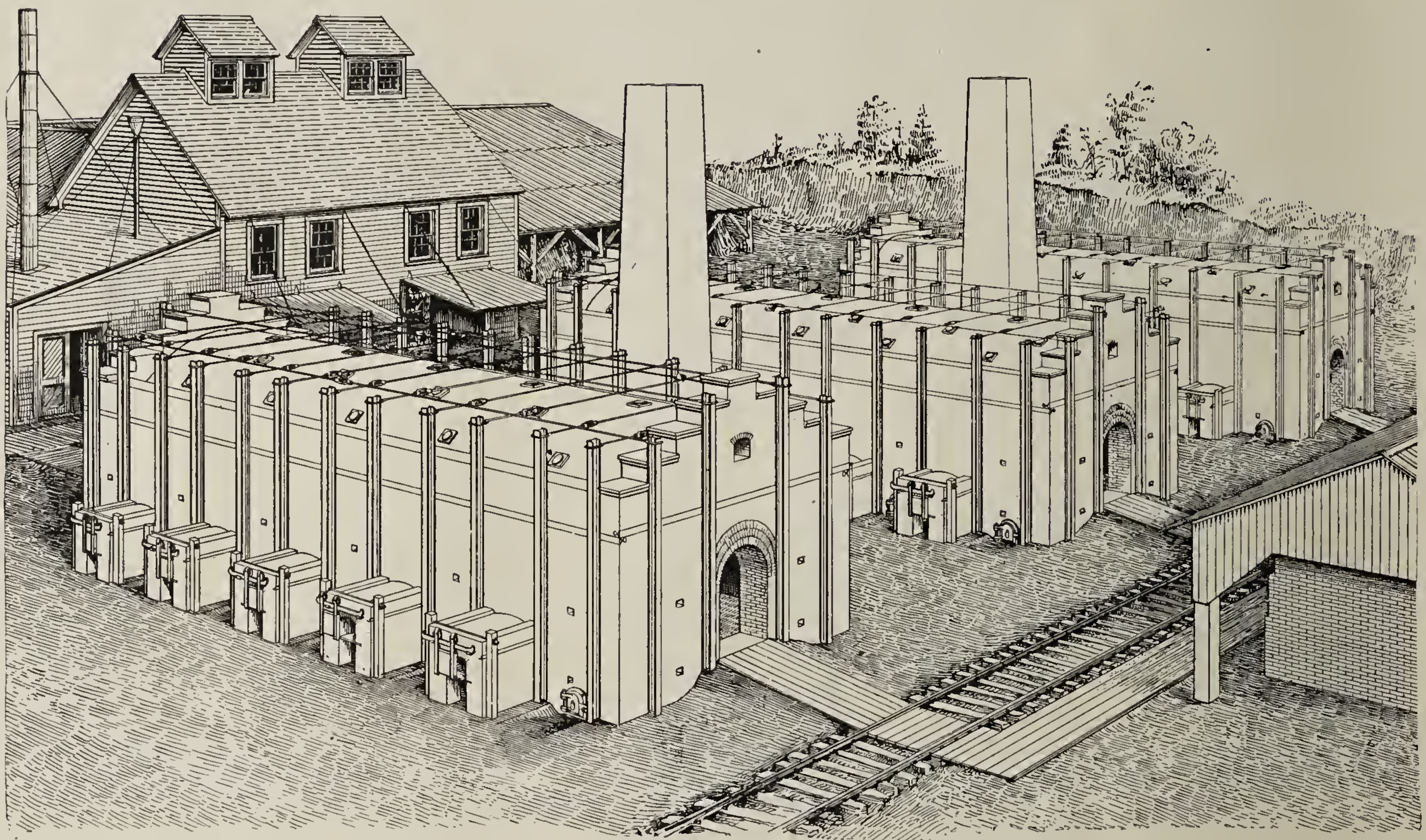
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

A Modern Brick Plant

As Arranged and Equipped by us with

The Boyd Brick Press,
The Flood Kiln and
Up-to-date Clay Preparing Machinery,

WILL MAKE 95 PER CENT. HIGH GRADE BRICK IN REGULAR EVERY DAY WORK.



All the most successful Brick Plants in the United States have been equipped by us.

Brick made on the **Boyd Press** have become the "Standard of Excellence" wherever they are used.

The CHISHOLM, BOYD & WHITE CO.,

OFFICE AND WORKS:
57th and Wallace Streets.

Chicago.

"NEMO ME IMPUNE LACESSIT."

Clay-Working Machinery.

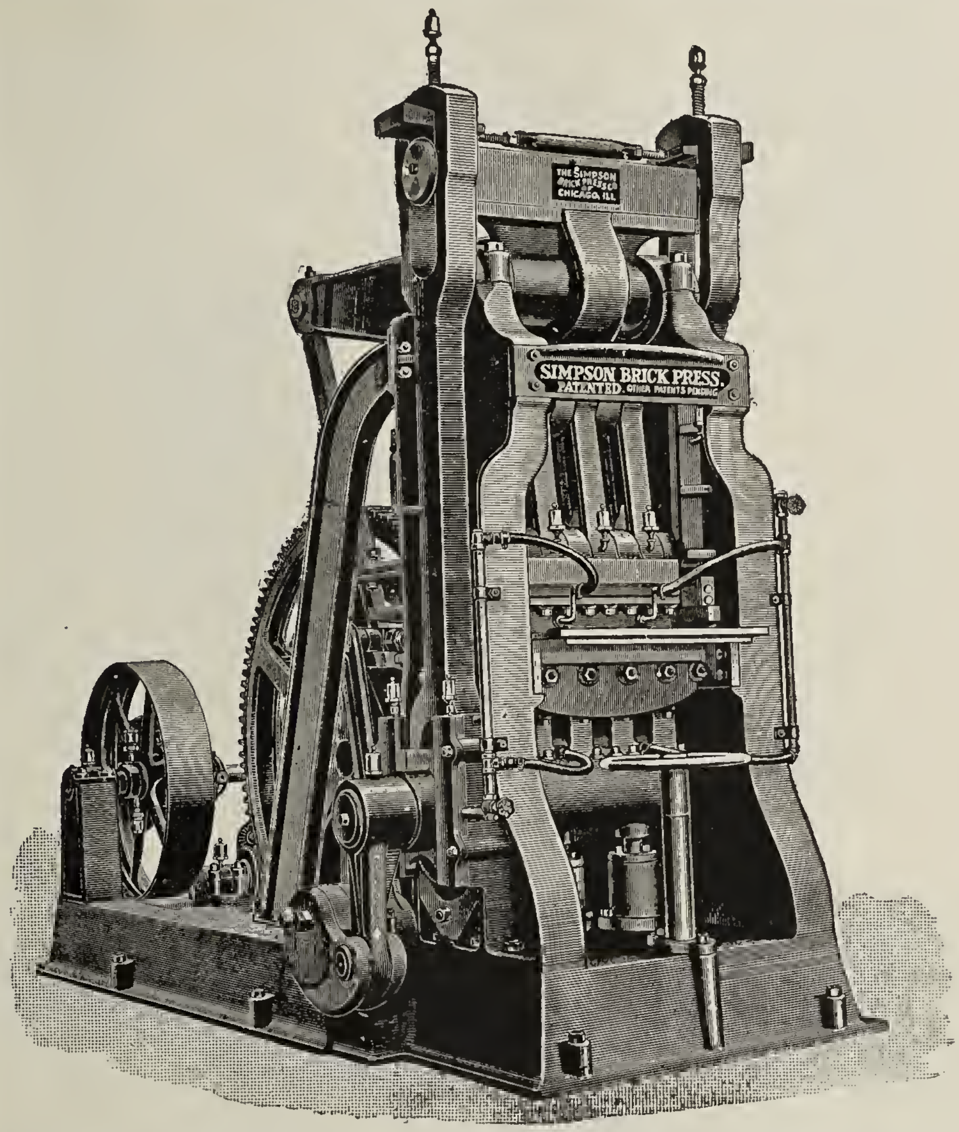
The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line
of Brickyard
Equipments. . .

Complete Plants
Constructed and
Guaranteed. . . .


THE SIMPSON BRICK PRESS CO CHICAGO, ILL.
SIMPSON BRICK PRESS. PATENTED. OTHER PATENTS PENDING

OUR MACHINERY has long since **passed the experimental stage,** and is considered the standard by competent brickmakers. Write for catalogues.

THE SIMPSON BRICK PRESS CO.,

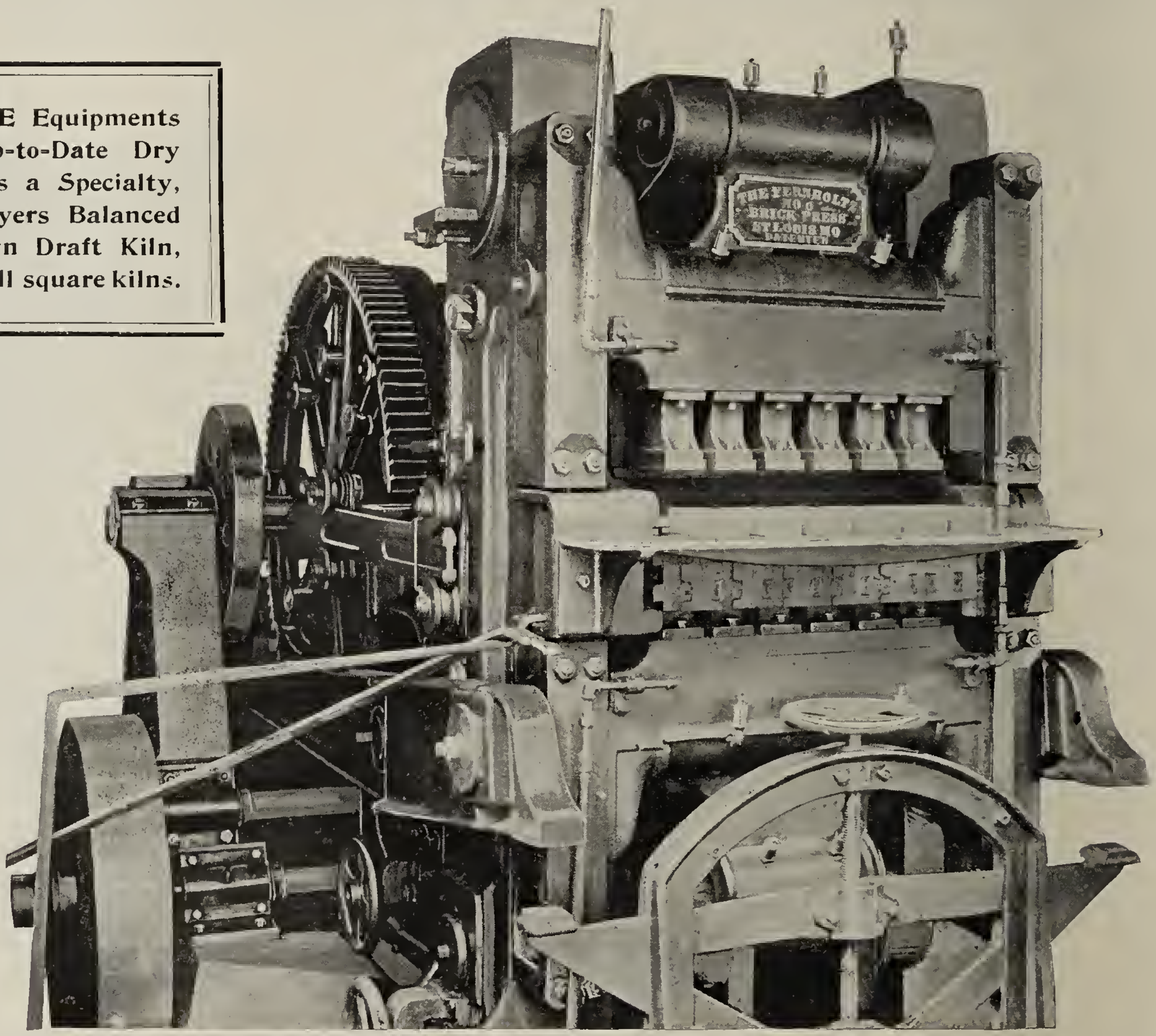
Agents for Canada:
WATEROUS ENGINE WORKS CO.,
BRANTFORD, ONTARIO.

Chamber of Commerce
Chicago...

The Fernholtz Improved Brick Press.

THIS press is the result of fifteen years of practical experience as a successful press brick and press brick machine maker, backed by inventive and mechanical talents of a high order. It is unequaled for strength and easy running, requiring only 6 to 7 horse power to operate the largest 6 mold press. All the parts subject to strain are made of the best bessemer steel and every part can be seen and got at easily. The thickness of the brick can be changed or regulated without stopping the press, and every press is fitted with the Fernholtz mould which is generally admitted to be the best mold in use. For fine pressed and ornamental brick this machine is unequalled, the pressure on and movement of the clay in the mold being such as to prevent granulation and insures the most perfect product possible.

COMPLETE Equipments for Up-to-Date Dry Press Plants a Specialty, including Myers Balanced Up and Down Draft Kiln, The Best of all square kilns.



The Fernholtz Six-Mold Brick Press.

We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

The opinion of those using our press and full information on application.

The Fernholtz Brick Press Co.,

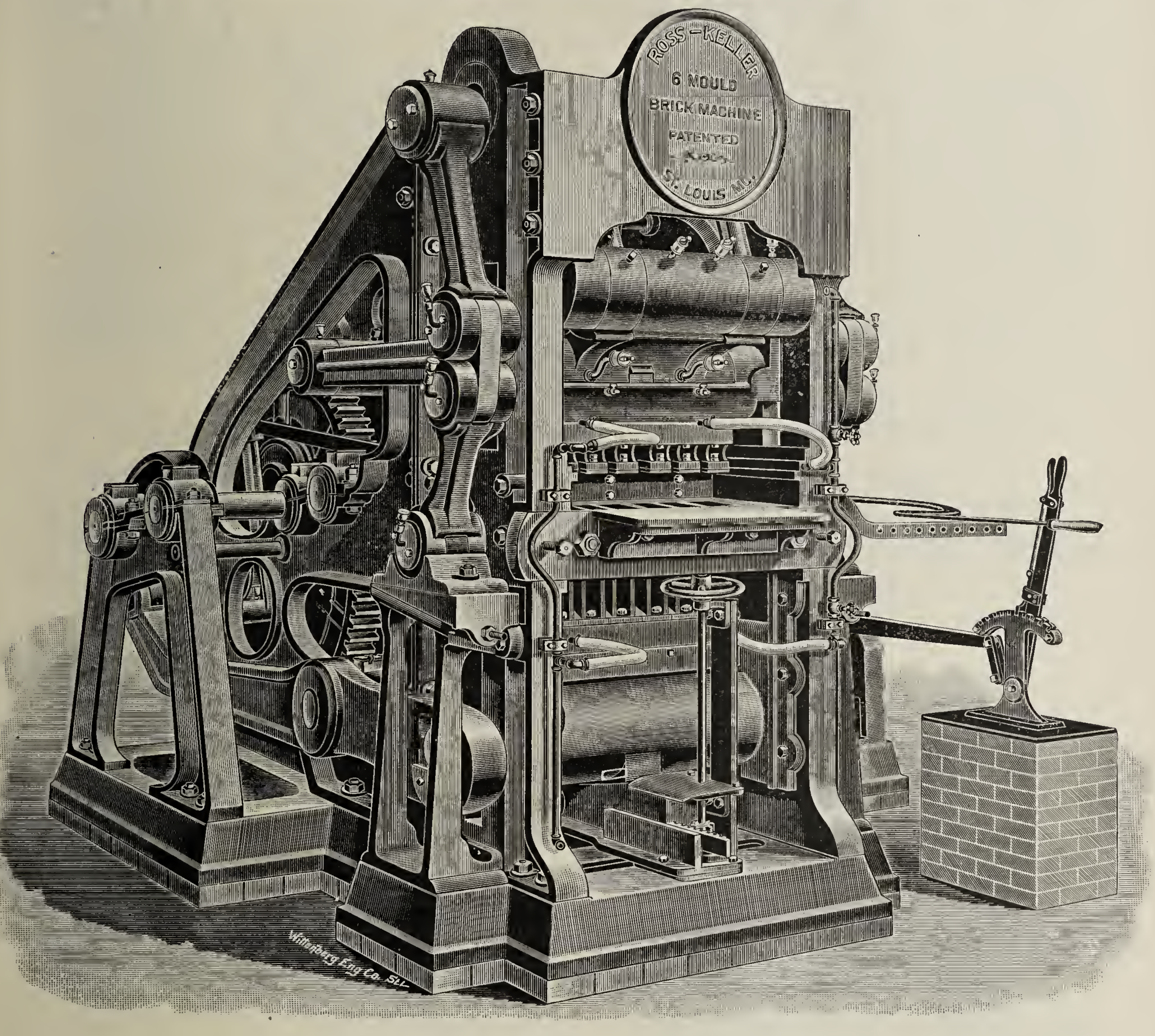
1214 and 1216 Poplar Street, ST. LOUIS, MO.

The Latest Improved

Ross-Keller TRIPLE PRESSURE Brick Machine.

Manufactured in four and six-mould sizes. Weight of four-mould machine 58,000 pounds; capacity 24,000 brick per day. Weight of six-mould machine 75,000 pounds, capacity 36,000 brick per day.

BRICK SET IN KILN DIRECT FROM MACHINE.



The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

If you want the best come and see us, or write for price and full particulars, address

Ross=Keller Brick Machine Company,

Office 108 Rialto Building, **ST. LOUIS, MO., U. S. A.**

Columbia Brick Press.

All working parts are made of Steel.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

The pressure is absolutely equal on top and bottom of brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

Any part of the gearing can be removed without taking machine apart.

The mould box can be taken out in a few minutes, without disturbing the other parts of machine.

The "COLUMBIA" presses clay or shale as dry as a hydraulic press, or so damp as to approximate a stiff mud brick, so that the range of products is from building brick to pavers. No other press does such a variety of work.

The "COUMBIA" is the only brick press on the market that meets ALL the needs of a brick plant.

For circulars and prices, address

H. B. HILGEMAN,
General Agent "COLUMBIA Brick Press,
. . . . and "COLUMBIA" Mould,
306 Oriel Building, ST. LOUIS, MO.

Terrazo Cement Tiles.

Complete Plants furnished for making the celebrated **"TERRAZO" Tiles.** Used to the exclusion of all other tiles in all floors, halls, etc., of the following among hundreds of structures in Germany:

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Terrazo Tiles, any color, design or size. For circulars, estimates, etc. Address

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General Agent of THEO. WELGE, for the sale of Dr. BERNHARDI SOHN, G. E. DRAENERT, GERMANY, Machinery and Processes for making TERRAZO CEMENT TILES.
306 Oriel Building, ST. LOUIS, MO.

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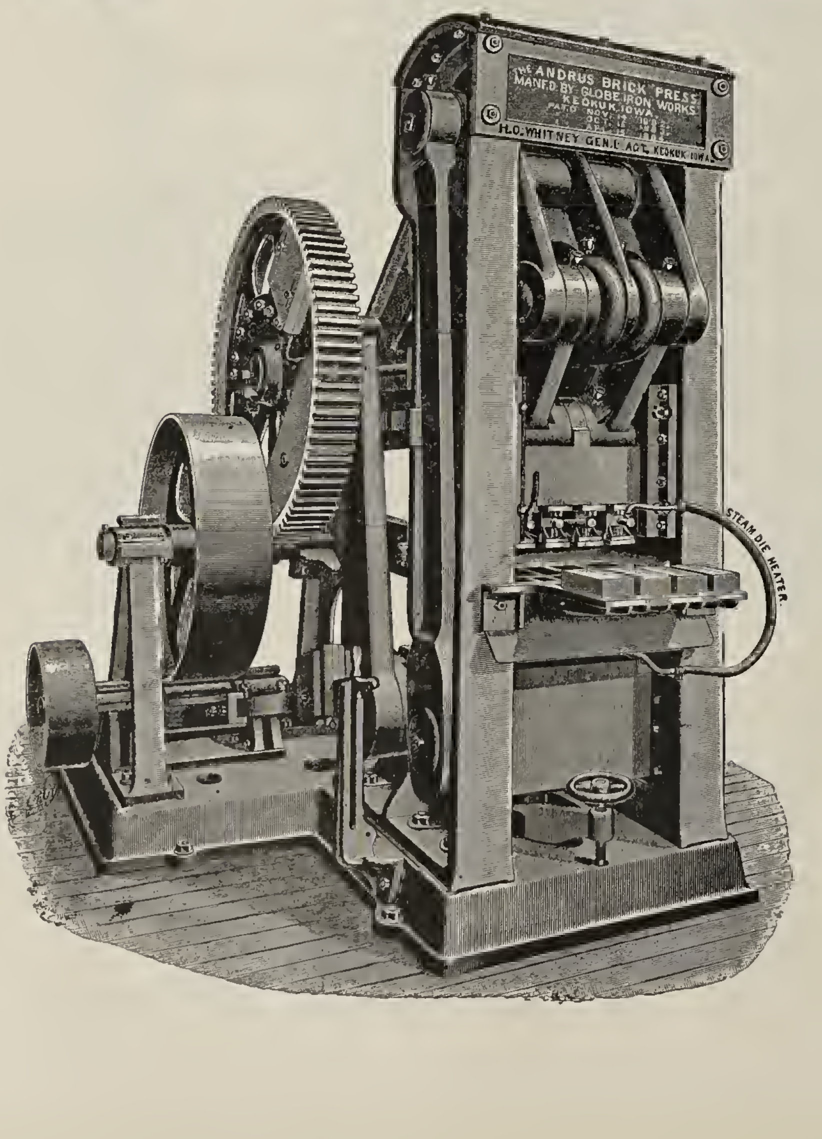
THE ANDRUS BRICK PRESS
MANF'D BY GLOBE IRON WORKS
KEOKUK, IOWA
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STEAM DIE HEATER

We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

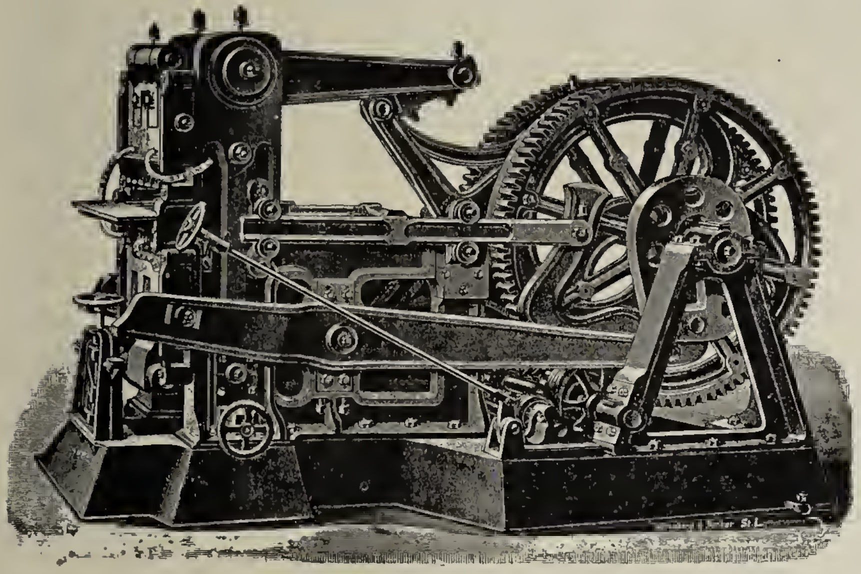
They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . . . .

Send for descriptive Catalogue, address

H. O. Whitney,
General Agent,
KEOKUK, IOWA.

The Progress Brick Press



FOR PLAIN AND ORNAMENTAL BRICK. . . .

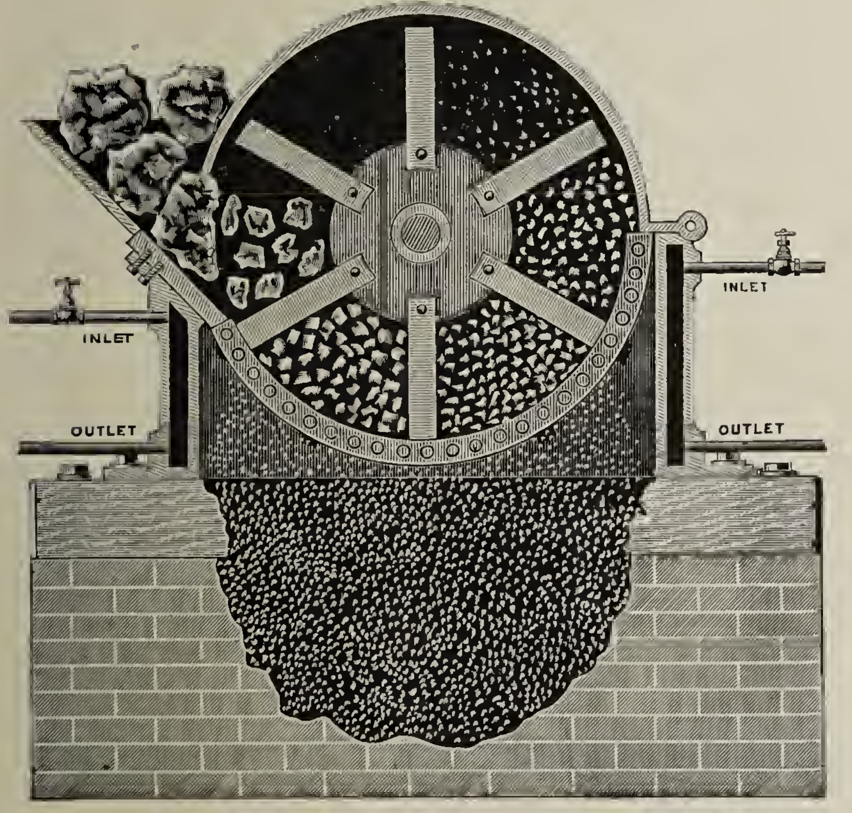
The Progress Brick Mould, Brick Grinding and Mitering Machines, Dry Clay Gatherers, and a full line of Dry Press Brick Manufacturers equipments.

DESCRIPTIVE CATALOGUE ON APPLICATION. . . . .

Progress Press Brick and Machine Co.,

King's Highway and Oak Hill R. R. *ST. LOUIS, MO.*

WILLIAMS'S COMBINED SHALE CRUSHER and CLAY PULVERIZER



This machine is a marvel and surprise to all who have seen it in operation. It does the work of two machines and prepares the Clay or Shale in a most thorough manner. It cannot choke with ordinary damp clay; it will do more and better work, with one-half the power, than any other kind of Pulverizer; the cost for repairs will be less than one-half, and the cost for oil will also be less than one-half.

We will furnish these machines upon 30 days' trial, to responsible parties.

FOR FURTHER
INFORMATION,
ADDRESS

MILTON F. WILLIAMS & CO.,
2705 North Broadway, ST. LOUIS, MO.,

Builders and Contractors of Complete Dry-Press Brick Plants. . . . . . .

A Good Investment!

That's how Mr. Florey regards his purchase, as a perusal of his letter below will show, and he but voices the sentiment of **all users** of

The Standard Improved Brick and Tile Drier.

Downingtown, Pa., October 25, 1895.

THE STANDARD DRY KILN CO., Indianapolis, Ind.

Gentlemen:—I have been operating one of your improved Natural Draft Driers about two months now and have given it a very thorough test. After getting the temperature and drafts regulated to suit my clay, it hasn't given me a particle of trouble; in fact, has been running along nicely ever since. My clay checks and cracks very easily, but I have no difficulty in drying my brick perfectly in your Drier.

I use the Chambers Stiff Mud Machine and make 35,000 brick every day. The Drier takes care of them nicely, and I have never had to set a wet brick.

I look upon the purchase of your Drier as one of the best investments I ever made, and cheerfully recommend it as the least complicated, and in every way the most practical device of the kind I know of. It is costing me 25 cents per thousand for coal to run the machinery and dry my brick.

Yours truly,

JAMES FLOREY.

Its adaptability to the drying of all kinds of clay and all varieties of clay products and the further fact that it is **no experiment**, but a **proven success**, makes it the **popular Drier** of to-day. If you have this subject under consideration, our 110 page catalog will surely interest you.

Can we Send You a Copy?

The STANDARD DRY KILN CO.,
Patentees and Sole Manufacturers,
186 South Meridian St., INDIANAPOLIS, IND.

THE CLAY-WORKER

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

Vol. XXVI. INDIANAPOLIS, IND., AUGUST, 1896. No. 2.

Written for the CLAY-WORKER.

STORY OF THE TEA PARTY PUNCH BOWL.

BY MRS. MARY E. NEALY.

THE SUBJECT of this sketch, of which we present original illustrations, is the most notable ceramical relic of the revolutionary war. Though of Chinese manufacture, the associations clustered about it make it a remarkable souvenir to all patriotic Americans. It is called the "tea-party punch bowl," because from its generous depths was served, on the night of the 16th day of December, 1773, the steaming and fragrant punch, brewed by skillful hands, for the warmth and encouragement of the brave fellows who had made up their minds to resist the King of England, and to throw the tea into the salt sea waves in Boston harbor.

The famous punch was made and served in the house of Mr. Benjamin Edes, of Boston, from whence, disguised as Indians, the patriot party proceeded to Griffin's wharf, and, being joined by many others from ships that lay there (these also being disguised), threw overboard three hundred and forty-two chests of tea. These chests were first broken so that the precious contents could not be recovered.

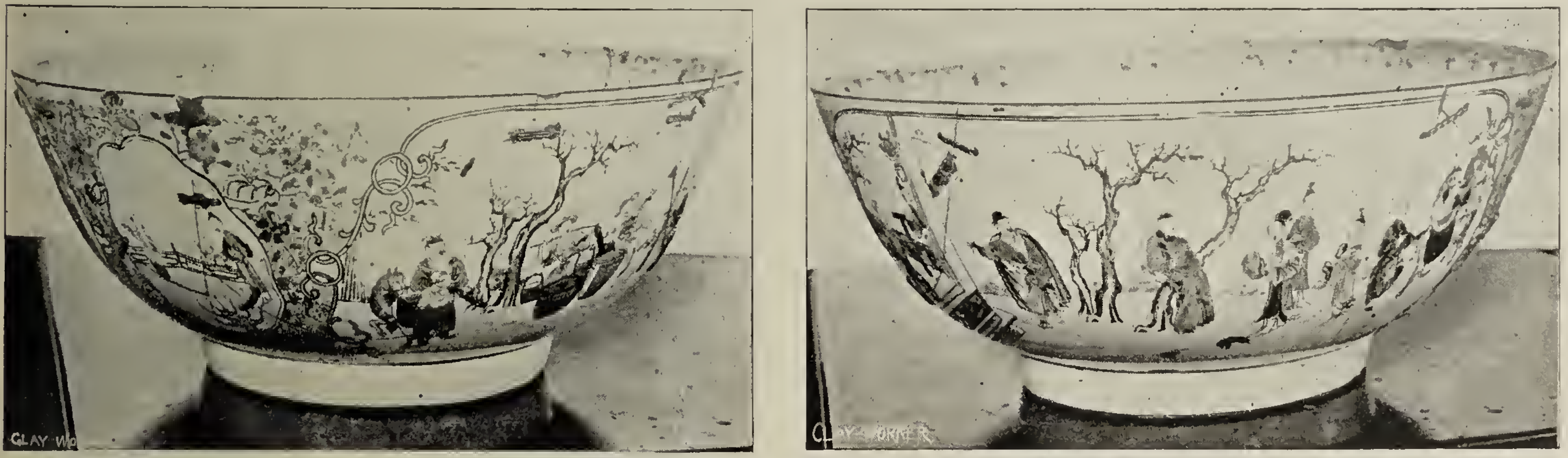
This bowl was presented to the Massachusetts Historical Society by Mrs. Benjamin Edes, of Baltimore, through Dr. Stearns, formerly of Boston. It had been inherited from the original owner, Benjamin Edes, of Boston, the famous tea-party patriot.

An original letter of Mr. Peter Edes, dated Bangor, Me., Feb. 16, 1836, and addressed to his grandson, Mr. Benjamin C. Edes, of Baltimore, was presented at the same time. This letter gives many interesting items. Mr. Peter Edes was a son of the first Benjamin Edes, of Boston.

As war had not been declared against England, the act of casting away a whole cargo of tea was altogether rebellious and unlawful. Much anxiety was felt as to the names of the rebellious subjects of King George. Mr. Edes was arrested and kept for some time in prison, in the hope that they would get some other culprit to bear witness against him and others. But they all remained true to their comrades, and Mr. Edes finally escaped. But after the war was over, and peace smiled upon the new nation, these men came out and acknowledged their share in the destruction of the tea, while each year adds to their descendants a degree of pride in their relationship.

At a meeting of the celebrated Literary Society of Washington, which flourished for ten years at the capital, and was attended by the most cultivated men and women of our land, the writer saw an excellent oil painting of this notable punch bowl. It was shown by Mrs. Long-Edes, a descendant of the Edes family, and one of the most brilliant members of the society. The occasion was the 22d of February, and the meeting was at the home of General Garfield, who had been elected President of the society. Soon afterward he was elected United States Senator, and, later, President of the United States. A few months after this meeting Lieutenant Long-Edes, of the navy, and only son of the lady mentioned, was instantly killed by an explosion of one of the torpedo boats he was testing near Providence, R. I.

This bowl may be seen at the Boston Library, from whence these illustrations were taken, through the courtesy and with the consent of the Librarian.



Punch Bowl from which the Boston Tea Party drank their Hot Punch before Going out into the Bitter Cold to cast the Cargo of Tea into Boston Harbor. Copied from the Bowl in Boston Library by Mr. Black, Photograph.

—A Centennial Tea Party, Dec. 16, 1873.—

(Written by request, and read as a welcome to the guests, who were attired in colonial costumes.)

It is more than a hundred years ago
Since King George ordered us, whether or no,
To pay an exorbitant tax, or go
Without the drink that we cherished so—
Our favorite cup of tea.

But our women were strong, as well as free;
And although they loved the fragrant tea,
They let old England plainly see
They could live without the dear Bohea,
And could drink from the spicewood tree.

So they bade their gallants cast it wide
Over the big ship's trembling side,
Where it floated away with the heaving tide.
For women and men would rather have died
Than pay the tax on the tea.

A hundred years? How they flit away!
And here we are gathered, dear friends, to-day,
With the costliest stores from the far Cathay,
And our Japanese cups, so quaint and gay,
A-drinking the fragrant tea.

Where the red men roamed in the forest then
Are clustered our hundreds of thousands men,
And the locomotive and teeming train
Bring guests from Eastern and Western main
To help us drink our tea.

And, as we drink, the electric wire
Flashes out our thought on its wing of fire
To the Orient lands, where mosque and spire
Speak still of the soul's divine desire
To rise, dear God, to Thee!

We have tunneled mountains and spanned the sea;
We have set a million of people free,
And have neither bowed nor bent the knee
To a mortal power in servility
Since we cast away the tea.

But—this is a party for drinking tea,
And we must not slight our old Bohea;
We must turn our backs upon memory
And note the people of dignity
Who have come for a cup of tea.

There are George and Martha—God bless their souls!—
For as long as the fair Potomac rolls
Or the voice of freedom our land controls
They will take the lead on the mighty scrolls
On our volume of Liberty.

There are Mrs. Bingham and Hamilton,
Mrs. John Adams and Jefferson,
The Mesdames Monroe and Madison,
And many a dame of the olden ton,
To share our Centennial tea.

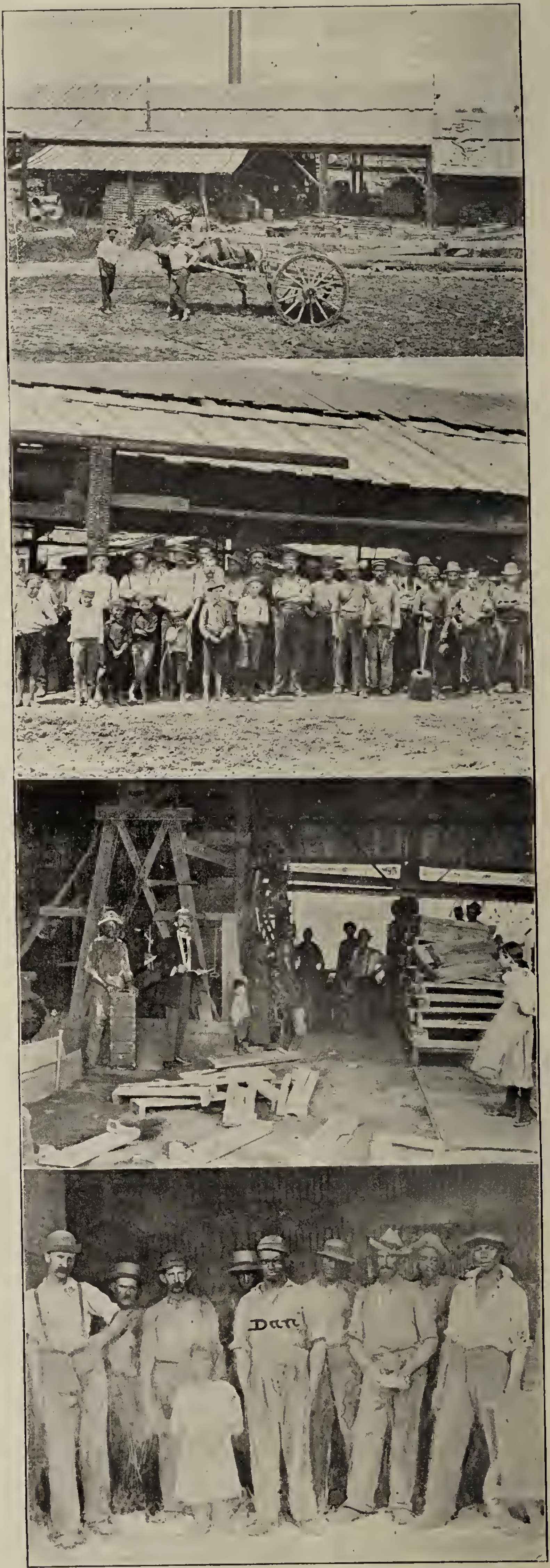
There are William Preston, of Kentuckie,
And the famed "Star-spangled Banner" Key;
And many a social light we see
Who graced the days of chivalrie,
When Jackson poured the tea.

All stepped once more on the stage of time
To join in the jubilant, ringing chime,
Which sets to music and joyful rhyme
The days which made our land sublime
As a home for the brave and free.

O "Spangled Banner!" O "Home, Sweet Home!"
Let your notes ring out from this vaulted dome,
And afar on the wings of the lightning roam,
Till all earth's peoples in spirit come
And join in our jubilee!

From the lacquered cities of old Japan;
From the porcelain palace of Kubla Khan;
From the glittering domes of Ispahan,
Where the Persian smokes on his low divan,
Let them join us at our tea.

And the toast we offer when all is done
Is this: "God bless us, every one!"
And as long as our mighty rivers run
May we walk in the paths of duty on,
And drink, in peace, our tea.



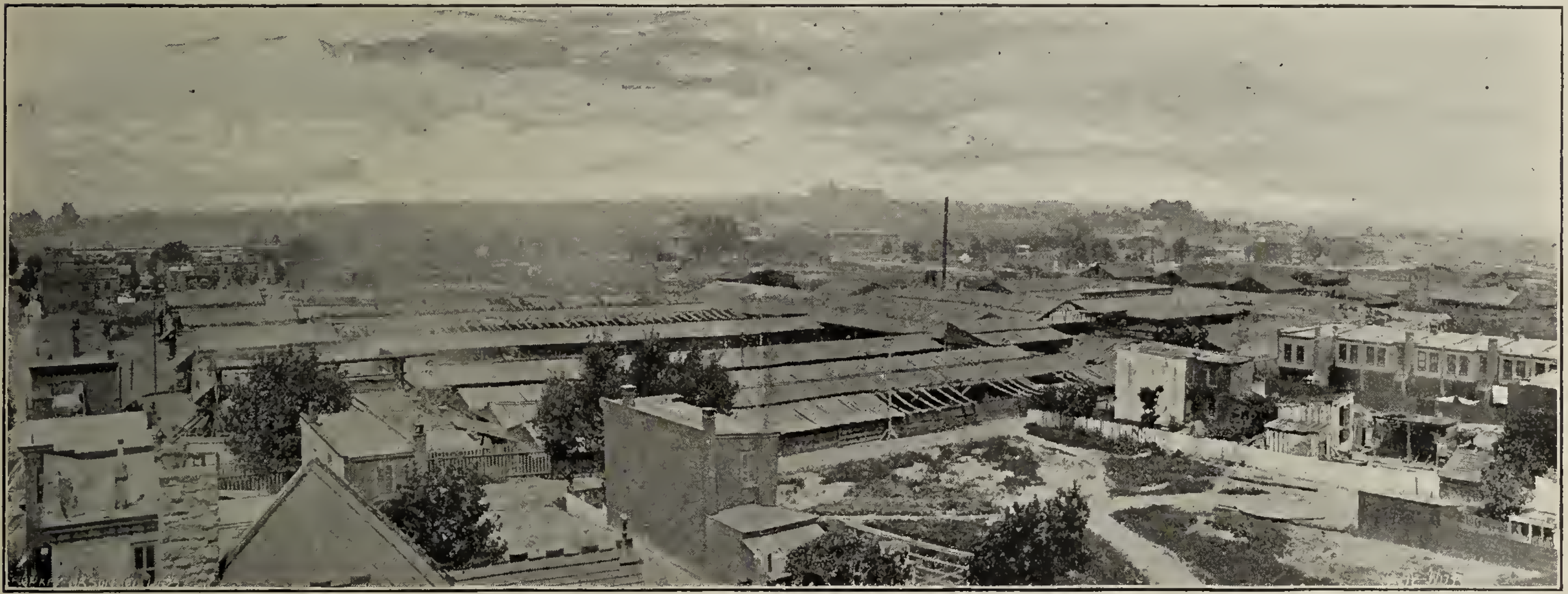
SNAP SHOTS ON ONE OF JAS. E. DINGEE'S BRICKYARDS—(1) Machine Shed. (2) Gang of Hand Molders, etc. (3) Interior of Machine Shed. (4) Setting Gang with Dingee's Mascott "Dan" in center.

In Philadelphia Brick Yards.

James E. Dingee's Brick Works—A Plant Without a Clay Bank.

ON THE FIRST of October of last year the brickyard of James E. Dingee was invaded by fire, water and newspaper men, and the dawn of the second presented nothing more cheering than a blackened and charred condition of things calculated to drive an ambitious man crazy. In days gone past old folks used to say three moves equaled a fire. The Dingees have moved ten times and have had positively two fires. How is that for hustling?

As I stepped off the car to-day and tugged at the bell line, which signified that its echo would bring the foreman, my glass eye gave that little spasmodic kink it always does when entering into a scene of extraordinary activity; for instance, a busy brickyard or paying my laundress.



Bird's-Eye View of James E. Dingees Brick Works.

In response to my inquiry, the foreman directed me to where I found Mr. James E. Dingee, seated on the handles of a barrow, quietly enjoying his weed. Here was a man with a load of responsibilities, and a mine of recollections. Think! When Edmund Dingee, Sr., came from Wilmington, Delaware county, he was able to dig for his clay and make his 250,000 bricks annually, between Eleventh and Twelfth, on Chestnut street, ground that now cannot be bought under $7,000 per front foot. And this was in 1838. Commercial enterprises spreading forced a move to Fifth and Green streets, and from there to Eighth and Poplar. From 1841 to 1847, a period of six years, they were left in undisturbed possession at Seventh and Master streets. Real estate speculators followed closely upon their heels, and again they were forced to move their plant to Sixteenth and Green, and thence to Twentieth and Master. Compelled by the rapid growth of residences, the plant was again removed, in 1858, to Twenty-fourth and Columbia avenue, and James E. Dingee was taken in as partner by his father, who lived but four years after to recognize with pardonable pride the ambition of his son James. Ever on the qui vive, he extended his plant, saw to the perfecting of the machinery, and faithfully carried out his contract for the supply of bricks, numbering 20,000,000, for the Philadelphia City Hall. In 1882, on the site of the old plant at Twenty-fourth and Columbia avenue, he erected 140 dwelling houses and stores, and next delved the clay at Twenty-fifth and Diamond. Three more moves did this traveling yard make—to Twenty-fourth and Issington lane, to Thirtieth street and Ridge avenue, and then on to where the Clay-Worker's representative found them, at Twenty-sixth and York streets.

Here it was that the destructive fire of last October got in its terrible work. And over this immense plant, covering four squares, nearly half a mile in length, and containing eighteen acres, James E. Dingee and myself made an inspectional promenade. Evidences still remain of the fire—sheds temporarily built up, beams, lintel posts and jambs charred, but still relegated to a useful although subordinate position. Everything and everybody working for dear life; two Martin machines, three pressed stretcher machines, twenty-eight hand gangs, turning out 2,500 daily; ten grinding machines, with a circumference of eighty-four feet each, and fifteen up-draft kilns, averaging 275,000, and ten hand presses. Thus, in concentrating all its power, able to turn out 35,000,000 a year; employing at the present time over 300 men and thirty horses and carts, three Hoff & Fontaine's engines, three 80-horse-power boilers; absorbing between 8,000 and 9,000 tons of coal annually. The American Blower Company's blast and fan drying process is in vogue here.

Seated quietly in the office, we smoked—that is to say, Mr. Dingee did the smoking and I did the spitting. He told me they were filling their many orders as fast as possible, and had all they could attend to. Prices were up 50 to 75 cents per thousand over last year. And right here let me say they enjoy many advantages in this section. Many thousands of two and three-story houses have been, and still are being, erected. The Dingees, James E. and his brother, H. C. (A. H. Dingee having retired in 1876), do not dig a cent's worth of clay, but from those very operations which they are supplying with bricks they obtain all the clay needed at a cost of 5 cents a load.

Among the many big operations for which they have supplied brick may be mentioned the City Hall, 20,000,000; the Boys' High School, now in course of erection, 10,000,000 bricks being the contract figure; Bergner & Engell's brewery and malt house, Betz & Sons, Louis Bergdoll and Baltz's breweries, including the Park and Girard Theaters. Four hundred and fifty two and three-story houses are now being supplied by them.

On the 11th he celebrated his thirty-third wedding anniversary, and "on the 21st I shall celebrate my fifty-sixth birthday. Remember me very kindly to Mr. Randall and smoke this Principe de la Galle on your way down. Good-bye."

W. P. L.

Written for the CLAY-WORKER.

WRINKLES IN CLAY MANUFACTURING.

Clay Screens.

A ROTARY, or shaking screen, is one of the greatest nuisances in a brick manufacturing plant, causing dust, noise, wear and tear, delay and constant expense. Screening by gravity is a comfort, and is comparatively inexpensive. The ground material should be taken from under the crusher by bucket belts, to a height sufficient to force, through a chute, back to the crusher, the particles too coarse to go through the first screen. This first screen need be only 15x18 inches, without a frame, sloping towards the crusher, and hung on loose springs, so that it gets a movement from each bucketful as it drops on to the screen. A second bucket belt takes the screened materials up high enough to be sent by chutes to the places required, passing over screens in the bottom of the chutes, where different sizes of grit are desired, and the bins can be placed for convenience. The chutes may be lined with No. 16 iron plates on sides and bottom, and may have branches for different bins. Carry the materials high enough, even above the roof, with the moving parts protected, and all the rest is easy.

—Floor Plates.—

In using a dryer system with cars, the tracks in some places are serious drawbacks; for instance, where barrows must cross them obliquely. In place of rails, iron plates, with grooves planed in them for the flanges of the wheels to run in, will soon pay for themselves, in facilitating the movements of the men. Plates can generally be found at old iron stores, and the grooves can be planed in a number at once on a large planer. The flanges of the wheels are quite strong enough to carry the cars, and it is easy to shift a car out of place and run it to a kiln door or into a kiln by simply lifting the forward wheels, by a lever, out of the grooves and running the car on the plates.

—Water Pans.—

Much better combustion may be had by using water pans under the grates of kiln furnaces. The evaporation of the water keeps the grates free from melted clinkers, so that the air passes in more freely and is better distributed, and it is much easier to poke up the fire. In gas works using coke fires it is not possible to run them without water pans to keep the grates free and rot the clinker. It is well known by chemists that phosphorus takes fire on being plunged into oxygen gas. It has recently been discovered by a French chemist that if the oxygen is entirely dry and deprived of moisture the phosphorus will not take fire. There are many other proofs that the presence of a moderate amount of moisture or steam aids the combustion of soft coals.

—Sliding Kiln Doors,—

Or doors hung by a chain, are a relief to firemen, for they can open them just enough to get a slice bar in, and be protected from most of the fire.

—Dry Floors.—

The smoothest and best dry floors are made by putting first, a covering of tiles, say 12x12x2 inches, on the divisions of the flues, and then setting, on the flat, hard bricks, using only enough sand to keep them level, and then running on top of them a grouting of any cheap hydraulic cement, mixed with sand, half and half. This fills the joints and makes a solid, even floor, and it is not too thick, as the heat is conducted readily through it, and very evenly.

—Kiln Arches.—

Arches for down-draught kilns usually give a good deal of trouble. Much of this may be avoided by constructing the arches slightly Gothic, never segmental. Lay out the arch about fifteen inches above a half circle and it will not strain the bracing so much, but will rise with the expansion.

In down-draught kilns the side and end walls should be made with small air spaces, for about four feet up from the bottom, and these spaces filled with fine sand, as the work progresses. Cold air is bound to leak through into the bottom of the kiln, unless this is attended to. Apply the flame of a lighted paper to a crack near the bottom of a kiln under fire, and this will be strikingly apparent. Many underburns are due to this leakage.

GEO. C. HICKS.

Written for the CLAY-WORKER.

THE DEVELOPMENT OF THE AMERICAN BRICK.

THROUGHOUT the New England States the manufacture of brick has for many years been one of the principal industries of the thrifty Yankee, and the ingenuity of Yankee inventors has enabled the brickmakers to compete with all the rest of the country, especially in the manufacture of the common brick.

In the early records of Cambridge, Mass., we find, as far back as 1660, entries that would lead us to believe that brick were being made there at that early period, and again in 1670 we find permission was granted one Mitchell to "take from the clay pits enough clay to make a kiln of brick for a stack of chimneys." From this time on we find numerous records, at different dates, which would prove, without a doubt, that the manufacture of brick was carried on to a certain extent.

In 1832 George Burpee established a yard in Cambridge, and was, at that time, the largest and most prominent brickmaker in that region. In 1840, as the business grew by the increased demand for brick and better facilities for manufacture, together with a decrease in prices, the success of Burpee incited others to enter the field, and these, in turn, were followed by others until 1845, when Hubbell & Abbott established a plant, introducing new and improved methods of brickmaking. This firm remained in business several years, and during that period proved conclusively that, when carried on properly, a brickyard was a good investment.

The Bay State Brick Company was organized in 1863, during the hardest period of our great civil war and when building operations were at a low ebb. Notwithstanding the unfavorable circumstances, however, this concern did a prosperous business. After this, in 1869, the New England Brick Company was organized, and in 1874 the Cambridge Brick Company commenced operations.

Parry Brothers took the plants of the New England Brick Company and the Cambridge Company in 1876, where they have continued to manufacture a high grade of brick to the present time. From time to time they have enlarged their plant, and now have a branch yard at Gonic, N. H., with which increased facilities they will this season greatly increase their output.

In 1884 Parry Brothers introduced and set up in Cambridge the first successful dryer, by means of which they were enabled to make brick in the winter as well as in summer. This same firm has also introduced a piece of machinery which is the invention of one of the Messrs. Parry. It consists of a patent screen for removing the stone from the clay. This screen has since been adopted by many brickmakers throughout the Southern States, and is proving a great success wherever used.

Parry Brothers made last year nearly twenty million brick, which amount they hope to increase this season, as the prospects in that vicinity for building are very bright for the coming season.

Throughout central and western Massachusetts brickmaking is extensively carried on. In Bloomingdale, Mass., bricks are made to supply the city of Worcester. In Springfield and Holyoke are large yards.

In 1840 Mr. Thos. Edwards began to make brick in a small yard in Keene, N. H. For many years he continued to make water-struck brick. Another yard was started in 1865 by Geo. W. Ball, who introduced, in 1872, a Martin sand-struck machine (horse power) for the manufacture of sand-struck brick. In 1874 another Martin machine and steam power were added. Since then the Martin machines have been replaced by the Springfield brick machine. This firm now makes three million common and several hundred thousand pressed brick per annum.

In Vermont brick were first made in the vicinity of 1840. In 1867 G. B. Drury began to make brick in Essex Junction, who introduced steam and modern machinery in 1890. He makes at present both pressed and common brick, about six million of the latter being made yearly.

Brick were manufactured in Maine as early as 1832 at Leeds Junction, by one Cyrus Bates, who made, the first year, fifty thousand brick. Some years previous to this the early settlers made brick with which to build chimneys, etc., and remains of the old kilns may still be seen in the vicinity of New Castle and elsewhere.

Capt. Alexander Farnham and Daniel Hopkins started a yard in New Castle in 1845, and continued to make brick for several years.

Wm. N. Bryant began to make brick in the same place in 1873, and continues to make about two million per year.

In 1873 G. T. Howe started a yard in what is now Wales, Me., and made two hundred thousand brick the first year. Starting with one wooden machine, he added, in 1877, an iron machine, and at present he has three modern machines, and makes many millions of brick annually. Mr. Howe is a veteran brickmaker, having been connected with the business for over forty-two years. When interviewed on the prospects for the brick trade in Maine, he said:

"I consider the prospects this year good, and don't think the yards will be able to supply the demand. I have worked at this business forty-two years, and have never seen but one time in that period (that was in 1860) that business has looked so favorable. I think the brick business in this country is just emerging from its infancy."

In Connecticut the manufacture of brick has been carried on for two hundred years, the first settlers at New Haven making brick and tile. Near Berlin, Conn., are situated not less than twelve brickyards, making in the aggregate something like twenty-four million brick per year. Here is also situated two terra cotta works and the Yale Brick Company, which makes the new metal-faced brick.

At North Haven are four yards which make some of the finest brick in New England. R. N. BUELL.

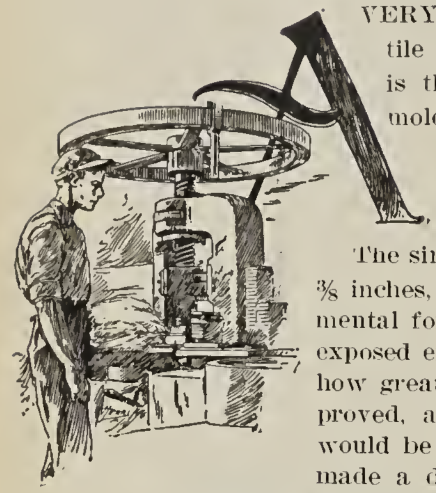
Wm H. Parry. Robt. A. Parry. Jno. E. Parry. Geo. A. Parry. Richard H. Parry.

WORDS OF HOPE.

The prospects for a good business season, despite the uncertainties and suspense of election year, are cheerful and encouraging. Things may seem a bit quiet for the time being, but beneath the surface there is an undercurrent of active preparation for the fall trade which should make all of us happy.—Exchange.

Written for the CLAY-WORKER.

ROOFING TILES—SHINGLE TILES.



A VERY GREAT ADVANTAGE which roofing tile has over any other material for a roof is the facility with which the clay can be molded into a great variety of forms. Slate admits of but very little change of form and presents ever the same monotonous appearance.

The simplest form of tile, the shingle tile, 6x12x ⅜ inches, can be made in a great variety of ornamental forms simply by changing the form of the exposed end. To illustrate this, and also to show how greatly the appearance of a roof may be improved, and at a trifling expense, over what it would be if laid with plain shingle tile, we have made a drawing showing eight forms of shingle tile and how they may be laid so as to present a pleasing appearance. (See Fig. 1.) The only change of form is in the outline of the part exposed "to the weather." As they are but plain sheets of clay, and the molds have no depressions for the retention of air, the metal molds may be used more satisfactorily than plaster molds. The blanks for metal molds are made more nearly the shape of the tile to be made, and there is therefore but little excess of clay repressed from the molds. This, however, is considered as one of the advantages of the plaster molds—that the repressing of a large proportion of the clay from the molds entirely changes the formation of the blank as made by the auger machine, so that there can be no seams or laminations in the tile. The body of a tile made in plaster molds is perfect, and it is no doubt true that the stiffer the clay is worked and the more nearly the blank conforms to the shape of the mold the more liability there will be to make imperfect tile. It is commonly supposed that the laminations are produced by the rotation of the auger, but more frequently the die is at fault. If the die is so shaped that there is more friction in one part than another, as in the corners of a brick die, the seams will form in curved lines, which indicate that the clay slips upon itself in passing through the die. This same effect is produced by making the die much larger at its entrance than its exit orifice, causing the sides of the die to be at too great an incline, so that the clay adheres to the die, forming substantially a clay die. The entrance should be no larger than is necessary to compress the clay to a sound body; more than this causes excess of friction and laminations. Any defect in the blank may affect the body of the tile, and it is very much more liable to do so when the tile are made with metal molds than with plaster molds. With metal molds the blanks must be made with about the quantity of clay required, because the escaping of a considerable amount from the mold carries with it the oil used for lubricating and causes the tile to stick to the mold. This is apt to be the case when the parting is made in the same plane with the upper or lower surface. Where the parting is made in the middle of the (thickness of the) mold, the clay in contact with the mold remains comparatively at rest, and the escape is from the body of clay. From what we have seen and have learned, we would decide that it is not well for a manufacturer to confine himself exclusively to the use of either, but to use metal molds for making shingle tile, Spanish and Roman tile, and perhaps the smaller forms of interlocking tile, and plaster for the larger sizes and for all new forms. It appears to require more skill to make and use a metal mold than a plaster mold. While the shingle tile is the lightest form of tile made, it makes a heavier roof, on account of its overlappings, than other forms. The weights of slate and tile roofs per square are about as follows:

Slate roof, per square	1,000
Shingle tile, per square	1,100
Spanish tile, per square	900
Interlocking, per square	730
Indianapolis clay shingles, per square	630

The Celadon Company have made patented improvements in clay, shingle in design and interlocking features, by means of which they make a roof having the appearance of clay shingles, but are lighter. The Indianapolis clay shingle is an interlocking tile, very light and strong, and looks well on a roof. It is nailed to the roof, and perhaps this feature distinguishes it as a shingle tile.

The writer is of the opinion that a tile having a plain flat surface should be called a shingle tile, and that when they have interlocking features they should be called interlocking tile. The company has, however, chosen a good trade name.

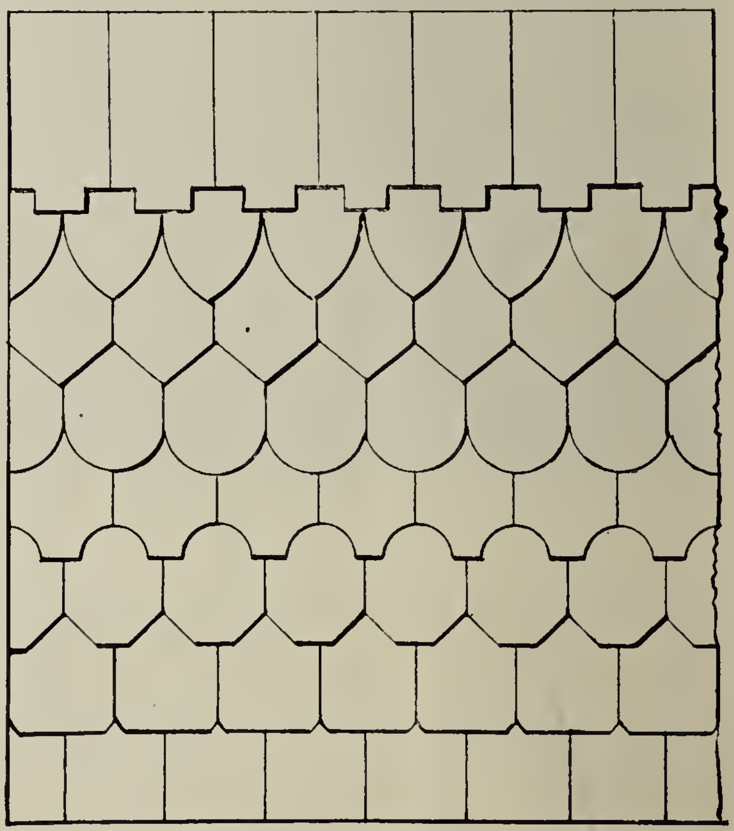
—Interlocking Tiles.—

We find in one of our German catalogues twelve patterns of interlocking tile illustrated. A number of them are patented, but it would be impossible to distinguish in the illustrations the patentable features. Perhaps they are, like the hypocrite's faith, "too fine for human sight, and never understood in heaven." The correspondent in Deutschland is writing fully upon this branch of my subject, and it will be well illustrated; therefore we will let the subject rest for the present, but before doing so we wish to say that we have some forms of interlocking tile invented by Americans that for novelty, vitality and beauty are not excelled by any foreign production. We frankly admit that the German's Fatherland has taken the lead in this art, and we wait with respectful attention to her instructions.

—Spanish Tiles.—

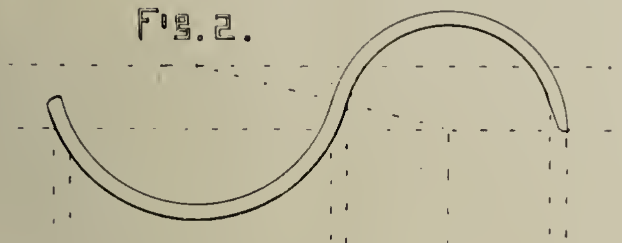
The Spanish tile was formerly made in two parts, "the roll and the gutter," and so made the heaviest pattern of tile roof. The old pattern has passed away, for the two sections of hollow cones are now made in piece, joined together so that a cross section forms the cyma reversa curve. There are few forms of tile, indeed, that present a more artistic appearance, and they appear to the writer to be more suitable for public buildings and for towers of fine residences than other forms. A cross section of the old Spanish was a half circle. A cross section of the new Spanish may show the gutter and roll of varying size and curvature, the gutter of less curvature than the roll. The writer hopes that it may not prove an unprofitable study to any one who is interested in the art to follow him in the delineation of a modern Spanish roofing tile.

Fig. 1.



Draw the parallel lines Aa Bb the distance apart of the thickness of the tile. At a right angle to them, and the distance apart of the length of the tile, draw the lines Cc and Dd. Draw the line Ee distant from Cc the length that one course shall overlap another, and the line Ff midway between Ee and Ef. From G as a center, midway between the parallel lines, set off equidistant the points Hh, the distance apart the width of space the tile is intended to cover. Dotted lines are simply to facilitate construction. Through the points Hh draw vertical lines Ll and Ii, and parallel to them, the distance of the thickness of the tile, lines Kk and Jj. On the line Ee set over to the left, the distance of the thickness of the tile, the points KL and IJ, and on the line Dd set over to the right, the same distance, the points kl and ij. Connect these points as shown and extend the lines to line Cc. If we have done our work correctly, then will bj, the internal diameter of the roll at the butt, be equal to RI, the external diameter of the roll at the lap, and the external diameter of the gutter at the butt, lb, equal the internal diameter of the gutter at the lap, KR. This being found true, draw the line Mm. Bisect Ta and bj, and from all points on the line Dd draw perpendicular lines to the line Mm. Draw Nn parallel to Mm, and distant therefrom one-half of Ot. Connect Oo, and from O as a center describe the curves of the roll, and connecting with them from o as a center describe the curves of the gutter. These latter curves may extend above the line Mm to give sufficient lap to the tile. The notching of the tile at the upper right-hand corner and the lower left-hand corner need not be here shown. Represent the inner corner of the roll, u, as made to fit the curve of the gutter. We have in Fig. 4 delineated the lower end of the tile and we may delineate the upper end in the same manner as shown in Fig. 3. It simplifies the problem to bear in mind that the axes of the two cones, or parts of cones, are in the same plane and parallel to each other. It is well to have some rule for laying out the work, so that a manufacturer can detect errors or prove the work, and in case of loss of patterns from any cause he may readily duplicate them. To delineate the Roman tile make the bottom of the gutter on the line Mm and cut off the curves by the line Vv.

Fig. 2.



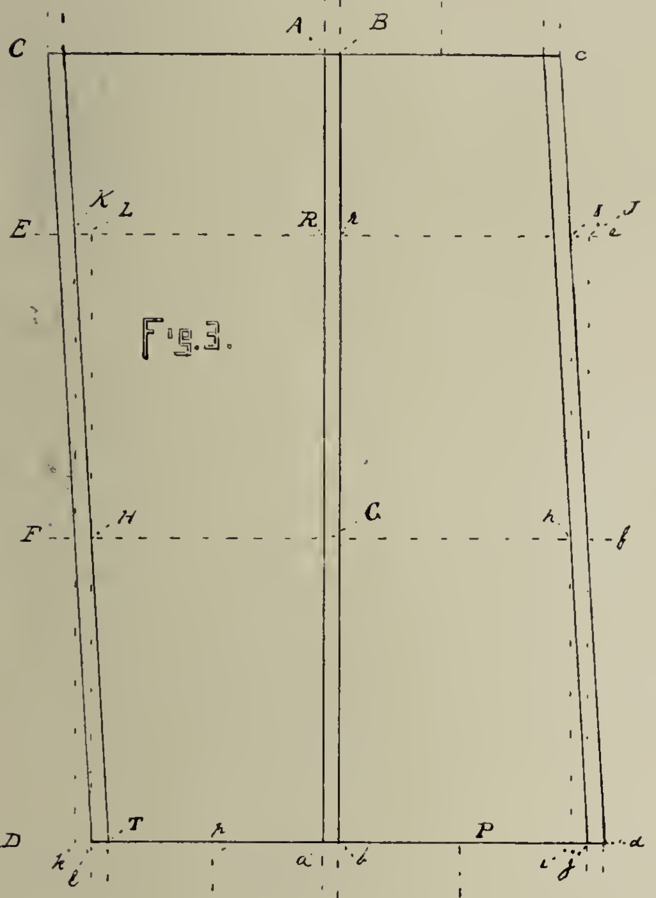


Fig. 3.

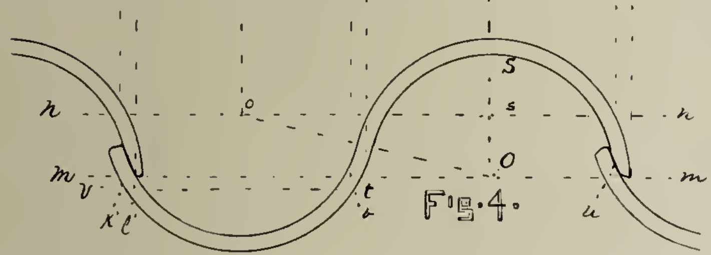


Fig. 4.

The blanks for pressing into Roman and Spanish tiles are made through dies of the shape of a cross section of the tile, slightly thicker, shorter and narrower. Lubricating rollers and copper slides are used of similar shape. The blanks are cut into suitable lengths, lifted from the table and set in portable racks by means of a loose section of the slide, and are carried in the racks to the press.

Roman and Spanish tile are made on steam presses by forcing the clay through a three-form die, as shown in Fig. 5. Knives are set at A B C, which cut nearly through. The notching of the corners is done by hand. The three tiles are dried and burned in the form they are molded, and are separated by a slight blow. As there is no change in the arrangement of the clay after it leaves the die, any seams made may appear as serious defects unless the tiles are burned to vitrifaction. Much caution should be used in making any earthenware tiles by simply pressing the clay through a die.

—Tower Tiles.—

On account of the variety in forms of towers and their great variety of pitch, this branch of the business is quite complicated. No especial form of tile has to be made for a pyramidal tower excepting the making of angular pieces to complete the courses at the corners; but for conical towers, to be covered with Spanish or Roman tile, a different pattern is required for every course of tile, and each tile must be numbered to indicate the course to which it belongs. Nor can a tile made to fit a tower of a given pitch be properly used to fit a tower of a different pitch. The writer once saw a roof of a tower covered with tiles made for a tower of a different pitch, and it looked well, but the roofer had cut the tiles so that their rain protecting features were sadly impaired. We could not refrain from saying, "I admire your skill, but not your judgment." We look to terra cotta for protection for a hundred years or more, and do not wish to depend on cement. Tower tiles are made to order, and in plaster molds.

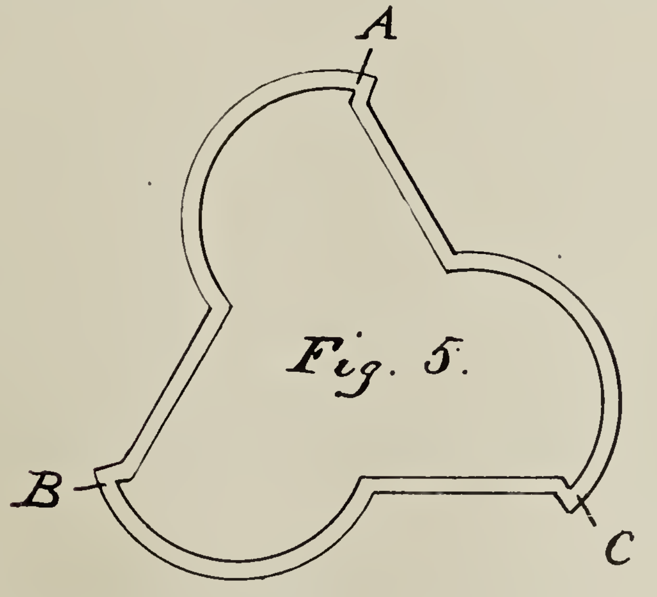


Fig. 5.

To ascertain the size and shape of a tile in each course we must first determine the width of a tile at the butt in the lower course. When we speak of the width of a Spanish or Roman tile, we mean from joint to joint, and not the full width. On a plane this is the same as the span it is to cover, but on a conical roof it must be more, because the joints between the tiles at their sides are distant from the roof. Twice this distance should be added to the diameter of the roof. This sum, multiplied by 3.14159 and divided by the number of tile we wish to have in a course, will ascertain the width of a single tile at the butt. As the tile tapers from this width at the eaves to nothing at the point of the tower, if we divide this width by the number of courses, we will ascertain the amount of taper in each course from the butt of one tile to the butt of the one next above it. We will then have, using Fig. 3 for illustration, the lines for each course of tile, Ee, Dd, LT and IJ. Bisect the line Dd and erect perpendiculars the length of the tile; set over to the left the points IL and over to the right the points iT, the thickness of the tile, and run lines indicated by their position the length of the tile, and lines parallel to them and distant the thickness of the tile, and proceed to delineate the ends of the tile for such course as shown in Figs. 2 and 4. The workman makes the lower mold first and proves his work as he proceeds.

A simpler and better method, where space permits, is to attach a long, narrow sheet of paper to a board and lay out on it a triangle, two sides of which would each be equal to the distance from the butts of the lower course to the point of the tower and the other side, the width of the tile of the lower course, adding for shrinkage of clay to both of these dimensions. Lay off from the point the distance covered by the finial, and divide the balance into spaces equal to the number of courses by lines parallel to the base. Draw lines in the middle of this space from eaves to point of tower, also lines outside of the side lines, the thickness of the tile. We have then on one sheet of paper all the foundation lines for each course, and may proceed to delineate their ends as represented.

The drawing should be marked with the number of order, the degree of pitch of the tower, and each space numbered the same as its corresponding pattern, and all should be preserved.

We feel that we have wearied the reader by these descriptions of details. Our only apology is that they lie close to the foundation of a successful business. The manufacture of roofing tile is "both a science and an art," and if you wish to excel in it you will certainly find an opportunity to test pretty thoroughly your knowledge and your skill.

Tecumseh, Mich. GEO. S. TIFFANY.

EXCELSIOR STONE AND BRICK COMPANY'S PLANT.

THE GROUND containing the above plant is situated on the old York pike road, about half an hour's trolley ride from the city's center and three-quarters of an hour's ride from the new resort formed for pleasure and good music by the Traction Trolley Company.

Starting twenty-two years ago as the Excelsior Stone and Brick Company, this plant turned out in the seventies about 3,000,000 bricks and many thousand perches of good mica-bodied stone for foundation building. To-day the stone has given out and clay is becoming scarce, so that the Clay-Worker's representative may be said to have paid his last visit to that yard, anyway. Three years ago John P. Lynch was made foreman, and from that time on, with his six "up-draft" kilns, a muffle kiln and fritting furnace, John has steadily and conscientiously served principal architect and builder with a good, clean, enameled brick, in white, cream and chocolate, making his own seggars and generally bossing things throughout the yard. With a forty-horse-power engine, slide valves, and a sixty-horse-power boiler, he turns out about 5,000 daily.

The six enameling kilns have a capacity of 17,000 each and one for 12,000, the work being confined solely to enameling red, buff and cream, pressed bricks being sent in from the other yard adjoining or from the Jarden plant down in the "Neck." Adjoining this is the plant of

—The Excelsior Brick Company Proper.—

This yard was started ostensibly for the supply of stone and manufacture of hand-pressed stretcher and salmon, in conjunction with the enameling yard, in 1875, and while it has undergone changes in proprietorship, there is still retained as its nominal head or foreman Edward McDevitt, who, day in and week out, has displayed all the co-efficients necessary for a capable boss and servant, always on the alert and ever ready to outstrip his subordinates in tending to the firing and seeing that the same comes off without a hitch.

In days gone by the yard echoed to the hum of 225 human voices and twice that number of busy hands, but now, owing to the scarcity of clay, work slackens up a bit, and ere long the machines and plant will be transferred, with the other, to the plant of the Jarden Brick Company, whose genial President, William H. Clothier, controls also the two above mentioned plants.

One Chambers end-cut machine and four seventy-horse-power boilers are in use, turning out, the day before my arrival, 60,000, or 104 cars. A large steam grinder and five Dutch up-draft kilns, with a capacity of 325,000 each, and Caldwell's system of drying, and about one hundred men complete the make-up and plant, which covers nearly seventy-five acres of very valuable ground.

The Jarden Brick Company report trade as being fair, but not rushing. Prospects, however, are good for fall trade.

Philadelphia, August 8th, 1896. W. P. L.

A NEW BOOK ON BRICK PAVEMENTS.

"VITRIFIED PAVING BRICK" is the title of a valuable little book published by T. A. Randall & Co., Indianapolis, from the pen of Prof. H. A. Wheeler, who has made a specialty of the study of clays. It is a very timely publication, in view of the active discussion on the subject of good roads that is now going on, especially as it is devoted to a class of pavements that seems to have a great future in this country. Brick pavements may be said to have made their appearance in this country on a commercial scale within the past ten years, though Prof. Wheeler cites one that has been in use for twenty-five years. They were used in the smaller cities and towns at first, but within the past five years, during which they have enjoyed a phenomenal development, to the extent of now being used in about four hundred cities and towns, they have been adopted by the largest and most conservative of cities. Yet it is not as well known as its merits deserve, as vitrified brick occupy a very enviable position, when compared with other pavements, as regards smoothness and ease of traction, freedom from mud, dust or filth, moderate noise, very small expense for repairs, and a comparatively moderate cost of construction.

As in all pioneer experiments, some of the first brick pavements were failures from not using proper clays, which Prof. Wheeler states is very important, as it usually requires a special kind known as shale. Serious blunders were also made in their manufacture in either not burning them hard enough, when they rapidly wear out, or in making them too brittle from improper annealing, when they readily chip. Experience has enabled these defects to be remedied, so that to-day the manufacturer is enabled to turn out a reliable, very tough, enduring brick that rivals granite in its lasting qualities.

Special stress is laid on the methods of manufacture and the tests employed to secure a reliable paving brick, and the author has introduced a novel formula for calculating the relative merits of different brick that will interest the engineer. Tests are cited of some of the well-known brands on the market, and the experience of nineteen of the largest cities (as given by the city engineers) that have been using brick for over three years is quoted. The whole shows that brick pavements are very satisfactory when under heavy traffic.

The book goes into details of the manufacture of paving brick, of their physical qualities, the methods of testing, their different uses, and a comparison with other standard paving materials. A point that is well made by the writer is that when vitrified brick are used for both streets and sewers it will then be practicable to employ the hydraulic system of cleaning streets, which is the cheapest method known where the grades of the sewers will permit it, and thus a small hose crew will do away with our dusty, cumbersome, inefficient sweeping machines. Whether the political bosses will agree to a method that so heavily reduces the plums of office, when it only results in cleaner streets at a much lower cost, remains to be seen.

The book is very neatly gotten up, its typography is excellent, and it is liberally interlarded with side lines that make references very easy. It is a publication that reflects credit on its publishers and is very timely in its advent. Price, $1.

Written for the CLAY-WORKER.

IN DEUTSCHLAND. No. 6.

Roofing Tiles—How they are Made.

NOT ALL OF THE ROOFING TILE patterns conform to our classification. There are several which form, so to speak, the connecting link between the interlocking tiles made with auger machines only and the third group, the true interlocking tiles. Fig. 1 represents one of these styles, invented by Schlickeysen, a manufacturer of clayworking machinery at Berlin. These tiles are made with the auger machine, but before leaving the cutting table they pass through an operation of stamping, which provides them with the interlocking socket at the one end. The column having the cross section B, with only the continuous rib, w, on the upper surface, leaves the die and passes on to the cutting table, but before the cut is effected two dies with plaster lining, one above and one below the column, ascend and descend, respectively, forming simultaneously the rib n at the bottom and the socket h out of the rib on top,

There remains yet the description of the third group of our classification, the interlocking tiles pressed out of blanks on presses. We may call these the true interlocking tiles, because they fulfill the requirements of a perfect interlocking tile, having lock joints at the sides and the ends. Their manufacture was commenced some fifty years ago, and the first to engage in the business were the brothers Gilardoni, at Altkirch, Upper Alsatia. Since then the manufacture has gradually spread over France and Germany, and it seems probable that the interlocking tile will become the prevailing roofing tile in those countries.

In producing an interlocking tile the most important part is obviously the proper construction of the joints. Much study has been devoted to the subject and many designs have been evolved, but, as in a good many other things, the simplest seem to be the most satisfactory.

The transversal and longitudinal joints represented by Figs. 2 and 3, respectively, show the usual constructions. Occasionally one observes longitudinal joints in which the rib overlaps, as shown by Fig. 4, but this is considered a faulty design, as the rain and snow, impelled by the wind against the projection b, is very likely to enter the joint c, owing to the fact that the tiles can hardly ever be burned entirely straight, making perfect joints.

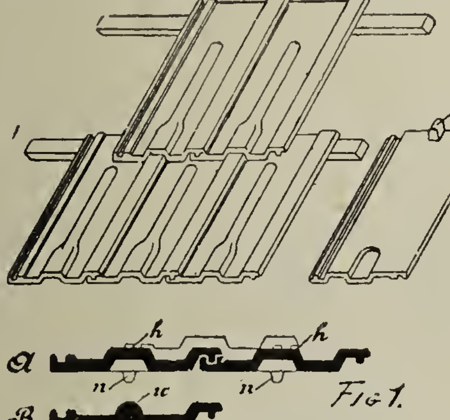


Fig. 1.

In order to attain greater security against leakage double joints are constructed (Fig. 5), and often triple in the case of transversal joints (Fig. 6). One of the oldest patterns is the Alsatian tile (Fig. 7), and on account of its simple shape it is used quite extensively. It can be put down on the roof in even rows only, thus requiring no halves at the ends of the roof. A very popular tile is the Zinstag tile (Fig. 8). It will be noticed that the ribs of the longitudinal joint have a peculiar projection, which effects a construction similar to a double joint. This tile can be put down in either even or odd rows.

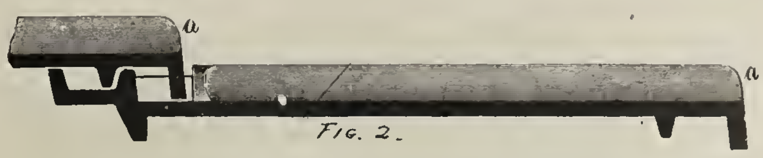


Fig. 2.

One of the largest manufacturers of roofing tile in Germany, Mr. Ludovici, who was one of the first to manufacture "Falzziegel," and who is the owner of two large factories at Ludwigshafen and Jockgrim, has constructed several patterns, one of which is illustrated by Fig. 9, the well-known Ludovici tile, with double longitudinal joint. Mr. Ludovici has also constructed a tile having joints somewhat resembling those of the Zinstag tile.

Fig. 10 represents a tile considerably smaller than the ordinary sizes, the Boulet tile, consequently it is more expensive to manufacture, but it has a very pretty appearance. It can be put down in odd rows only. Warped interlocking tiles do not furnish a roof entirely preventing rain and snow from being driven under it by the wind unless laid in mortar. However, divers improvements have been proposed for making interlocking tiles which are not subject to this annoyance, even if warped to some extent. Such an improvement is claimed for the Lesmeister tile, where the longitudinal grooves are provided with slanted ribs, which close up the space between the two tiles, forming a kind of shutter (Fig. 11). However, modern interlocking tiles, properly made, should not need any provisions of this kind, for any water getting into the grooves, provided these are deep enough and straight, will run down these channels and pour on to the next tile below.

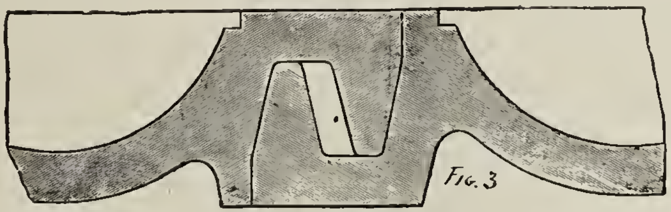


Fig. 3

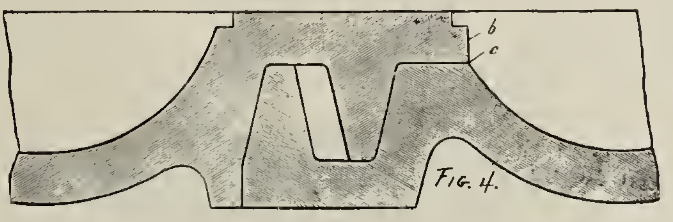


Fig. 4.

An attempt to collect all the tile patterns on the market would be a task beyond the limits of this paper, and without much profit to the readers. It has been endeavored to compile only some of the more common ones in use. Without ridge tiles no roof would be complete. These are made in many varied shapes, either molded by hand plaster molds or pressed on the roofing tile presses, the latter being the more usual way with plain patterns, such as shown by Fig. 12, as long as their height does not exceed five and one-half inches.

In the first stage of making the interlocking tiles two operations take place, viz.: the molding of the blanks or clots and the pressing. The former part is accomplished with auger machines, the latter with the revolving tile press, repeatedly made mention of in these papers. This press, whose simple, yet ingenious and efficient, mechanism is shown by the accompanying cut, Fig. 13, is the one generally used in the manufacture of roofing tiles in Germany, although several other kinds of

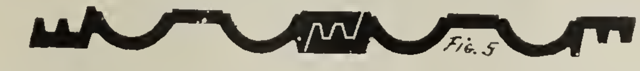


Fig. 5

power and hand presses are employed to some extent. For the cut of the machine we acknowledge our indebtedness to Th. Groke, Merseburg. In operating the press a blank of tile somewhat larger than the tile to be made is put on to one of the five molds of the prism, and, having arrived at the position under the plunger, it is pressed into a tile. The motion of the prism is, of course, intermittent, due to the motion of the five-armed cam. The tiles, after being put on pallets, are placed on revolving tables, around which operatives are stationed, employed in trimming the tiles, removing the seams caused by the pressing. The tools used for this purpose are steel blades or forks, between whose ends a wire is stretched. The force needed to run such a press consists of five, sometimes six, persons. Two are required for feeding the press and taking off the tiles; the others, either women or children, are engaged in trimming. On the average, the capacity of a press varies from 4,500 to 5,500 tiles per day, depending on the speed of the press, the time of pressing, the quality and preparation of the clay, the shape of the tile and the quality of the plaster used for the molds. The molds are the most important part about a roofing tile press, for, being of plaster, cast into cast-iron boxes, they require constant attention and renewal. One mold is good only for pressing about eight hundred tiles, providing it is made of good plaster. A new set of molds must always be on hand to replace the worn ones, and every roofing tile factory has a mold shop where they are being made. The making of molds is not a very simple operation; in fact, it requires considerable experience to produce good ones. The first essentials are good, dry plaster and soft water. It is needless to say that the patterns from which the casts are taken must have exact dimensions and be perfectly clean. Preparatory to casting they are coated with a thin layer of tallow and oil. In preparing the plaster it is added to the water, never vice versa, and the least quantity of water is used; the less water the better the cast. Sufficient plaster must be made up in the first place for the entire cast. As soon as a thick paste is obtained, by constant stirring, it is spread over the pattern, and the whole is subjected to pressure in a screw or lever press until the plaster has become hard enough. Then the molds are parted from the pattern by means of flat iron wedges. The molds must be kept wet when in use.

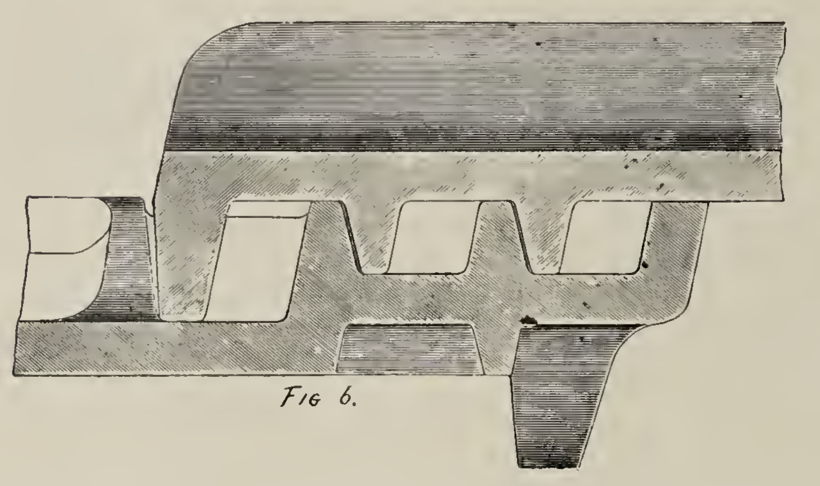


Fig 6.

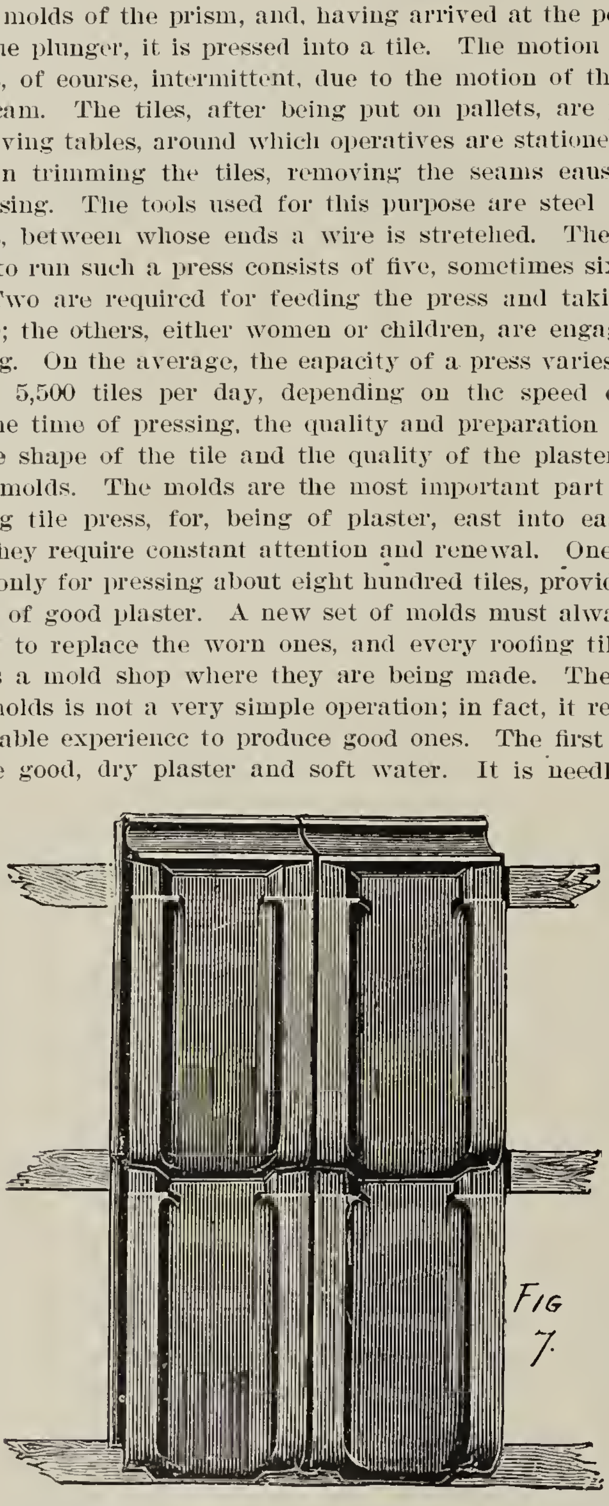


Fig 7.

In the manufacture of interlocking roofing tiles much attention must be paid to the pallets, for it is impossible to make straight tiles by using warped pallets. The drying of the Falzziegel is accomplished in the usual manner, on racks.

Usually roofing tiles are an auxiliary product of brick or drain tile plants, so that in setting they are set on top of the brick or drain tiles, in this manner lessening the danger of the tiles being deformed by their own weight. In the continuous kilns brick are always set next to the firing flues, thus keeping the tiles from coming into contact with the fuel and ashes. When the tiles form a large percentage of the ware in the kiln, entire fire rows, or at least the middle holes, may be left out in order to afford more room for the tiles, these being easier to burn than bulkier goods. In factories where roofing tiles are made exclusively, and where the clay is of a kind standing up well, with little danger of crushing and consequent deforming, the tiles are, of course, set from bottom to top. But with clays where this is not practicable stands of brick are built up, between which the tiles are set. Special care must be taken in the setting of glazed ware, in order to keep the tiles from sticking to each other. At some places they are set on end on fire clay tiles with ribbed surfaces, the ribs being V shaped, and T-shaped spiders being used to keep the roofing tiles apart. At other concerns they are suspended from fire clay blocks by their ribs, having no other points of contact, and each pair of tiles being kept from falling by fire clay clamps, which hold them together on top. The writer has never seen glazed tiles burnt in seggars, and, with few exceptions, they are not even burnt in muffle kilns, but nearly always it is accomplished in ordinary continuous kilns, frequently provided with the Haedrick fire walls. In setting, considerable skill is often exercised in protecting the tiles by encasing them with brick.

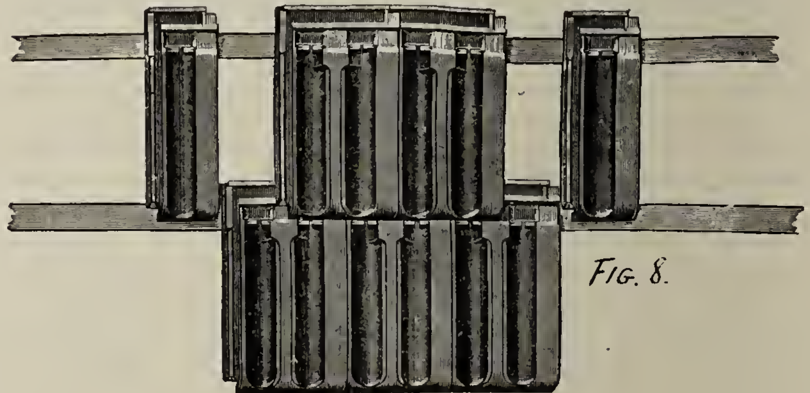


Fig. 8.

In the manufacture of roofing tiles the greatest waste is caused in burning by the warping of the ware, and, of course, the harder the burn the greater the liability of warping. Warped tiles are hard to put down on roofs, and, when laid down, are a source of trouble, being subject to leakage, more or less. Such tiles, in order to be used at all, must always be laid in mortar or packed with hair, hemp or similar substances. It is not surprising that manufacturers, in order to avoid this source of loss, endeavor to burn their tiles at as low a heat as possible; in fact, some go too far in this direction at the cost of durability. We had occasion to see tiles which did not seem fit to withstand the weather any length of time. According to a German trade paper, tiles are being made absorbing 15 per cent. of water. It is obvious that this is entirely too much for a sound roofing tile. As an example of a well-burned, satisfactory tile we may mention the Siegersdorf tiles, which absorb, in the average, from 2.5 to 3 per cent. Experience has taught that the absorption of a good tile should not exceed 5 per cent. Some makers try to render their ware water-proof by glazing it, usually with a soft lead glaze. This is, however, an entirely wrong procedure, for a glaze not only does not protect a poorly burned body, but it accelerates its destruction. Moisture, which is absorbed by the unglazed surfaces, freezes, and, finding its outlet barred at the glazed side, destroys the layer of glaze by bursting it off. At the same time, soft lead glazes are themselves decomposed by the acids of the atmosphere. A good glaze requires a well-burnt body. Roofing tiles are also often made impervious to water by being soaked in hot tar.

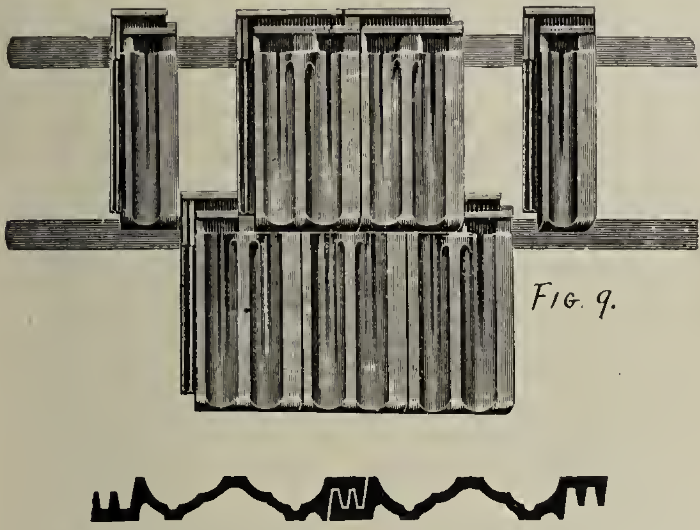


FIG. 9.

Some controversy is repeatedly met with in which the respective merits of glazed and bluesmoked roofing tiles are discussed. It was the writer's intention to gather information from practical men as to the merits of both processes, but we must confess that some very contradictory opinions have been obtained. However, according to Cramer and others, it appears that bluesmoking does not improve the weather resisting quality of the tiles, it being simply a coloring process. On the other hand, a well-burnt tile is improved in quality by a good glaze, as dirt and vegetable growth cannot accumulate on the glazed surface. In the following we give the composition of two glazes in ordinary use, the first one being a soft lead glaze, the other one a boracic acid glaze, which requires fritting:

No. 1: 72 parts (by weight) oxide of lead; 18 parts clay; 20 parts sand.

No. 2: 50 parts (by weight) quartz sand; 5 parts oxide of iron; 4 parts manganese; 8 parts carbonate of lime; 35 parts borax.

Of course, the glazes differ with every clay. The glazes mentioned fuse at a low temperature, being applied to red-burning clays. The usual colors are brown and black. Nearly always the glazes are applied to green tiles.

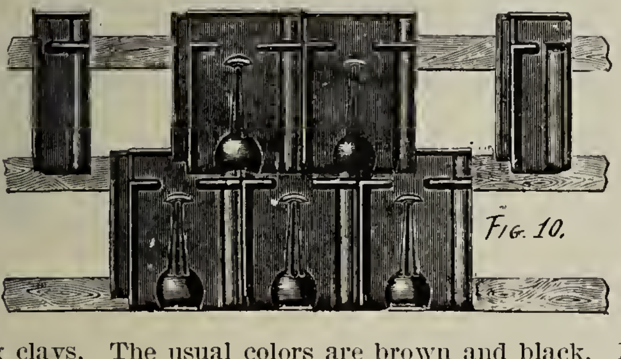


FIG. 10.

In comparing the different types of roofing tiles with each other we find that the flat roofing tiles and the pan tiles are produced the cheapest, and that they will always make good roofs, even if not quite perfect in regard to shape and straightness. But their weight is greater than that of any other type, as they have to be laid double and in mortar. Beaver tails, 14.6x6.6 inches, weigh, according to thickness, from 2.75 to 3.3 pounds per piece, and from 125 to 138 pounds per square yard, including weight of mortar. Interlocking tiles, with longitudinal joints only, are lighter than the preceding type by a good deal, but more difficult to lay, as they must be perfectly straight in order to make a good roof; otherwise they must be laid in mortar or packed. The dimensions of these tiles differ with every factory, some concerns making them 14½x7 inches, others 12x6⅝ inches.

The interlocking tiles, with longitudinal and transversal double joints, of the best pattern, when straight, make a perfect roof. A dense interlocking tile of this class weighs from 5.5 to 6 pounds, and on the roof, per square yard, from 70 to 74 pounds. The standard size is 13.3x8 inches, but as a rule nearly every factory has its own size.

The selling prices of roofing tiles vary according to the location. The prices, as a rule, are lower in northern Germany than in the southern parts, and sometimes the differences are quite surprising. For common beaver tails the price per thousand, on yard, fluctuates from $7.50 to $12; for pans, from $11 to $13; for auger machine interlocking tiles, from $12 to $18; for interlocking tiles proper, from $18 to $25. These, of course, are average quotations.

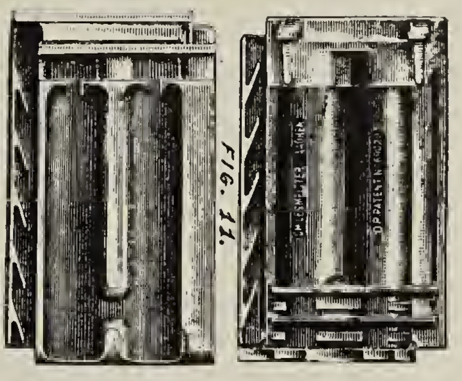


FIG. 11.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 46.

MR. HENRY BESSEMER, now Sir Henry Bessemer, is a splendid specimen of the men who theorize. In using the term theorize, I would have it understood not to mean guesswork and wondering, but the building up of a theory by observation, inductive reasoning and experiment. Men who neither use halter nor check rein on their imagination are scarcely entitled to the name theorist. A man told me the other day that he had millions in the United States Treasury, and the building up the avenue there was the United States Capitol. He himself was General Scott. The fact was, the poor fellow was simply a lunatic and confined within the walls of an asylum. This man was no theorist; neither is the man a theorist who is chasing that phantom, perpetual motion; nor is any man who ignores natural laws and reason and builds upon no better basis than his opinions. Such are really laboring under delusions.

A little over forty years ago Bessemer undertook the task of solving the puddling question. At that period not one puddler in a thousand attributed the change from cast to wrought iron to chemical action, but the overwhelming majority of them scouted the idea, and had solidly fixed opinions that the change was solely due to their muscle and skill in using the rabble.

Samuel Baldwin Rogers, a Welsh chemist, was the father of the present system of puddling, which was a long stride from the old sand bottom system, now all but forgotten, and

I believe all the thanks or remuneration he ever got was the charming sobriquet, "Old Iron-bottom." He was a very clever chemist and metallurgist, but away ahead of his time, and, consequently, not appreciated.

I think it was in 1851 he published his "Metallurgy of Iron," the first work of the kind I ever saw, and nothing since has pleased me more, although several of the later productions, of course, leave my old favorite pioneer in the rear.

Bessemer availed himself of all the metallurgical lore he could lay hands on, and soon perceived, like all other intelligent observers, that the change from cast to wrought iron was effected by a very simple and well-known law of affinity, viz.: the affinity of very hot carbon for oxygen, and, reasoning on these lines, he soon became convinced that the oxygen of the atmosphere was very much more plentiful and available than the oxygen in the oxides of iron, and that all the agitation of the metal necessary to bring all the carbon in contact with the oxygen could be produced by a blast blown into or through the metal. Now, this is a theory worked out on a sound basis, not on a fanciful supposition or hypothesis. About the benefit to the world at large and to Bessemer, financially and otherwise, I need not enlarge; everybody is aware. They may not, however, know that in 1870 this theorist had an income of £50,000 per week in royalties from this very simple, but very beautiful, theory, which he put into practice. It would take up too much space and time to relate half of his achievements, his difficulties, the opposition and ridicule he received from practical iron and steel masters and workmen, and his inventions, though not affecting the clayworker to a very large extent, still they play some part, and it must be remembered that his converters and ladles create quite a demand for high class fire clay goods.

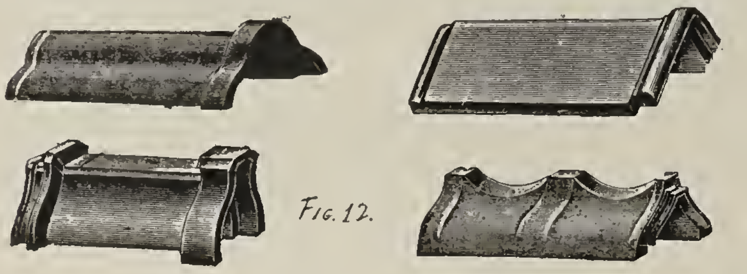


Fig. 12.

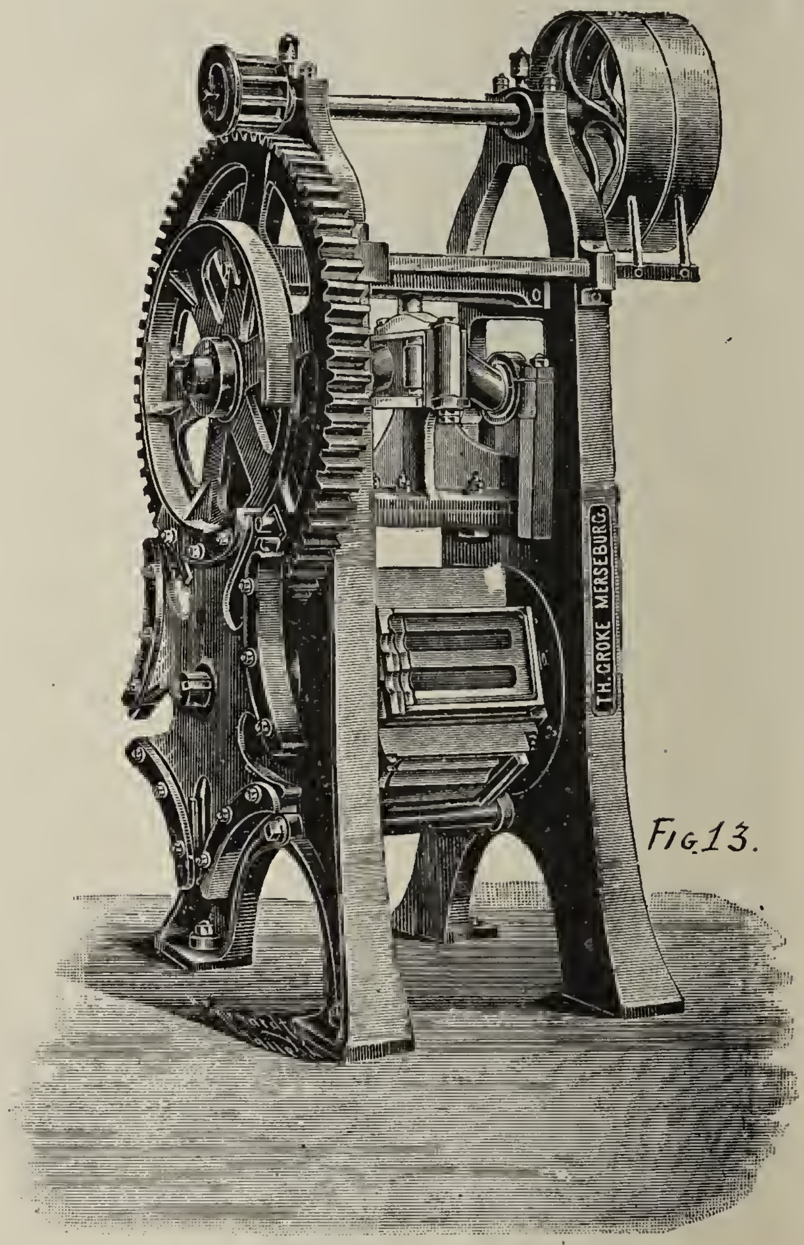
IN DEUTSCHLAND—Ridge Tiles. Page 111.

Of the two inventors, perhaps, Sir C. W. Siemens will be of the most interest to the clayworker, inasmuch as one of his many inventions is for the economical generation and saving of waste heat, one of the most important problems the thinking clayworker has to face.

Early in the fifties, and probably previous to this time, Siemens had observed—as many others had done—the immense amount of heat wasted daily in all metallurgical operations, and in domestic operations, too. In the manufacture of iron and steel this waste was so flagrantly apparent to the casual observer that the careful inquirer could not allow it to occur without some kind of protest. It was found that every ordinary steel pot melting furnace was allowing a vast amount of heat, at a temperature of about 3,000 degrees Fahr., to escape into the atmosphere without doing anything except rapidly destroying the fire bricks of which the flues and stack were built, for we must always remember that the escaping heat is necessarily some degrees hotter than the object to be heated; for example, the heat impinging on the melting pot and then passing into the flue or chimney must be hotter than the molten steel in the pot, and similarly the iron nearest the flue in the heating or the puddling furnace is heated and kept hot by hot gases somewhat higher in temperature than the iron itself. Again, the top course of bricks or other ware in an ordinary up-draft kiln or the bottom course of a down-draft kiln is raised to its final temperature by increments of heat considerably above the temperature of such top or bottom course, as the case may be. If this be granted, it must be evident that if the top or bottom course is heated to 2,000 degrees Fahr., and the heat performs no further duty, there is a large quantity of high temperature heat (above 2,000 degrees Fahr.) wasted.

Siemens and others, as I said above, saw this very clearly, and devised various methods to utilize this escaping heat. Steam boilers were placed with their flues to connect with those of the heating and puddling furnaces, and by this means some rolling mills, etc., were run without any fuel being used specially for steam. This plan, however, has its drawbacks; besides, many of the steel works in and around Sheffield had their tilt hammers run by water power, therefore did not need steam.

It required two tons to two and a half tons of best coke to melt a ton of steel. Siemens taught the bred and born, lifelong experienced melter to melt a ton with 12 cwt. of good slack or nut coal. Thus did this clever theorist teach the practical man how to do his work with one-twelfth the expense; in other words, he taught him to do for about 42 cents what was costing him $5. The steel melter was not the only practical man he taught how to generate heat and use it; he also taught the puddler and the heater in the rolling mills how to save fuel in about the same proportions, and, what is of more importance to the iron master, the puddler and the heater, he taught them how to prevent such an enormous waste of iron, amounting frequently to 10 or 12 per cent. This is often overlooked when setting forth the advantages of Siemens's inventions, yet the saving of iron very frequently far outbalances the saving in fuel.


T.H. GROKE MERSEBURG.
Fig. 13.

IN DEUTSCHLAND—Revolving Tile Press. Page 111.

—Siemens's Steel.—

Here is another example of theory in its scientifically defined sense, leaving rule-of-thumb practical experience far in the wake. Ignoring all the fine steel mixtures of the Sheffield practical steel melter, rejecting also his accumulated knowledge of furnaces, pots, molds, etc., Siemens constructs a crucible of his own, which is crucible and furnace combined, and in the place of expensive Sweedish bar iron and the usual conglomerate of scrap and physic, he uses haematite pig iron, which he melts and decarbonizes with any good and suitable oxide, precisely on the same principle that malleable iron is produced, except that the latter remains solid and is decarbonized very slowly, while Siemens's steel, or rather metal, is melted and decarbonized much quicker. It is natural to suppose that he would engage some of the experienced Sheffield melters to assist him in ushering in this new process, but he did not. No; he selected an intelligent copper smelter and taught him the principles involved, and this pupil soon taught some of his fellow-smelters, and in this way the first plant, near Swansea, South Wales, Great Britain, was started in 1868.

IN DEUTSCHLAND—Setting Brick and Roofing Tile in a Continuous Kiln. Page 111.

What I consider of the utmost importance to the clayworker among the inventions of Siemens is his method of producing fuel gas, and his system of regenerative chambers for the restoration of waste heat. They are expensive appliances, I will readily admit, but I know of nothing that can touch them for saving fuel and producing exceedingly high and equal temperatures, and I firmly believe that the regenerative kiln is the kiln of the future.

In thus eulogizing the scientific theorists I by no means forget the intelligent practical man, who is conscious that all clayworking knowledge is not centered in his own brain, and can appreciate a good idea emanating from the brain of another, who regrets his neglected early education, but, by way of compensation, strives to acquire it later on in life, and, of course, not averse to book knowledge nor to the man who is able to teach him. With all such I can shake the hand of fellowship.

The chemistry of iron and steel might be extended through many more numbers of the Clay-Worker, but I think few clayworkers would be interested in it. I will therefore endeavor to interest my young friends with some other element, but in leaving iron I may refer to it again where I find it desirable. I cannot, however, dismiss it without some further reference to the facility with which oxidizing, neutral and reducing flames may be produced and maintained in melting, heating, puddling and other furnaces by the Siemens gas system. It would be of little value to the clayworker if such a system were not applicable to the burning of clay ware. I have for years advocated and maintained it to be the system of the future for the clayworker to burn his ware, as many of the readers of this magazine can testify. I have mentioned above that in iron and steel works it was not the saving in fuel alone, but, in the majority of instances, the saving of metal was the most valuable feature. That there would be a saving in brick and an improvement in quality there is no doubt. That it is equally applicable to drying, watersmoking and to generating steam is also proved beyond doubt, notwithstanding the statement from time to time made in this journal that for watersmoking it is necessary to use wood or coal. The same plea obtains with some who use oil for fuel. To such I would ask: Have you thoroughly studied up the conditions necessary to watersmoke successfully? Now, independently of what your father, your grandfather or others have told you on the subject, have you thought out the why and the wherefore of the process for yourself? If not, by all means do so, and, in conjunction with that study, try to discover the difference between the heat obtained from the flame of oil, wood, coal and gas.

I am quite prepared for the usual replies of "This gives a dry heat," "That gives a moist heat," etc., etc. This may be a very convenient mode of expressing certain conditions of the gases passing through a kiln, but it is not the strictly correct thing to couple moisture and heat, nor any other quality except hotness. It may appear a small matter to quibble about, but correct results are dependent on correct ideas. Of course, we can get what is called a "moist heat" in the kiln by burning green wood, but it is by no means necessary to burn green wood to obtain moisture in the kiln. Fortunately, there are other easy methods of producing moisture when necessary.

I intended to say a few words on regenerative chambers and the use of reducing flames in the kiln, but must leave it for some other time, maybe in my next.

WM. WAPLINGTON.

Written for the CLAY-WORKER.

FUEL BILLS UP TO DATE.

BY D. W. STOOKEY.

THE SUBJECT of fuels and fires is one that is ever before the clayworker. It is one that concerns him most. His success or failure may be determined by the manner in which he selects and burns his fuel. It has been considered the second largest item of expense to the brickmaker, but the introduction of improved automatic labor-saving machines and artificial methods of drying, in which the heat necessary to evaporate the water from the green brick is artificially supplied, show that the trend of modern methods is to more and more place the whole burden of expense upon the fuel.

A moment's consideration will show that this is no fancy sketch, but a fair reading of the signs of the times. The clay is being spaded from the bank by steam shovels. It is hauled to the machine by steam, elevated, ground, screened, steamed, pugged, molded and cut off by machines driven by steam power, requiring the attention of only a man here and there to attend the mechanism and keep it in order.

After being formed the brick are dried by artificial heat, drawn from fuel that must be charged up in the total fuel account. In every department the tendency is to supplant hand work with machinery. Clay spaders, haulers, temperers, pit men, molders, truckers, edgers, hackers and wheelers are being crowded out by mechanical methods that do more work, do it better and at less expense than they could do it by hand. These methods all utilize power that must be derived, in nearly every instance, from fuel.

The principles involved in the burning of all fuels are the same, and are well understood by scientific men. The question of the selection of fuel, whether it be wood, coal, oil, gas, peat, lignite, asphalt, bagasse, tanbark, straw or buffalo chips, is simply a local one, and must be determined by the consideration of local conditions. In any case, fuel is simply something from which heat may be obtained by combustion or burning.

As ordinarily understood, burning is the rapid union of the carbon and hydrogen of the fuel with the oxygen of the air.

C. J. Holman & Bros. Brick and Tile Works, Sergents Bluff, Iowa.

The use of gas as a fuel is only of local interest, and need not be considered by the masses of clayworkers. Oil has been experimented with quite extensively, but those who advocated its use have, in many instances, returned to the use of coal. Wood is still used in many localities, but its use will grow less as the country settles and the business of manufacturing increases.

Coal is the most reliable fuel for brickmakers, and promises to become the universal fuel for the manufacture of the heavier class of clay goods. This paper has been prepared with this thought in mind, and may be adapted more closely to the burning of coal, although the general principles are the same and equally applicable to the combustion of all fuels.

—How Fuels Burn.—

Complete and efficient combustion can be obtained only on the following three conditions:

1. A sufficient supply of air.
2. A thorough mixture of the fuel and air.
3. A high temperature.

It is not only essential that these three conditions be met, but they must all be fulfilled at the same time and within the furnace, or before the draft has carried the air and gases beyond the place where the heat is to be utilized.

—Practical Application.—

It now remains for the inventor to produce an apparatus that will satisfy the conditions announced.

Solid fuels may be considered as being composed of free or solid carbon, combined carbon and hydrogen or volatile hydrocarbons and ash.

In the burning of solid and liquid fuels all combustible portions assume the gaseous form in the process of burning. This is evident from considering that the products of combustion, steam and carbon dioxide, are gaseous.

When a supply of fresh, cold fuel is placed in the furnace its first influence is to reduce the temperature of the fire by absorbing heat sufficient to raise the temperature of the fuel to that of the furnace. As the temperature reaches the proper degree the volatile portions of the fuel change into gases and start with the draft for the chimney. This is a critical time, and much depends upon proper conditions for the burning of these gases before they have escaped beyond the place where their heat may be utilized.

In order that these gases may be completely burned it is necessary that they be supplied with a sufficient amount of air. Each atom of carbon must have two atoms of oxygen to unite with it so that it will be perfectly burned and changed into carbonic acid or carbon dioxide, CO_2. Two atoms of hydrogen will combine with one atom of oxygen to form one molecule of water, H_2O. As carbon and hydrogen will not unite with more oxygen than this, any excess of air admitted will tend to lower the temperature of the fire by becoming heated and carrying this heat up the chimney.

As the gases and air are flowing rapidly towards the chimney it is essential that they be quickly and thoroughly mixed, so that they can readily combine in burning. A stream of gas flowing in one part of the furnace and a stream of air flowing through another towards the chimney will not give the desired results, even if the proportions are properly supplied.

Again, it is necessary that the air and gases should be kept at a high temperature. Chemical action is much more vigorous at high temperatures. As the gases and air are rapidly passing through the furnace, it is important that they unite quickly. It is one thing to burn all the fuel, and it is another to burn it at the right place. A blaze at the chimney is a sure indication that just so much of the fuel is being wasted by being burned after it has passed the place where its heat was needed.

The solid carbon of the fresh fuel in the furnace becomes heated by absorbing heat from the furnace and fire. As its temperature rises, each atom of carbon unites with one of oxygen and starts for the chimney as carbon monoxide or CO, which is a gas, and which carries with it about two-thirds of the heat that it is possible to obtain from the solid carbon. It is important that another atom of oxygen should waylay this fleeting gas and require it to give up the remaining two-thirds of its possible heat before it escapes beyond the place where the heat is to be used. Being now a combustible gas in the furnace, it may be considered as coming under the same rules and subject to the same treatment as the other gases just mentioned. Each molecule of carbon monoxide will complete its burning and give out its full amount of possible heat by uniting with another atom of oxygen. It then becomes carbonic acid, carbon dioxide or CO_2.

Thus it appears that it is possible to pass fuel through the furnace and up the chimney without burning much of it and without getting much benefit from the heat that might possibly be obtained from it. Or to think of it in another way, it is possible to so badly manage a furnace that it becomes a fuel gas producer and sends the greater part of the heat producing value of the fuel up the chimney instead of burning it in the furnace and thus utilizing it where wanted. The importance of this may be made more impressive by repeating the quotation from an eminent authority that "It is a settled fact that the combustion of solid fuel in ordinary boiler furnaces will not generate as much steam as will the gas made from the same amount of fuel when it is mixed properly with air and fed to the same furnace."

Scientific investigators have made known the natural laws and requirements essential to the complete and economical combustion of fuel. These conditions are so simple and so generally well known that the wonder is that better results have not been obtained in practice.

(To be continued.)

AN IOWA BRICK PLANT.

SERGENTS BLUFF is located on the Sioux City & Pacific Railway (C. & N. W. system), seven miles south of Sioux City, at the base of a high point or bluff projecting into the Missouri river bottom to within one mile of the river. The bluff is about 150 feet high, and is the bank which C. J. Holman & Brother are trying to work into brick. About thirty feet of the top is a sandy loam, which they formerly used largely in their old soft-mud brick. Below this is, first, a stratum of fat, strong potter's clay and a very light gray fire clay, hard and dry, the two being some twenty-five feet deep, clean and free from rock. Below this the clay is mixed with some sand rock and hard iron rock, in loose bowlder form, but not enough to cause much inconvenience in working. This occupies some fifteen to twenty feet more, when below this the clay becomes better and stronger, but very hard to mine, requiring powder or the action of winter frosts. This lower clay is well adapted to the use of paving brick, and extends to a depth far below the level of their yard, they having bored over one hundred feet.

They commenced making brick by hand in 1867; put in a horse-power machine in 1868, using two of them later, and a steam-power soft-mud machine in 1879. They put in their first stiff-mud machine in 1886, but soon found that the stiff-mud brick took the lead and dropped off the old mud yard altogether, and are now running a Chambers machine, Frey-Sheckler dry pan, puggers and carriers, also Columbian repress, using the strong, hard clay mostly. They run about 40,000 brick per day, and dry about one-half on two steam floors and the rest in pallet racks, the dry floors being heated by the exhaust steam from an 80-horse-power engine only, and are made of hollow brick, 12x12x4, laid on the flat and covered with Portland cement. These hollow brick are made by them, burned hard, and the steam turned loose from pipes above every sixteen feet, thus avoiding expansion or any very serious repairs. For the past two years they have been using the escaping heat from cooling kilns to watersmoke the brick in kiln. This is done by connecting the kiln to be burned to the cooling kiln by a fourteen-inch pipe. A forced draft is obtained by means of a blower or fan. In this way they make a decided saving in fuel bills. The watersmoking continues about ten days, when the green brick are dry and hot enough to stand a good strong fire.

They commenced burning in down-draft kilns eight years ago, and now have eight "round" kilns, holding from sixty-five to eighty-five thousand each; also two square up-draft kilns, holding 220,000 each. These they are replacing with the round kilns, building one every year of their own pattern, for they have settled the question of burning on their yard in favor of the down-draft kiln, especially as they have no waste, all the brick being burned hard and the kiln fully under control of the burners; and, besides, they get 50 cents per thousand more for them to the same trade.

They ship nearly all their product to some fifty or more different towns, including Missouri Valley, Omaha and Sioux City, their largest trade being to lumber dealers in the smaller towns for retail use, and who want all whole, sound brick, which they can supply from their down-draft kilns. They make their own fire brick and sell a good many; also sidewalk brick and some pavers when there is demand near home. Their retail trade is quite regular, all orders coming by mail and running from forty to sixty carloads per month during the working season, and by the 1st of April they are usually out of brick. They run full force during 1893 and 1894 and one-half of 1895, this being the only season since the plant started that it did not make brick all summer. They are now running full time, with prospects of a good season.

The different kinds of clay in their bluffs, they expect, will be utilized more extensively in the near future than at present, which now sustains one pottery shop and two brick plants. The clay has been tested in many ways and found to be of superior quality, and is, they think, one of the finest beds of clay and best located in the State.

C. J. Holman & Bros. Brick and Tile Works, Sergents Bluff, Iowa.

Written for the CLAY-WORKER.

BOTTOM SAND.

How to Determine its Value by Chemical Analysis.

THERE ARE VARIETIES of sand which are peculiarly adapted to the construction of the bottom of reheater furnaces in rolling mills, and it is these grades of sand to which I have special reference.

Most clayworkers who have had much to do with the disposition of refractories learn by observation how bottom sands are applied. Suffice it to say that a layer of this sand constitutes the bottom of a reheater furnace, upon which the hot iron rests as it becomes white hot, preparatory to being rolled into merchantable shapes. The characteristic feature, as it may be easily imagined, of a good bottom sand is its ability to "set," forming a hard, durable furnace bottom. It is not safe to use sands which contain clay or are of a "loamy" nature.

By reason of the plastic, sticky nature of the clay constituent of such sand the tendency is for the iron to "take up" the bottom sand, then when a bar of the hot iron is rolled the sand is embedded in the finished product.

After a good bottom sand is thrown into the furnace and carefully spread over the entire surface of the bottom, it should become hard on top within fifteen minutes after the furnace is closed again.

While it is essential that the bottom sand should set quickly after having been thrown into the furnace, it must not be of such a fusible nature as to become seriously affected by the heat of the furnace.

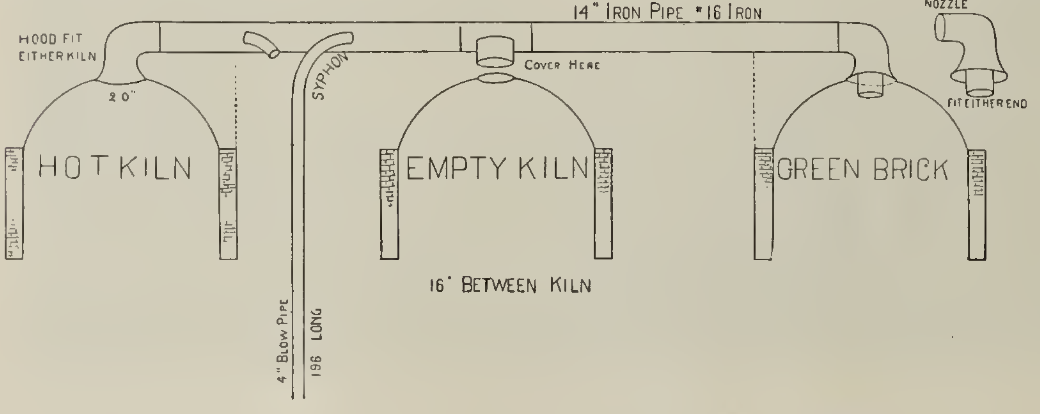
If siliceous material like sand is partially fused, or even approaches that state, it assumes the same sticky property which clay imparts to it, and that invariably leads to trouble.

A furnace bottom is not expected to last more than one heat without renewing, and at the expiration of this time fresh sand is thrown in on top of the old "furnace bottom."

After the bottom sand has remained in the furnace for several heats it becomes thoroughly fused and runs off as a slag. In this way the furnace bottom gradually wastes away and needs to be kept built up.

There are but few deposits of sand which can be used for the purpose to good advantage.

It is hard to realize, until a practical test of bottom sand is made, in how many slight, yet important, particulars this material may fail to do its work satisfactorily. When all of these conditions are considered, which must be fulfilled in producing a superior bottom sand, we do not wonder that its deposits are not more plentiful.



Scheme for Utilizing Heat From Cooling Kilns, C. J. Holman & Bros., Sergents Bluff, Ia.

This property of setting, that the sand must have in the furnace, is affected by the very slightest tendency of the mass to fuse.

The best illustration of this result is found in the burning of street paving brick. The material in the green brick assumes its bond by virtue of the plastic property of the mixture. Each molecule of kaolinite and quartz are not so thoroughly united that the burned brick is able to sustain any great amount of weight.

When these brick are vitrified in the kiln they become fused only to the very slightest degree and sufficiently to amalgamate the constituents of the brick into one tough and homogeneous mass, yet not fusing them so much as to make the brick soft and incapable of holding up the burden of several courses of brick on top of them. In either case the bottom sand or paving brick refractory property is the important feature to be considered.

Some of C. J. Holman & Bros. Workmen.

The heat employed in the reheater furnaces or in the kiln when this real effective work is done practically remains a constant factor, and is governed by the ability of the brick or sand to resist heat treatment.

If my reader considers the difference in physical condition of the paving brick when "green" and after it has been taken from the kiln he will fully understand what I mean by a bottom sand "setting."

For a long time it has seemed to be impossible for the chemist to determine the real comparative value of several different grades of bottom sand. It is customary for the iron manufacturer to submit specimens of such sand to the chemist of his works before giving his consent to try it in a large practical way, with the hope that he may get from the chemist a reliable judgment of the possible value of the bottom sand, certainly so far as the sample either being totally unfit for the purpose or worth testing in the furnace without fear of disastrous results.

But in a great many instances this problem seemed to be far beyond the chemist: at least, in a number of cases, the sand which, according to analysis, the chemist considered good proved to be worthless. I think it is the tendency of a great many people—yes, including some scientists—to conclude from these results that it is not possible to determine from the chemical composition and physical appearance of a specimen of bottom sand as to how it will act in the furnace. They do not stop to consider that possibly they are lacking in their ability to interpret results, rather than any inadequacy of available data which is before them as they glance at the specimen and its chemical analysis.

As I say it is possible to formulate a theory from the physical and chemical condition of bottom sand, which will give us a reliable test of any specimen, I would like to emphasize the fact that chemical analysis is the most helpful, trustworthy and valuable teacher that the manufacturer, miner and consumer of refractories has got.

As the true index of the value of any bottom sand is dependent upon its refractory property, we find that those chemists who have failed in their test assumed that this feature of the sand is only affected by its chemical composition.

In practice we find, too, that the size of the grain of the sand controls to a large degree its ability to "set," the coarse sands requiring much more heat than the finer ones, when the chemical composition of both are identical. This subject has been the source of a great deal of annoyance to many iron and steel chemists. I have one in mind now who had investigated the chemical composition of many of the best bottom sands of the country with a view of finding in them a definite chemical law which he could rely upon as being characteristic of and invariably marking an efficient bottom sand.

The result of his work led him to believe that the percentage of total silica present was the all-important feature of the sand and which determined its adaptability for making furnace bottoms. It so happened in his experiments that every sample of sand which gave flattering results carried a uniform percentage total silica, hence he felt justified in establishing the theory in his own laboratory that if a given specimen of bottom sand contained the same quantity of silica fixed upon as his standard a satisfactory practical test would be insured.

His theory served him well till he began to determine its applicability to fire sands.

According to chemical analysis many of them carried the proper quantity of total silica, but the only other constituents present were "combined water" and alumina, at least practically so. These fire sands, like most others, were composed of pure quartz, mixed with a little clay, and were not clean and sharp like the best grades of bottom sand.

If the chemist's theory, viz.: "any sand carrying the fixed and standard percentage of total SiO_2 will set successfully," had been true, as applied to all varieties of sand, theoretically these various specimens of fire sand should have set, but in practice they showed no inclination to do so. Besides the inability of the fire sands to set, there was another feature in relation to them upon which they would have been condemned.

The trace of clay in the fire sand caused the hot iron to take it up, and, when rolled into merchant iron, lumps of sand could be discovered on the surface and in the body of the bar.

I have the analyses of two bottom sands which were tested:

	A.	B.
Silica (total) SiO_2	91.55 per cent.	91.47 per cent.
Alumina Al_2O_3	7.40 per cent.	4.88 per cent.
Ferric oxide Fe_2O_3	7.40 per cent.	4.88 per cent.
Lime CaO	.51 per cent.	.21 per cent.
Magnesia MgO	.11 per cent.	None.
Water of constitution	.61 per cent.	3.61 per cent.

A.—Good bottom sand. B.—Poor bottom sand.

These analyses were made of the two varieties of bottom sand with which the iron and steel chemist was working just as he encountered his difficulty.

The report (A) shows the chemical composition of the bottom sand which was in vogue in the rolling mill where these tests were made, and at that time was the best sand for the purpose available in this locality.

Analysis B gives the composition of the fire sand that approached the closest in chemical nature to specimen A with respect to total silica. Bottom sand B was tried at different times under the most favorable conditions, and was left in the furnace for twenty minutes, but without avail, for it would not manifest even the slightest tendency to "crust over."

Under the identical same circumstances the sand A would "set" very hard in fifteen minutes, but B, after receiving the proper treatment, came from the furnace calcined, though in a perfectly disintegrated state.

Had I noticed even the slightest indication on the part of B to "set" I would have allowed it to remain in the furnace long enough to have become thoroughly hard, and noted the time. These experiments, which were performed upon these two samples of sand, seem to blast the theory that the percentage of total silica is the only datum necessary for determining the real practical value of any bottom sand. That is to say, if a given bottom sand carrying 92 per cent. of total silica will "set" nicely in a mill furnace, it is not true that any sand containing the same amount of silica will harden as readily and work as successfully in practice in the same furnace.

Referring again to analyses A and B, the most important difference is in their percentages of alumina and ferric oxide and water of constitution. In the analysis A we have 7.40 per cent. of alumina and iron together, with hardly more than a trace of water, while in B there is only a little more than half the quantity of alumina and iron, and the difference is made up by water.

Another serious criticism upon this report is that its alumina and iron should have been reported jointly. The effect of these two substances upon refractories is not the same. Iron combines with silica and forms fusible silicates, while alumina, on the other hand, unites with silica to form an exceedingly refractory substance—kaolinite. Let us take, for example, two bottom sands which are alike in every other respect except in size of grain.

If tested in a rolling mill furnace, would they "set" the same? By no means. The coarser grain sand would require more heat than the finer one. Again, suppose they are of the same size grain and identical in every other physical condition, and, indeed, the percentage of total silica and total fluxing bases are equal, but individually the percentages of some of these bases differed, as, for instance, magnesia and fixed

TWO VERY GOOD REASONS.

E. A. Poe, Jr., and O. C. S. Poe,

Whose anticipated arrival at the home of Mr. and Mrs. E. A. Poe, Fayetteville, N. C., in December last, prevented Mr. Poe from attending the Atlanta Convention.

alkalies. Under such circumstances, would the two samples set alike? Not exactly.

We have already discussed the unequal chemical affirmities of the various bases for silica at a high degree of heat. The fixed alkalies will unite with silica much more readily and at a lower temperature than magnesia or iron. Lime, too, requires much more heat than the fixed alkalies for forming the corresponding silicates.

Washington Street Front, Showing Sam and Joe, the two Horses who draw all the machinery manufactured by C. &. A. Potts & Co.

Alumina, while it has faint basic properties, and therefore, from a chemical standpoint, would naturally be regarded as a base, still it unites with silica to form a highly refractory compound, therefore we estimate it separately and associate it in the report with the silica.

If a chemical analysis is to be a guide for us in the choice of a good bottom sand, I believe the results should be interpreted and arranged as follows:

Silica (combined), Alumina, Quartz—Refractory constituents.

Water (combined)—Plastic properties.

Lime, Magnesia, Ferric Oxide, Fixed Alkalies—Fluxes.

Besides these chemical considerations, there is the important physical condition to be observed, viz.: the size of grain or degree of coarseness.

If two bottom sands are equally coarse or fine, as the case may be, their similarity in other respects can be determined by chemical analysis. In the first place, we want to avoid sands which have any traces of plasticity. They should be short, sharp and clean, which is always characteristic of the sands containing no clay. But how are we going to tell them by a chemical analysis if the alumina in the sand is the base of a clay or a substance that has no plasticity?

The presence of any amount of combined water, say more than .10 per cent., usually indicates the presence of kaolinite, therefore to choose a nice bottom sand it is essential that the water of constitution should be very low.

The fluxes, lime, magnesia, iron and the fixed alkalies are the substances which play the most important part in the "setting" of the bottom sand. In the aggregate these bases probably amount to 4 or 5 per cent. in many superior bottom sands, and, as the fluxing powers of these substances with silica are nearly all different, to bring about the same results the same bottom sand would require possibly twice as much of one as the other.

To illustrate, let us suppose that we have two specimens of sand, both of which give perfect practical results and are the same in chemical composition, except with respect to the principal fluxing base. In one instance the flux is iron and in the other potassium oxide, but the percentage of the iron would far exceed that of the alkali, for it takes less of the latter to accomplish the same effect than it does of the former.

If the composition of any unknown sand contains only a small amount of "combined water" and about the same quantity of total fluxes as an efficient bottom sand, then we can consider the percentage of each base separately, and after a little experience anticipate pretty accurately as to the deportment of the new sand in furnace work.

Chemical analysis may be regarded, perhaps, as an indirect method for judging of the value of bottom sand, but I believe chemical analysis, if properly interpreted, will afford more valuable and reliable data upon this subject than we are apt to discover at first glance.

When you apply such a careful examination as I have just outlined, there are but few deposits of sand which would stand the test with flattering results.

This laboratory test, to be sure, should never be considered final, but it is a very convenient way of detecting the many worthless samples which are submitted to the iron manufacturers for trial.

It is also a means of avoiding much serious trouble which arises from these large practical tests of poor bottom sand. If a sample barrel of sand is thrown into the furnace and does not happen to set successfully, it may spoil a large batch of iron.

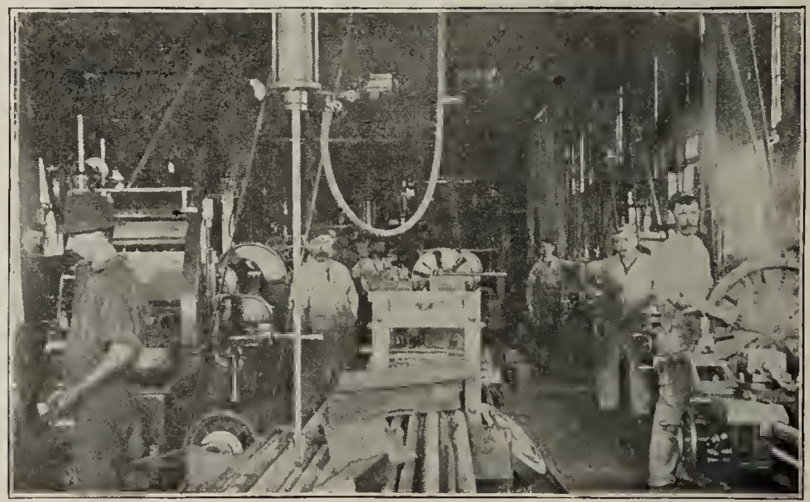
Small, quick laboratory tests of this kind can be used to great advantage if gotten down to a reliable basis.

CHARLES FERRY.

BRAINS AND PUSH.

NEARLY ALL of the great manufacturing establishments in this country had a small beginning. The first thing done was to start with an idea, then prove its value by actual experiment, then let the people know by demonstration and advertising what has been done and invite their patronage. No one wants to buy a machine in its experimental state. When an idea has been once worked out, if it is a good one, people are certain to take up with it. Any one who can show the world how to make a better brick or a cheaper brick can make money. Even if only some detail is furnished with this idea in view, those originating it are sure of support and patronage. In the manufacture of machinery the idea must be a good one to begin with; then it must be well carried out. The machine must be thoroughly and well constructed. It must be secure against breakage and convenient of operation. People generally have no respect for an idea in the abstract. They estimate by the way in which the idea is carried out.

The history of C. and A. Potts & Co. is an exemplification of the principles as above set forth. They started their shops in the winter of 1885. They were men with an idea and limited capital. They then employed ten men. During recent years a hundred and twenty-five men were by no means an unusual number on their pay rolls. Their establishment is fitted with the best tools that money will buy. They have every device for manufacturing brick machinery of a high grade at the lowest possible cost. They own their own electric light plant, have an electric crane in the foundry and a pneumatic hoist over



Corner in Machine Department, C. & A. Potts & Co.

each tool and on the erecting floor. Theirs is one of the most complete machine shops in the State. The pictures which accompany this article tell the story better than we can do it in words. The history of C. and A. Potts & Co. shows what a good idea, industriously and energetically followed up, will do. This firm has been liberal advertisers. While we do not believe that advertising will make a success of a poor article, we do not believe that an enduring success can be achieved with any article, however good, in which the public may be interested, without advertising. The cut of a train load of brick machinery, shown on page 167, is pretty good evidence of their being in the line of success.

Written for the CLAY-WORKER.

SURVIVAL OF THE FITTEST IN BRICKMAKING.

BY R. B. MORRISON.

BRICK MANUFACTURERS have felt the weight of hard times for three years perhaps more than most manufacturers in other lines. While it is true that manufacturers of building material suffer greater loss of business in times of financial stringency than many engaged in other lines of manufacture, for the reason that people can stop building and improving at such times, and they do that first before economizing in other ways. While this explains our long siege of dull times and low prices, in part, it does not fully account for it all.

FOUNDRY DEPARTMENT, C. & A. Potts & Co.

In the past twenty years there have been many improvements in the way of labor-saving machinery, as well as great improvement in the quality of the product. The improvements and the extent to which they have been utilized have awakened unprecedented interest in this manufacture among business men of the country. The old-time process, making by hand in a temporary sort of way, was rather uninteresting. A brickyard did not receive much notice, and no one had ever heard of a brick plant. Capitalists gave no thought to this business, and would as soon have taken stock in a railroad to the moon. When, however, steam power begun to succeed muscle power, permanent buildings took the place of unsightly sheds; permanent walls replaced temporary "casing;" soon the business began to be systematized and enlarged. It began to attract attention of capitalists, who were charmed with the clock-like precision of the output. Investments in brick plants paid good dividends; labor-saving machinery had reduced cost of manufacture; demand was good, and prices were still on the hand-made basis. These results induced others to go into this most enticing business, as the raw material cost next to nothing and could be rapidly converted into the finished product. When the "boom times" of ten years ago came brick plants were built wherever there was a demand for brick, and in many cases where no brick had ever been used and never will be.

These are facts familiar to all brickmakers, but there are some encouraging features in them to the thoroughbred, sure enough brick manufacturer. The principle of "survival of the fittest" will in this case prove beneficial to the survivors. The brick concerns that are not well grounded, favorably located and well managed are out of the race. They have fallen in the unequal struggle for existence, and as soon as the silver cloud with the golden lining rolls by, and prosperity beams upon us once more, the survivors will have less competition than before, and capital, noted for its timidity, will not plunge so recklessly into this business. They have learned that capital, unaided by favorable location and practical brick sense in the selection of place, plan of plant and management of same, is utterly inadequate to success. They have found that it is much easier to turn thousands of dollars into acres of clay than to turn acres of clay into thousands of dollars.

CORNER IN WOOD WORKING DEPARTMENT, C. & A. Potts & Co.

This financial storm will clear the atmosphere, and the sure enough brickmakers will have a better show in the future. The greatest struggle to come is the restoration of fair prices. Like clocks, they run down, but have to be wound up. The fierce competition of the past three years would naturally cause more or less unfriendly feeling between competitive firms. These differences should be amicably adjusted, and brickmakers should understand each other better. There should be a harmonious effort along the whole line to have fair prices for bricks. A combination may not be best. It seems they do not hold together long, and in many States there are laws with which this might be construed as a confliction.

ERECTING DEPARTMENT, C. & A. Potts & Co.

There can be no objection brought against an association of local manufacturers modeled after our National Association. It could be in the nature of a social affair, where mutual interests could be discussed and local manufacturers could be allies instead of enemies one to another. Cutting prices to get contracts is senseless, and can gain the party making the cut only a temporary advantage. When the next contract is let his competitor meets his price, and, to make sure of the contract, goes a little below the reduced price of his competitor on the former contract. Then there is no stopping place until the competing brickmakers come to an understanding or the price goes down to or below cost of production. The consumer looks on and smiles, and waits, actually delays, the beginning of his building enterprise until the poor brickmakers, by their foolish strife, become his victims. They inflict just as much injury upon themselves as they do their competitors in this kind of a fight. If they will meet once a month as the National Association meets once a year they will cultivate friendly relations that will go far toward preventing these disastrous results. If all brickmakers could attend the meetings of the N. B. M. A. and see the "broad gauge" spirit that prevails in these conventions they would firmly believe in the brotherhood of brickmakers and appreciate the great advantages which accrue to those who have the privilege of attending the annual meetings.

Written for the CLAY-WORKER.

A COLLEGE FOR BRICKMAKERS ON THE INDUSTRIAL PLAN.

BY J. W. CRARY, SR.

AN INTERESTING LETTER appears in the July Clay-Worker, from the pen of Professor Orton, on the subject of his school for clayworkers. Professor Orton deserves much credit, also liberal patronage, for his enterprise in pursuing this line of teaching. It is, I think, the first attempt ever made in the United States to teach the science involved in the art of ceramics. I do not know who claims, or can claim, the initial move or suggestion for a regular industrial school for teaching the science and practice in claywork generally. The Germans and French, I believe, have to some extent taught the science of ceramics in their schools, but I am not aware that they have made it a specialty on a large scale. That is to say, there is no large educational clay works where the science and practice of clay work generally is taught on the industrial principle, so as to be self-supporting and profitable by the manual labor of the students.

In reading Professor Orton's letter I cannot understand just how his students pay for their tuition. He speaks of "credit hours;" I presume that means that students are given credit for the time they work in the shop or factory, but he does not say that the products of their labor go to make up the stock of goods in the factory, sold in the market on general account. If I understand the functions of Professor Orton's school, it is partially practical and specially technical. Professor Orton does not propose to turn out a finished or even properly qualified brickmaker or potter. He quite eloquently says: "A student who has finished a technical course is like a roll of sensitive film which has passed, inch by inch, before the lens of a camera." Then on, in the same paragraph, his illustration is poetic and beautiful: "As the roll lies in the darkness of the camera it is a useless thing, a mere roll of transparent fabric, coated with a yellowish scum of chemicals, not to be distinguished in its appearance from one which has never been used. But in this wondrous coating there lies recorded in each molecule the lights and shadows which make up the grandest views of nature, the most delicate and complex of the productions of art, and the most subtle shades of human humor. And only when this roll has been through the mysteries of the 'developer,' and has been printed, do we realize its wonderful powers and exceeding usefulness."

This is not only poetic, but it is graphical and sublime. Professor Orton was, I think, at his best in the above description of the unfledged brickmaker or potter. Yes, it takes the "developer" to make the par excellent brickmaker. The ordinary brickmaker is a "mere roll" of self-conceit, "coated with a scum" of ignorance and arrogance. Of course, Professor Orton means that in developing a true clayworker there must be a mind and body of peculiar fitness. No amount of technical learning will enable a man to be a first-class brickmaker unless he is naturally endowed with the necessary qualifications.

—He Must Have the Best Kind of Common Sense.—

Then he must have a strong desire to learn and master the business. He must have a strong, well-developed physical constitution. He must have a natural pride and ambition to excel, not in making a large quantity of brick, but in making the very best quality. He must be careful, watchful, vigilant, untiring and sleepless when burning brick. As his kiln approaches a finish he will watch his fires with increasing interest, and be on the alert for any change or phenomena that may take place. A good brick setter and burner is a temperate man. He never indulges in any habit that will stifle or in any way impair his best qualities of mind or body, and it is a singular fact that, although brick burning, well done, is a heavy tax on both body and mind, it is, perhaps, the most invigorating of all other employments. I was never sick an hour around a burning brick kiln, nor did I ever see others sick, no matter how great the exposure.

—A Hot Brick Kiln Is a Great Health Giver.—

I have seen men go to work attending a burning kiln of brick who complained of their health, and by the time the kiln was done burning they would be strong, with good appetite. Why this is the singular effect of a burning brick kiln I am not fully prepared to explain, nor have I found any scientist that could give a perfectly clear theory of the fact. After sixty years' experience in burning brick, in all sorts of climates and seasons, and in a great variety of ways, I can only say that a burning brick kiln is a sure health giver. Whether it is by destroying sickly germs in the surrounding atmosphere or by what chemists call "catalysis," or "presence action," I am unable to say. I can undertake to teach the practice of brickmaking anywhere, but I will leave the science to Professor Orton and his contemporaries.

—A School for Brickmakers No New Thing.—

I have often talked of it before I commenced writing for the Clay-Worker. I have several times suggested a school for brickmakers in that journal. Over five years ago I said in the Clay-Worker that "brickmaking has been regarded as a sort of mean, dirty business, followed only by ignorant, vulgar 'mud larks,' ready for a rough and tumble tussle at anything, but the art is coming up. Capital and brains must go together to win, and the demand for intelligent brickmakers and burners will induce young men of fitting capacity to engage in the art, with a purpose to master all its intricacies and understand its various phases. A first-class, expert, scientific brick burner or clay worker of any kind will take rank in the front of all the mechanical and skilled pursuits.

"I doubt not that a sort of university or school for the practical and theoretical training of the right kind of young men in the clayworking arts would be a great success, and would result in very great improvement to the real economy, efficiency and durability of our best building industry."

—Brickmakers' School on a Large and Paying Scale.—

Professor Orton has made a good beginning, and, as a school for technology and the science of clay work, he will succeed. But the time is at hand when the brickmakers of the United States can and should establish a college, not a university, for teaching, practically and theoretically, a thorough and complete course of instruction in brickmaking and all that pertains to the art. Now, the question is, How can this be done so as to make it pay? for it could not be expected that the brickmakers should endow and maintain a college "gratis," just to qualify brickmakers for high positions, and then pay their salaries. So we must start out on the hypothesis that the college for making brickmakers must be self-sustaining and even profitable to the stockholders.

—A Feasible Plan for Beginning on a Small Scale.—

Let the thousand or more well-to-do brickmakers in the United States subscribe, say, $50 each, paid-up stock. Then meet by proxy or otherwise and elect a board of directors and draw up such a charter for incorporation by Congress as might be deemed best. Then let the board of directors purchase a suitable site in some central State, where the facilities for all kinds of raw material, transportation and market would be good. Then let the plant be put in operation. Use the three distinct kinds of brick machines alternately, to suit the raw material. Use the up-draft and the down-draft kilns for burning alternately. Use two or three kinds of dryers and such other things as are regarded profitable. Put up buildings that would be suitable for working about fifty hands, the hands to be students, say one from each State. Each student should have a good common school education, should be able-bodied, capable and willing to make a full hand at any work on the plant. The hours of labor should be from 6 to 12 a. m.; the hours of study and lectures should be from half past 2 to half past 5 p. m. In burning brick there should be regular six-hour watches—six hours on and eighteen off. There should be competent literary and mechanical professors under the board of directors.

—This Plant Could Be Started on $50,000 Capital.—

It would make all kinds of first quality brick, say, in all, about 3,000,000 per year, and, being first-class, would net about $20,000 at the works. This would pay all the expenses and leave a small margin of profit to the stockholders. The place for the plant should be where good clay would be inexhaustible, but much of the clay used would come from all parts of the United States. All brickmakers having first-rate clay of its kind would be invited to send samples for at least a thousand brick, freight paid, so that their clay might be fully and scientifically tested. Such samples as would make fine front brick would be sold as such, and these being all shades of color in different clays, and architects now preferring a variety of colors in fronts, would give special orders for these brick, and the market would never be glutted, as there would not be any competition. If we imagine a fine building fronted with beautiful brick of every shade and color, all natural to the clays of which they are made, with no artificial glazes, we see a thing of enchanting beauty, a beauty that has never been born, unless in the refined classic mind of the most accomplished architect.

—There Is a Local and National Pride in This Idea.—

First, every man that would send a sample of clay that would make a fine front brick would be proud, as well as benefited, by the use of his brick in a fine, well-noted building. It would be no mean advertisement for his place and locality, and he could well afford to send a carload of clay, free of cost, every year, or send any quantity at cost that might be ordered. Every owner of a fine building would have a pride in seeing and saying that the front of his building was a solid, lasting picture of the union of States. In fact, it would excite the patriotism and admiration of every passer-by of intelligence and good taste.

—Let Every Brickmaker Stockholder Send Brick to Build This College,—

And let the next meeting of the N. B. M. A. take the initial steps to accomplish this laudable and much needed enterprise. The N. B. M. A. could well afford to start this brickmakers' college. While we should do all proper things to help and encourage Professor Orton in his school for clayworkers, we should not be content with this one channel as the only course for young brickmakers to take. We need a well-endowed college for brickmakers, where a young man, naturally well qualified and desirous of being a first-class brickmaker, can honorably gratify his aspirations. We want a college not only to teach the theory of brickmaking, but the practice. To do this all kinds of kilns, on a small scale, must be used; every process of setting and burning brick now in common use must be tried; every kind of popular brick machine and dryer must be tried on a small scale, and each and all of these things that are essentially good and most profitable must be used by the college. As the wants of the college increase the patronage would increase, and there is not a possibility of its failure after once put in proper operation. It may be asked, What would you do if there were not students enough to do the work? Well, then hire laborers to supply the want; but there is no probability that a scarcity of students would ever be seen. Indeed, the reverse would be the case. There would be more applicants for admission than could well be accommodated, and the only trouble would be to provide for increasing patronage.

—This College Would Give a National Character to Brickmaking,—

And whatever elevates the character adds to its opportunities for profit and financial success. Every town and city would soon have its scientific brickmaker, and "works" for turning out perfect, first-class brick, and, the supply being assured, all the best buildings, public and private, would be built of brick. The world over prefers a perfect brick to all other material for good building. In order to get a reliable supply of perfect brick we must have perfect brickmakers. To get these we must have a national college to teach the art.

A NOTED KILN MAN AS HE APPEARED WHEN DEPARTING FOR EUROPE.

THE NAME OF W. A. WILFORD is now quite well known to those who are interested in brickmaking. The Wilford kiln is a prominent factor in many yards of this country. Mr. Wilford recently built three of these kilns for one yard in Rochester. The results are known to be eminently satisfactory. So far as we know, this is the only yard in this country which uses three continuous kilns of the same make. Mr. Wilford has recently organized a stock company in Rochester, N. Y., with a capital of $130,000, for the manufacture of brick. He has been elected President and General Manager. His general business intelligence and push bespeak success for this enterprise. Mr. Wilford's connection with the brick business does not mean, however, that the erection of kilns will in any way be neglected. He will continue to give this business his personal supervision. The outlook for his kiln business, he says, is very satisfactory. Mr. Wilford started for Europe on a business trip on the 12th of this month, and will return within a few weeks. The accompanying portrait may serve as an introduction to our readers across the water.

W. A. WILFORD, Manager of the Wilford Patent Kiln Co., Rochester, N. Y.

By The Light of The Kiln Fire

Second Session.

THE SCHOONER, "John and Tom Yates," was surely the oldest, rottenest, pitchiest, crankiest and altogether most depraved tub that ever floated down river. Long years ago the boat had been a small lighter, blunt at both ends and without a curve throughout her entire length, but after coming into possession of Cap'n Johnty, the present skipper, it had been fitted up with "wind gear" by stopping two old spars found floating down stream and rigging to them in some indescribable manner a couple of old brown, bepatched, dirty and besmeared sails. The old Captain was as proud of his "wessel," however, as though it were the most clipper yacht afloat, and manifested it in many ways peculiarly his own. In order to make more significant his favorite expression, "I wuz at the hellum," he had picked up some place a very decrepit wheel, with but few remaining spokes, and rigged this up in place of the more usual tiller, and Johnty always insisted upon having his man observe all the rules of etiquette laid down for the conduct of the crew of a man-of-war.

His crew consisted of Big Mike, a huge, horny waterman, with all the love of his life concentrated on his Cap'n and little girl—the "Little Un," the skipper's grandchild, a bright elfin little thing of six, and the pride and comfort of the old man's heart—a very large, ugly and mutinous cat of the Thomasine persuasion, called "Lone Star," from its fondness for that particular brand of plug tobacco, and all the rats, mice and smaller vermin that this last was unable to exterminate.

Cap'n Johnty carried all the coal for Yates Bros., and unloaded it at the wharf some quarter of a mile from the yard, from whence it was hauled in carts. The freight on this, with a load of brick now and then or a small cargo for other yards along the river front, gave him a living. He was very old, all crooked from rheumatism, toothless, and his little eyes were scarcely visible for the shaggy brows and lashes; a touch of whisker under his chin made him an ideal waterman, and Cap'n Johnty would look like, talk like or act like nothing else, not for any consideration.

The river was full of ice, and the old boat had been tied up for the winter for some weeks, her crew continuing to live aboard her, however, and the Mud Puddle Club, since Sandy had burned off his last kiln, had been holding its meetings in her little warm cabin. This was about ten feet square, projecting above the deck some three feet, making it necessary to descend four steps to get into it. Upon one side was arranged the bunks, one above the other; in the center stood the little stove, and against the back wall of the cabin hung a table so arranged on hinges that it could be let down when not in use; around all of the walls not otherwise used were lockers, and upon these, or in the bunks, or stretched out on the floor the boys were lounging now. The stove was redhot, for fuel was always plentiful with the worthy skipper, and the fun was getting fast and furious.

The night being so cold, the President had consented to allow them to drink gin, instead of rushing Mickey's duck, "Pervidin' yez on'y take two swigs apiece—a eye opener an' a nightcap," Sandy said, but it was noticed that the bottle always stopped by him, and from his twinkling eyes and the perfect contentment expressed by his whole attitude, it is fair to suppose he had several in between times, but if he did take more than his share, why, wasn't he the "Prisydint?" and, of course, the rules of common men do not apply to them—at least that was his way of looking at it.

Cap'n Johnty and Mike sat on the locker, side by side, listening to the fun and keeping a wary eye on Mickey, who, now that there was no work to be done, was, as Paddy said, "A domned imp of inicuity," and Paddy knew, for Mickey's pranks were usually directed toward him. A few minutes before, the little rascal had been caught with one of the Captain's sail needles, busy as a bee, sewing up the overcoat sleeves—those that had any, that is—but this was such a mild sort of mischief for the Mud Puddle, and as his sworn supporter, the "Little Un," had volunteered to rip out the stitches he was forgiven, after promising Fritz to "pehave like a shentlemean."

By some mischance Paddy had forgotten his "wee dujene," and Cap'n Johnty had offered to loan him a spare one. Mickey was called on to get it out of the locker upon which he was sitting, and volunteered to fill it. Now, this was a suspicious circumstance at any time, and Paddy, under any other conditions, would have been on his guard, but he was busy brushing up on "Kathleen Mavourneen," his selection for the evening, so very innocently lighted the pipe. A few puffs was sufficient to ignite the powder the wary Mickey had placed in the bowl, and for this prank he was soundly cuffed, sent flying out of the door, and ordered to "kape your dirty fiz out o' dis meetin'." After this interruption the business of the club went on until it came time for Paddy to sing his song. With great gusto he rolled out the words; melody was a secondary consideration, the main point of merit, to the minds of the Mud Puddlers, being the amount of noise made. He had just reached the last note, which he was straining every nerve to make effective, standing with head thrown back and an expression of beatific rapture on his face, when the skylight directly over him was cautiously pushed aside a little way, and Lone Star dropped, with a hideous howl, on poor Paddy's shock of red hair. This was nuts to the cat, who, after pulling out about half of it, and incidentally plowing some furrows down the back of his neck, made a wild dash around the cabin and disappeared down a rat hole, Paddy, in the meantime, breaking from his rendering of "Kathleen" into a string of profanity that he brought over with him from the snakeless land of green—if there was room enough in the steamer for it, that is. After this escapade Mickey stuck his head in the doorway of the cabin, and, making a very eloquent gesture with his open hand, and nose in close proximity, disappeared from the face of the footstool until Paddy's lock grew out again.

Silence restored, Cap'n Johnty volunteered to tell a yarn. Instantly all was attention. In recognition of this great favor the Cap'n was "fired up" with a good long pull at the bottle to get his "thinkums drawin' right," and, nestling the little girl on his knee closer to him, told of how near he came to losing his crew.

"My wessel wuz takin' a cargo o' coal up to this here yard below here—I furgits the names on 'em—an' me an' Mike hed cum up 'ith the tide an' lay to at the mouth o' the creek, cos yez hes to pole up to the wharf, an' there hain't more'n seven fut o' water 'longside at the best o' times; so yez see we cud on'y git up at high water. We hed put out lights, an' hed all turned in for a gud snooze, an' it wuz jist about break o' day w'en I called Mike. The tide wuz a settin' up strong, an we poled up quietly as we cud, so's not to wake the Little Un, an we wuz makin' bow on fur the wharf, an' Mike jumped ashore 'ith a line from the stabbord side for'd to snub 'er an' throw 'er starn in. The tide hed caught us by this time, an' the wessel wuz swingin' in a hummin', w'en up them companyun steps thar cums this here little gal in her slip an' 'ith her ha'r all hangin' roun' her neck, an' afore I'd seen her e'en a'most she runned an' stud teeterin' like on the rail next the wharf, watchin' Mike, I 'spect. I wuz for'd a-makin' my line fast an' thinkin' I'd hev to run aft an' git my fenders out, fur the starn wuz comin' in fast, wot 'ith the tide an' a strong wind, too, but afore I cud make fast I heerd a splash an' cud jist see the little creetur a-goin' over in atween the wessel an' the wharf.

"Well, boys, this here little mite o' a gal hez been 'ith me an' Mike fur nigh on to six year. She never knowed no other dad but me, an' she's gone asleep many a time 'ith the river a-lappin' ag'in the side o' the wessel, place o' a mammy to sing to her, an' w'en I knowed she'd gone over all uz I cud see wuz her shiny he'd, all smashed, an' her 'ittle white body all broked up an' out o' shape, an' I thunk o' sailin' along widout her. Well, but Mike, he seed her an' jist made two jumps, an' over the side o' the wharf he went in atween it an' the wessel, an' thar wuz jist room fur him, too, an' he tuk the Little Un in his han's, an' ez the wessel wuz on to him he made a kind o' fender o' himsel' an' kep' it from a-hurtin' o' her." The old man paused a moment, sniffed a little, and then went on. "An', mates, w'en I seed the two o' 'em up on deck ag'in, an' the little gal a laffin' up at me through the mud, my ole knees jist seemed to bend down an' I hed to thank somebody, seein' ez Mike cudn't hear nothin', he wuz hurted so."

At the conclusion of this yarn the boys donned their coats, and wrapping their throats and ears in all sorts of rough woolen rags, etc., took a long pull at the jug, and, one by one, bade good night to Johnty and Mike, and, with a last look at the Little Un, sleeping now in the old man's arms, went quietly out into the night, each thinking of how they had many a time watched the old boat go slowly sailing down the river in the sweet gray of a summer twilight, vanishing at last in the misty evening to reappear at another port, even as will we all of us when our twilight of old age deepens into the gloom ere the one perfect dawn.

F. W. BUTTERWORTH.

THE ROAD TO RICHES.

The road to poverty is easy to find, but hard to travel. The road to riches is hard to find, but easy to travel, if you know how to advertise yourself on the way.—J. G. Newitt.

Written for the CLAY-WORKER.

PAVING BRICK—ITS MATERIAL, MANUFACTURE AND USE.*—Sixteenth Paper.

BY DANIEL W. MEAD.

—Burning the Brick.—

AFTER THE BRICK are dried they are ready for the last and most difficult process in their manufacture, that of burning. Thoroughness in drying will greatly facilitate the burning, for all moisture left in the brick after drying must be slowly removed by slow firing in the kilns; otherwise the rapid formation of steam from the moisture in the brick will disintegrate and destroy them. This preliminary slow heating is technically called "water-smoking," and must always take place, no matter how thoroughly the brick are dried, as all the water is never removed by the ordinary processes of drying. The period of water-smoking is, however, greatly shortened by efficient drying.

As previously stated, about one-half of the water in a green brick should be removed in drying at a temperature of about 212 degrees Fahr. (108 Cent.) The entire balance is lost at a temperature of about 1,400 degrees Fahr. (760 Cent.) in the burning. The water lost at the lower temperature is sometimes called the water of the pores, or free water, and most of it is expelled at or near the boiling point. The water lost at the higher temperature is the water of composition, or combined water, which is in chemical union with the other ingredients of the clay. The loss of the physical and chemical water of the brick is accompanied by a corresponding loss in weight and a considerable shrinkage in the dimensions of the brick. The final vitrification of the brick is a change in physical form, not in chemical composition, and consequently a change in dimension but not in weight may be noted. The loss of weight due to the removal of the water and the consequent shrinkage, as well as the shrinkage due to vitrification, is shown in the following results, which have been determined at the various factories named:

—Shrinkage in Volume and Loss in Weight in the Manufacture of Stiff Mud End Cut Brick from Shale Clays.—

FACTORY.	Stage of Manufacture of Brick.	Size (inches).	Cubic contents—inches	Loss between stages.	Gross Loss.	Weight, lbs.	Loss between stages.	Gross Loss.
National Clay Co., Sears, Ill.	Green	8.5 x4.44x2.5	94			6.46		
	Dry	8 x4 19x2.25	75.2	18.8		5.79	.67	
	Soft Burned.	7.87x3.89x2.12	64.4	10.8	29.6	5.08	.71	1.38
	Vitrified	7.75x3.75x2	58	6.4	36	5.08	.0	1.38
Galesburg Paving Brick Co., Galesburg, Ill.............	Green	8.87x4.5 x2.63	105			7.66		
	Dry..........	8.63x4.37x2 63	98.5	6.5		6.19	1.47	
	Soft Burned.	8.5 x4.13x2.5	87.5	11.0	17.5	5.87	.32	1.79
	Vitrified.....	8 x3.87x2.38	73.5	14.0	31.5	5.87	.0	1.79
Purington Paving Brick Co., Galesburg, Ill......	Green	8.75x4.5 x2 69	106			7.28		
	Dry..........	8.67x4.37x2.63	99.5	6.5		6.21	1.07	
	Soft Burned.	8 41x4.03x2.56	87	12.5	19	5.67	.54	1.61
	Vitrified.....	7.78x3.81x2.34	69.3	17.7	36.7	5.67	.0	1.61
		Repressed brick.						
	Green	8.75x4.63x3.12	126			8.75		
	Repressed ..	9.13x4.69x2.94	126	.0		8.75	.0	
	Dry	8.87x4.63x2 81	115	11.0		7.56	1.19	
	Soft Burned.	8.62x4.31x2.69	100	15.0	26.0	6.75	.81	2.00
	HardBurned	8.19x4.09x2.56	85.5	14.5	40.5	6.75	.0	2.00
Decatur Brick and Tile Co..	Green	8.87x4.25x2.50	94.3					
	Dry	8.50x4.00x2 37	80.6	13.7				
	Vitrified.....	7.75x3.75x2.25	65.4	15.2	29.8			

—The General Principles of Burning.—

The principles which underlie the art of brick burning are not as simple as those involved in brick drying, for the process is in reality a compound one, consisting of

First—The removal of the free and combined water.
Second—The vitrification of the material.
Third—Annealing the vitrified brick.

—The Removal of the Water of Composition.—

As shown in the table of analysis of various clays (fourth paper), all clays contain a percentage of combined water, usually varying from about 6 to 14 per cent. This water cannot be expelled at the ordinary heat of the dryers, and must therefore be driven off in the kiln, together with such water of the pores as may remain in the brick on account of inefficient drying. In the close-grained structure of paving brick clays the pores of the material are very small and the sudden liberation of this water in the form of steam within these minute passages will disintegrate the material and destroy the brick. To retain the homogenity of the brick, therefore, the steam must be so slowly liberated that it may readily pass through the pores of the material. This is accomplished in practice by slowly raising the temperature of the brick to the point at which all of the free water is removed, then again raising the temperature gradually to the point at which the combined water is removed. The rapidity with which this may be accomplished depends on the structure of the material and the amount of water contained in it, and usually varies from two to four days. The watersmoking does not depend largely on the structure of the kiln, as the only requisites are good draft and large amounts of air in order to properly control the temperature. As previously shown, the temperature of combustion depends on the relative amount of air admitted to the furnace; hence, by controlling the admission of air, the temperature of the gases resulting from combustion can be varied from below the temperature of the dry room to the temperature at which the water of composition is entirely released. The aim of the processes of watersmoking should be to slowly increase the temperature from the lower to the higher of these limits, slowly and uniformly, the rapidity of increase depending on observations as to what the nature of the material will demand.

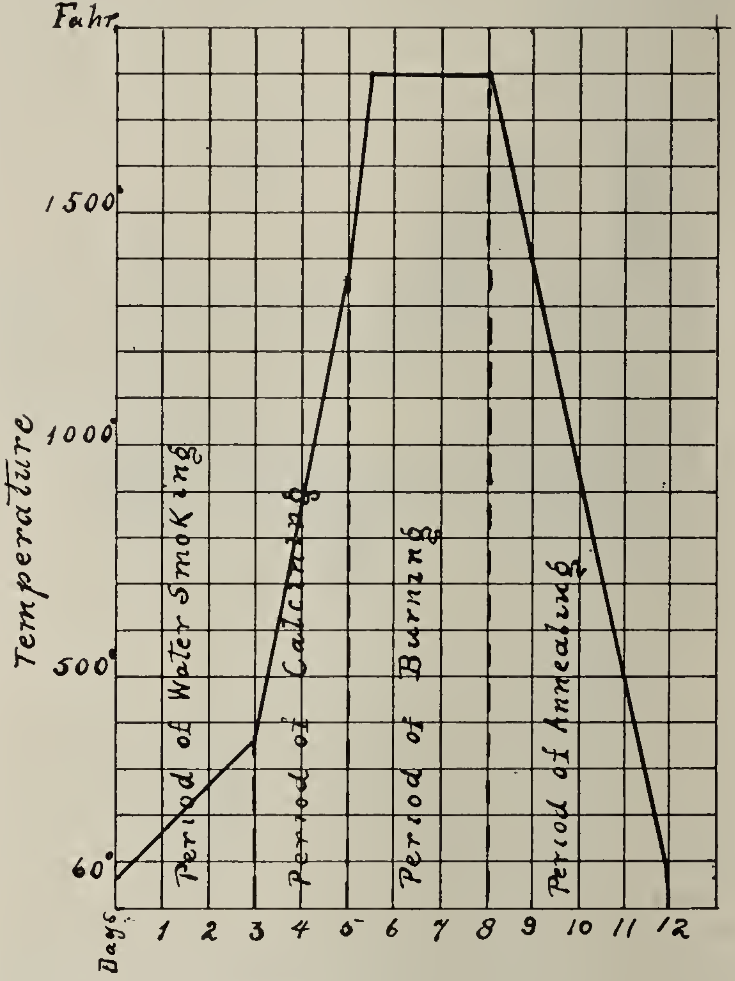


Figure 1. Diagram showing Temperatures and Time of the Various periods in Burning Paving Brick.

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In the June number of the Clay-Worker, 1895, Mr. A. E. Barnes gives a table of observations of the temperature and time of expulsion of the water of composition from clays, which is reproduced in connection with the above considerations:

Trial Brick, Number.	Degrees Fahr.	Percentage of Water Expelled.		Total No. Hours Heated.
			Duplicate.	
1	250	.76	.85	1:00
2	300	.78	.83	2:10
3	400	.79	.82	3:00
4	500	1.05	.98	6:00
5	600	1.07	1.08	8:30
6	700	1.11	1.10	10:00
7	750	1.16	1.00	11:40
8	800	1.12	1.08	13:20
9	850	1.17	1.14	18:00
10	900	1.05	1.06	20:15
11	950	1.06	1.19	22:45
12	1000	1.18	1.24	24:35
13	1050	1.86	1.86	37:00
14	1100	4.85	4.83	40:25
15	1150	5.30	5.32	45:00
16	1200	5.46	5.42	48:00
17	1250	5.53	....	51:20
18	....	5.69	....	54:10
19	....	6.21	6.00	60:00
20	Bright red	6.13	6.25	72:00

—The Vitrification of the Material.—

The temperature of vitrification depends largely on the chemical and physical composition of the clay, being, perhaps, as low as from 1500 Fahr. (816 Cent.) in the highly alkaline shales, and as high as 2000 to 2200 Fahr. (1093 to 1205 Cent.) in the impure fire clays.

The second process in burning paving brick is to continue the uniform increase in temperature from the temperature at which the water was expelled (about 1400 Fahr. or 760 Cent.) to such temperature as the vitrification of the clay may require. Care must be taken not to raise the temperature above the point at which the clay becomes vitrified, or the brick will be melted and either stick together or become a solid mass, as the intensity and period of excessive heat may determine.

It is the success in reaching, but not exceeding, the required limit of temperature which determines success or failure in burning vitrified brick for paving purposes. Its accomplishment requires,

First—A clay which is uniform in character, so that all brick made from it may vitrify at the same temperature.

Second—A thorough knowledge of the clay.

Third—A kiln in which the heat can be well controlled.

That uniformity is required is quite obvious, for otherwise, with clays which vitrify at different temperatures, either a portion of the brick must remain unvitrified or those which vitrify at the lower temperature must be subject to the hazard of melting.

With uniform clay the success of vitrification will depend on the knowledge and skill of the burner and the design of the kiln.

—Necessary Features of the Kiln.—

For burning brick with economy the kiln must be so designed that we may obtain,

First—A uniform temperature of vitrification throughout the kiln.

Second—The maximum utilization of the calorific value of the fuel.

Where only limited quantities of paving brick are made, and a good market at a fair price exists for the softer brick for building purposes, uniformity in burning is not so essential as where first-class paving brick only are desired and all others are comparatively a waste product.

—Up-Draft or Clamp Kilns.—

In such localities some attempts have been made to utilize the common up-draft or clamp kilns for burning paving brick, but with poor success. This class of kilns is not well designed for high uniform temperatures. The brick at the arches receive the play of the flames and are often overburned. The brick at the walls and near the platting radiate the heat so rapidly that they cannot be vitrified. The brick in the center of the kiln are in better position for burning, and, with some clays, 30 or 40 per cent. of the brick can be vitrified and will make a fair quality of paving brick.

Uniform vitrification of the product requires kilns in which undue radiation is largely prevented and in which the heat can be well controlled. To accomplish this the kiln walls must be of such thickness and structure as to prevent rapid radiation. This is necessary both in order to obtain uniformity of temperature and a high heat. The furnaces or fire places must be uniformly arranged with regard to the body of brick to be burned, and the furnace should be so arranged that the coal will be consumed with a supply of air which can be limited to that required to obtain the desired temperature. A further requirement for a suitable kiln for paving brick is perfection in the arrangement and regulation of the draft. It is by proper kiln walls that radiation is prevented, but uniformity and quantity of draft limit uniformity and intensity of temperature in the kiln.

Diagram No. 1 gives a graphical record of the range of temperature in burning a vitrified clay of medium character. The time indicated will, of course, vary largely from that shown with local conditions and circumstances.

—Economy of Kilns.—

In either the ordinary up-draft or down-draft kilns much heat is wasted in the process of burning. In watersmoking, the heat is about all utilized in the evaporation of the water and in creating the necessary draft. As the temperature of the kiln increases, however, the waste gases are discharged at higher temperatures and the waste of heat becomes very large. At the lower temperatures necessary for burning common brick the up-draft kiln is almost or quite as economical for such purposes as the down-draft kiln. But at the temperatures necessary for burning paving brick there is much economy in the use of down-draft kilns, besides the element of uniformity of temperature. It is evident, however, that if the waste heat of the down-draft kiln can be utilized for purposes at which its temperature is available, economy will be further subserved. This may be done in several ways.

First—The waste heat may be utilized to raise the temperature of the air used in the furnace, and thus create a higher temperature with the same fuel.

Second—The waste heat may be taken from the kiln and used in the dry house to dry the brick.

Third—The heat may be utilized to still better advantage in a continuous kiln, where the entire process of watersmoking, burning and annealing are going on at one and the same time.

In the Journal of the Society of Arts for 1880, page 239, Mr. Herbert Guthrie, who is the inventor of a continuous kiln, furnishes a most interesting article on the application of his kiln to burning pottery. In this paper he furnishes an estimate of the amount of heat used in burning clay goods and the saving which may be effected by the use of good continuous kilns. From this estimate the following table has been prepared, which it is believed will be of interest in this connection:

—Table Showing Estimated Thermal Units Required in the Manufacture of 100 lbs. of Prepared Clay, Containing 37 lbs. of Water, Free and Combined.—

Stages.	Common Clay.		Refractory Clay.
Drying—			
To raise 63 lbs. of clay from 50° to 150° F.........	1260.0		
To raise 37 lbs. of water from 50° to 150° F........	3700 0		....
To evaporate 29 lbs. of water......................	28014.0		....
		32974.0	
Steaming—			
To raise 63 lbs. of clay from 60° to 212° F..........	1912.2		....
To raise 8 lbs. of water from from 60° to 212° F...	1216.0		....
To evaporate 4 lbs. of water............	3864.0		....
		6995.2	
Calcining—			
To raise 63 lbs. of clay from 212° to 700° F.. ...(a)	6148.8		....
To raise 4 lbs. of water from 212° to 700° F.....(b)	1952.0		....
To evaporate 4 lbs of water.........	3864.0		....
		11964.8	
Total..	51934.0		
Deduct the drying..................................	32974.0		
Total heat units used in preliminary burning..	18960.0		18960.0
Burning—			
To raise 63 lbs. of clay from 700° to 1700° F+100 per cent. of waste.... .. ..(c)	25200.0		....
To raise 63 lbs. of clay from 700° to 2500°+150 per cent. waste.................................(e)	....		56700.0
Total heat used in common kiln.............. ..	44160.0		75660.0
Heat wasted and which can be utilized in a continuous kiln..........................(.4a+.4b+c)	28440.3	(4a+4b+8e)	48600.3
Total heat used in continuous kiln............	15719.7		27959.7

Mr. Guthrie has also expressed his estimate graphically by a diagram reproduced in Fig. 2. In this diagram the vertical line represents degrees Fahr. and the horizontal line feet. The space between the two vertical lines at the left of the diagram represents the extent of an ordinary kiln, and the total length of the figure represents that portion of a continuous kiln which is supposed to be under fire at one time. The firing is supposed to take place at the extreme left, and the curved lines show the temperature at any given point. At the bottom is shown the watersmoking stage, during which the water of the pores is freed. The second is the calcining stage, during which the combined water is freed. The third section shows the temperature at which the impure clays are burned, and the fourth the range of temperature at which the purer fire clays can be burned. The total length of the continuous kiln under fire is supposed to be about fifty feet.

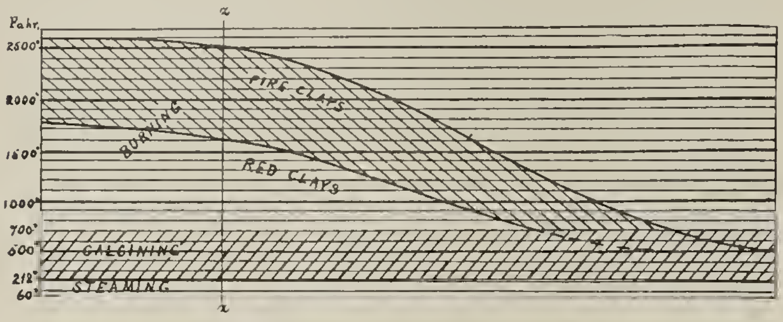

FIGURE 2. Diagram showing heat expended in burning clay goods.

Mr. Guthrie says: "If we test a continuous kiln, we shall find the temperature not very far from those indicated in the diagram by the curved line. Therefore, if we calculate the area of the burning stage beyond the intermediate perpendicular line X and the end, and inclosed between the curved line and the exit temperature, we find that amount of heat utilized which must be the amount that would otherwise have gone up the chimney. The deduction for loss by conduction and radiation, however, has not been made."

A portion of this valuable article, with the diagram and tables, is reproduced in Vol. 1, Grove & Thrope's Chemical Technology, from which the diagram is here reproduced.

TRADE INTERESTS FAVOR RECIPROCITY.

DURING THE LAST SESSION of Congress the Ways and Means Committee appointed a subcommittee, of which Representative Albert J. Hopkins, of Illinois, was made Chairman, to investigate the results of reciproctiy, and to ascertain the sentiments and suggestions of those who are directly interested.

With this end in view the committee sent circulars of inquiry to merchants engaged in the export trade and to manufacturers in the different sections of the country who produce articles for export and have made active efforts to introduce and extend the sale of their products in foreign markets, and to commercial and industrial associations in the United States.

A great many replies have been received by the committee, and it is interesting to note that there is a remarkable unanimity in the sentiments expressed concerning the value and results of the reciprocity arrangements negotiated by certain countries and colonies in the authority of Section 3 of the tariff act of 1890 and the disastrous effect of their repeal. It is also interesting to note that the commercial and industrial interests of the United States, as represented in these replies, without political distinction, are, almost without exception, anxious that such arrangements shall be renewed with other nations, and that the reciprocity policy be permanently adopted in future legislation affecting the tariff and the foreign commerce of this country.

The following was received in reply to the committee's circular of inquiry to manufacturers of clayworking machinery:

The Wallace Manufacturing Company, Frankfort, Ind. Clayworking machinery for manufacturing brick and drain tile in particular. Capital, $20,000; invested, $40,000; employs 30 persons; annual output, about $50,000.

"The majority of our trade is at home. We export some of our goods, particularly to Canada. We recently shipped a $3,000 plant to Guatemala, Central America. Part of our export trade we received through exporters, and part direct. We have made no direct effort to get foreign trade.

"Personally, we know of no particular discrimination except between Canada and the States. The duty on brick machinery going into Canada is 30 per cent. The result is, we are deprived of considerable business from Canada. The duty is making it possible for our machinery to be manufactured in Canada. We find that the German manufacturers, as well as the English and the Canadians, are copying after our machinery as nearly as possible; and with the duty against us, and with the difference in the price of the labor, we cannot hope to have much trade from these three sections. We can only suggest that such materials or goods that those countries produce that we cannot produce should be admitted into the United States free, on condition that goods that are not produced by those countries and produced by the manufacturers of the United States be admitted free.

"If the duty was removed from brick machinery going into Canada we could increase our business fully 25 per cent.

"The output of our factory in 1893 and 1894 was 50 per cent. of what it was in 1891 and 1892. Our output for 1895 was 10 per cent. less than it was in 1892. Our output this year will fall off 75 per cent. of what it was last year if it continues as it has been since the 1st of January.

"The cost of production of our machinery is about the same as it was six years ago. The trade has demanded a high grade of machinery. The cost of labor is slightly less; nothing to speak of as compared with the better grade or the extra cost incurred in making higher grades of machinery. The cost of material is, in some respects, lower, but in other respects it is higher. The same can be said of railroad transportation. Our selling prices are fully 20 per cent. lower than they were six years ago.

"We meet with considerable competition in the States with Canadian, English and German makes of brick machinery. Our foreign competitors, Germany and England in particular—we speak of them for the reason that they are the largest manufacturers of clayworking machinery of any country outside of the United States—have a very considerable advantage over us in the matter of wages paid for labor. We find, on close observation, that our direct labor account equals a little more than half of our general expense of producing our machinery, and with Germany paying at least 50 per cent. less and England 25 per cent. less, and with strong competition at home, it drives our margins on machinery to the lowest notch, and we still cannot meet their prices east of the Allegheny mountains. The advantage that we have so far is that our machinery in this country is superior to the machinery made in England and Germany, but they are copying after us very rapidly, and we look for very strong competition with them for the Eastern trade as far west as Pittsburg, if there is not sufficient duty placed upon brick machinery to protect us against such competition.

"The United States could consume 75 per cent. of the output of our present facilities for manufacturing brick machinery. Therefore, we have facilities at the present time for making a surplus of fully 25 per cent., and have plenty of ground and money to very materially increase our output.

"Most undoubtedly the reciprocity treaties of 1890 would be favorable to the export trade of the United States, and the repeal of the same we consider one of the greatest blunders of the age. Our stringent times in the manufacturing lines of 1893, 1894, 1895 and 1896 are due largely to the repeal of the reciprocity treaties, for the reason that previous to 1889 the manufacturing interests of the United States were working on an unsupplied market. In a great many lines they had struck the zenith long before that time, and were not only able to supply home consumption, but to make a surplus. The reciprocity treaties of 1890 opened a market for this surplus, a larger quantity being consumed at home by giving employment to the surplus labor, thereby making business in the United States much better for those who were depending upon the United States for the consumption of their product. When the United States lost its export trade through the repeal of the reciprocity treaties, we lost not only our export trade, but the trade in the United States from the lack of the ability of the laboring classes to purchase a great many articles that they could have purchased if they had been given steady employment, as they were during the short time when reciprocity treaties were in force.

"Most undoubtedly we are in favor of applying the reciprocity principles to future tariff legislation, and the President should be authorized to negotiate reciprocity treaties with all countries, especially South America and Central American countries, as well as Mexico, admitting many of the articles that they manufacture or produce, and that we do not manufacture or produce, into the United States, on condition that they admit our manufactured articles free."

IN BROKEN DOSES.

Competition is the life of trade, but judicious advertising is the tonic that keeps the life from ebbing away.

To make a success of advertising you have got to have the energy of a pile driver and an enthusiasm worked up to a white heat all the time. Semi-occasional spurts won't get you to the goal.

Some advertisers have a great deal of faith in advertising, but do very little of it. The fellow who gets rich through advertising has lots of faith in it, and does lots of it to make sure of results. He has faith in persistent advertising, and persistently advertises.—Jed Scarboro, in Trade Press.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

Brick vs. Stone in St. Louis.

Editor Clay-Worker:

The outlook for business this summer and fall is not very bright. The demand for brick used for repairing in the cyclone district has decreased 50 per cent. Buildings now standing which will have to be reconstructed are owned by people who can afford to wait and make contracts on their own terms and in their own time. There is no question but that the entire district will be rebuilt, but not rapidly enough to affect the demand for brick.

The general work has fallen off about 30 per cent., with practically no new work coming on. Prices of merchantable brick, which ruled, sixty days ago, $5.50 per thousand, have fallen to $4.50.

There are several large buildings under construction which are taking a great deal of material, but there are only one or two new ones mapped out. The owners of a large shoe factory and thirty-six dwelling houses which were projected will defer building until the financial situation, caused by silver agitation, is settled. There are no doubt many others which could be similarly classed.

We note in Stone an article which compares brick unfavorably with stone, and invites attention to the ruins of buildings that had stone fronts and brick side walls. If the writer of the article visited the cyclone district he must have had his head turned the other way when passing stone front buildings. The stone fronts referred to were built some fifteen years ago, and were veneers which were held up by brick work.

The lack of stone buildings in the district through which the storm passed would seem to me to be against making any comparison. It is possible that stone chimneys which were not very high might have escaped. This, however, might be from the same reason that a light frame building escaped, while its neighbor, a solid brick structure, was destroyed.

I am surprised at his referring to the Eads Bridge. It is about the only stone structure of note which was exposed to the elements, and the east end of it suffered very materially, the size of the blocks appearing to make no difference; neither the iron anchors nor the excellent cement which was used prevented its destruction at the point where the storm struck it.

The facts are that nothing could withstand the power of the storm. The objection I make is to the manner in which the comparison is made, reflecting upon brick in favor of stone, and the statement that "stone came through so much better than baked clay and cement products" seems to me to be decidedly overdrawn. BRIC-A-BRAC.

Gaseous Fuel.

Editor Clay-Worker:

As this is one of my pet subjects, I am not averse to discussing it in these columns, providing it is of interest to the general reader. Brother Stookey and myself may be very much interested in it, but I feel quite certain of others who are not. However, I am convinced there are many still of the scientific stripe who, at least, will permit it.

I really cannot see many points of difference between Brother Stookey and myself, except that he contends—so it appears to me—that fuel, carbon, for instance, gives off some heat previous to its gasification. I can only stand by my text in December Clay-Worker, as quoted by Brother Stookey, "that all solid fuel must be gasified before it is available as fuel."

Brother Stookey need not apologize if he cannot view this subject through my spectacles. If we do not arrive at the same result, one or both of us are in error. He explains his own views explicitly enough, thus: "Lumps of free solid carbon burn with a red glow and do not assume the gaseous state until partially burned by uniting with the oxygen of the air," etc.

Now, as fuel is generally used for the production of light and heat, and will be confined to those uses in all I have to say on the subject, and to make the subject as plain as I can, we will only consider carbonaceous fuel, say, coke, charcoal or pure anthracite coal. Take, then, the last named and heat it up to, say, 2,000 degrees Fahr. in some vessel that will prevent its contact with oxygen; it will not be burnt, nor will it give out any more heat than has been imparted to it. Now take some and put it on an ordinary grate and kindle it with wood, etc., in the usual way, and what takes place? Why, until it attains a heat of about 1,200 degrees it absorbs heat. I forget the combining temperature of anthracite coal, but I know from experience it is very high, varying, of course, with its compactness or density. When it reaches the combining point it is in a condition to gasify and combine with oxygen, one of the results of such combination being heat. If the combining temperature is not reached the coal gives out none of its latent heat, for no combination of the gases takes place, and the coal only gives up what heat the kindling gave it. The attempt to kindle the coal is a failure, with nothing burnt but the kindling. I have repeated this statement so often in the Clay-Worker that I am afraid it is becoming monotonous. I vary the phraseology as much as I can, but the fact remains the same. Carbon at a certain temperature has an affinity for oxygen and will combine with it if they are brought together, the results of such combination being heat, etc. Fuel is not available fuel unless it gives up its heat; it parts with none of its heat until it is oxidized, or, in other words, gasified; oxidation is the cause of the heat, consequently precedes it. From this other deductions may be made, viz.: that all fuels absorb heat until they begin combining with oxygen; that fuel at a white heat on the grate may not be burning; that as soon as fuel commences to burn it becomes invisible; that which we see is ready to burn and becomes invisible.

As I intend saying something in a future article, or articles, on fuel gas and gas producers, I will leave that portion of Brother Stookey's article untouched. I think we shall understand each other by and by, but I must take exception to his unqualified statement of carbon not combining with nitrogen. If he will look up his chemistry for cyanogen, CN or Cy, he will find it a rather important compound. With one atom of hydrogen added, it forms that deadly poison, prussic acid, HCN. It plays no part, however, in the fuel question.

There seems to be considerable misapprehension about the terms, burning and burnt; so it appears to me. If we do not agree as to the meaning of these terms we are not likely to be unanimous in any other portion of the subject. Now, respecting fuel, I maintain that simply heating—no matter to what temperature—does not burn it, nor is it burned by being decomposed, as in the case of coal in a gas retort. True, its identity is destroyed, but as yet there has been no burning, no giving out of heat; all absorption of heat so far. Burning, in its only true and correct sense, is a chemical combination of the thing to be burnt with oxygen. No combination, no burning nor heat. WM. WAPLINGTON.

Enameled Brick.

Editor Clay-Worker:

As the demand for enameled bricks is continually on the increase, I shall give a few hints to intending producers that, if followed, will help to save time and money and bring about results that will be satisfactory and remove many of the difficulties that are supposed to be attached to the manufacture of these goods, more especially the manufacture of white enamel on unburned brick, known amongst manufacturers as the one-burning process.

No doubt many readers familiar with experimenting on enamel brick, fritting the enamels, grinding, burning in seggars, paying a big price for oxide of tin, or, worse still, trying to oxidize tin themselves in a crude way, will hardly think it possible to produce a perfect white enamel on green or unburnt brick without going to the expense of the above-named process, but nevertheless it can be done without the use of seggars, without oxide of tin and without setting the brick on edge in kiln to prevent the enamel from running, and at a great deal less cost than any other process, producing an article that will give universal satisfaction, both to architects and consumers.

—Selection of Clay.—

One of the principal things to be taken into consideration is the selection of the clay. For these products it is not absolutely necessary to select a clay that burns pure white; it will do if it burns an approach to a light buff or yellow color, but it is imperative that the clay should stand a great heat—about 3,000 degrees—and a good close body that dries safely; that is, does not crack in drying, and a clay that does not contract or shrink in burning. This character is of great importance. The contraction in burning is caused partly by the loss of water, of combination, and of the carbonic acid in the carbonates, and to the ignition of any carbonaceous matter in the clays, more especially to the drawing together of the particles in the production of vitreous silicates, and depends both on the chemical and mechanical composition of the clays. Alkali and iron complete vitrifaction, which results in a great amount of contraction.

If clays can be found that will compare with the following analysis they will be suitable for this process of enameling and glazing: Silica, 44.99; alumina, 36.11; potash, 3.31; lime, .43; magnesia, .22; iron, 2.34; combined water, 11.96.

On the other hand, in clays containing much free silica or silicate of alumina, without the alkalies, the contraction is very little, and the result is an open, porous body, as in the case of kaolins and fire clays. The contraction of a good clay for enameling will generally be found to be about one-eighth to the inch from the clay in its plastic state to its state after burning.

Having found a clay that is suitable for the manufacture of these goods, we require some fusible substance that will burn absolutely white without the aid of any alkalies, borax or lead. As these ingredients fuse at a low heat and are all transparent, it is obvious they will not suit the production of a white enamel. As a flux feldspar takes the place of the above fluxes, but feldspar alone does not possess that peculiar opaque result we want. With feldspar oxide of zinc and plaster of paris can be used in small quantities, also flour of asbestos, which burns pure white. Feldspar, oxide of zinc, plaster of paris, ground flint, whiting and clay, in proper proportions, will make a good glaze. They can also be stained to produce different colors, and, if manipulated properly, there is very little question of crazing, as in the case of lead and borax.

Many writers advocate the fritting process, and no doubt in many cases it can be done successfully, as I have known enamelers to frit and grind their mixings several times, but this has been done to give a more compact body of enamel on the brick; now it is possible to purchase these articles for enameling commercially pure, so that there is no need for fritting. Not only this, but you will find in the case of fritting enamels, no matter how finely they are ground afterwards, the enamel, when applied to the brick (after drying) is apt to fall off in handling, without extreme care, and in enameling on green brick what is required is a paste or slip that will cling to the brick, so that in handling from dipping room to kiln there is no question of such things happening.

In mixing enamels for this process it is necessary to have at least 15 per cent. of clay in the compound or solution, the clay to be the same as that from which the brick for enameling is made. Should it be found, in using this clay, that it causes the enamel to become a little too dark, then, in place of using 15 per cent. of the clay, take 7½ per cent. kaolin and 7½ per cent. of the plastic clay, which will produce the desired white. If kaolin is used alone, without adding plastic clay, the result will be as in the case of fritting—the enamels, after becoming dry, will fall off in handling.

By following these instructions the loss in producing will be reduced to a minimum. As in burning any clay material, it is always found there is a certain percentage of loss, sometimes the fault of the kiln, sometimes the burner and sometimes on account of a non-suitable clay. With a good kiln, where a uniform heat can be guaranteed, and a good burner, there is not much risk. Where you have but one enamel in kiln, that will fuse at a certain heat, without uniformity in burning it is not to be expected that the enameled brick in kiln will be salable.

The question of grinding these enamels is a matter of consideration. As I have stated, it is no doubt better in some cases to grind the enamels for certain clays, and again it is not necessary to grind for other clays. This is a question to be determined after experimenting. It is seldom that the ordinary Albany slip clays, as used by stoneware manufacturers, are ground, as, if thoroughly dissolved in water and put through, say, about a sixty-mesh sieve, the residue is very little. These same remarks will apply to raw enamels, as they are used at the same consistency, applied the same way and fuse at about the same heat, although the lustre is brighter.

OPAQUE.

From the Far Northwest.

Publishers of the Clay-Worker:

We have just opened our first kiln of paving brick, and are delighted to find them vitrified down to the bottom row. We uses Eudaly kilns, end-cut machine, set our brick twenty-three high and 110,000 in the kiln (they are built to hold 160,000). With our next kiln shall set twenty-seven high. The brick are nice and square, even to the floor.

Ours is a shale clay, the top of light color, then a stratum seven feet thick of a darker clay, filled with iron rust; below this is a streak of silica, and, at the bottom, a stratum of hard clay resembling block marble. These several clays are so hard we have to blast the bank and then grind all together. When thoroughly pulverized and pugged we have no trouble in getting thorough vitrification.

THE JENSEN PAVING COMPANY.

Portland, Ore., July 24, 1896.

The Money Question From the Silver Side.

Editor Clay-Worker:

Your editorial upon the "Money Question," in the July issue of the much esteemed Clay-Worker, contains one clear, concise statement of fact. It is, "Whatever tends to help the employer helps the employe, and vice versa." Permit me to congratulate you upon the presence of this one great truth in the article referred to; though, without intending to question either your knowledge of the money question or your desire to be candid upon this great issue, I am inclined to limit my congratulations to the quotation referred to.

Before giving attention to your implied query, "What constitutes sound money?" it is proper to review the statements contained in your article, which you doubtless intended should be statements of fact. I agree with you that we should discuss this subject dispassionately and without prejudice, for however much men may differ in their reasoning, there is absolutely no excuse for the misstatement or distortion of recorded facts, unless resulting from lack of judgment, and even then it is hardly pardonable; for, where one sets up as a teacher, accurate knowledge is a prerequisite. Happily, as regards the money question, the record is complete, and so plain that "he who runs may read."

And so, "for the benefit of those who have been studying clayworking more intently than monetary affairs," brief reference is made to your statement that the ratio of gold and silver in the first coinage, that of 1786, was 11.50, or 11½ to 1. The first coinage legislation after the organization of the federal government was the act of April 2, 1792, entitled "An act establishing a mint and regulating the coins of the United States." This law established the coinage ratio of gold and silver at 15 to 1, and made the silver dollar containing 416 grains of standard metal the unit of value. This ratio was maintained until 1837, when the ratio was changed to 15.98, usually called 16 to 1. This change in ratio was effected by reducing the weight of the gold dollar. Again, in 1853, the weight of fractional silver coins was reduced to check their exportation, which was made possible and profitable by a higher coinage valuation placed on silver by France. That these changes or fluctuations were not caused by any difficulty in maintaining a parity of the two metals, or, as you put it, "because impossible to maintain the parity on the basis of real value," is abundantly proven by the market prices of the bullion, or the "real value" ratio. Starting with the year 1687, which is as far back as authentic records go, we find that when the coinage ratio was 15 to 1, on to the year 1837, the "real value" ratio ranged from 14.94 to 15.70. From 1837 to 1873, with a coinage ratio of 16 to 1, there was even less fluctuation.

At no time in this period of almost two hundred years was the ratio eleven and one-half, as you state. And at no time in the history of coinage, the world over, has the parity of the two metals fluctuated more than 2 per cent., until the legal tender quality of silver was surreptitiously destroyed by the act of 1873.

You refer to the unusual output of gold in the fifties. This is a historical fact, but you omit to mention another historical fact—that the great gold discoveries of that period led to a proposition for the demonetization of gold, the argument being the same that is now urged against silver—that gold was getting so plenty it would be dumped into the mints and we would be flooded with it. But the argument that the production of wealth would make us poor was regarded as absurd in those days of common sense, though it seemingly has some advocates at the present day. You argue that, there having been no corresponding increase in the production of silver, it became too valuable to convert into coin—a refreshingly new argument. But let us see how much the commercial ratio was disturbed by the great disproportion in production before we accept this statement as fact. The record shows that the ratio was practically stationary, being 15.94 in 1873, although the gold output was almost three times greater than silver from 1849 to 1873. Figures are tiresome, but they have their value at times. All herein quoted are from the "Statistical Abstract," issued by the United States Treasury Department in 1892, and are indisputable.

In the light of this evidence, which, as stated, is indisputable, and is within the reach of every man, is it not manifestly absurd to say that the coinage of silver ceased because it was at a prohibitive premium? It is, however, true that at several periods, for a short time only, coined silver dollars and fractional silver commanded a premium as subsidiary coin, possibly as high as 8 per cent. in some portions of the country. This was notably true in 1853 and again in 1893, when silver and small bills were at a premium of 3 per cent. in New York city, though the relative bullion value of silver was 24.52 in the last named year.

Coming now to your remarks concerning the demonetization of silver. You state that "every silver dollar that had escaped the artisan or exporter retained its full legal tender character." From what source have you divined your knowledge of the money question? If it were true that every silver dollar retained its full legal tender character we would have escaped many of the ills that have afflicted us. There would have been less disturbance of our monetary affairs, less business "paralysis," and the producers of the country would have been many millions of dollars better off. There would be no contention over the money question and no silver party to-day.

The act of 1873 absolutely destroyed the "legal tender character" of silver in amounts exceeding five dollars; made gold the unit of value; wiped out of legal existence one-half of our metal money, or, in other words, destroyed one-half of our money of redemption, and, last, but by no means least, by the terms of this act, the government of the United States refused to accept money of its own issue for its own dues.

Then, and never until then, was there a difficulty encountered in maintaining a parity of silver and gold. It is useless to occupy space in quoting any of the bitter things uttered in denunciation of this law by great men of all parties or to refer to the influence alleged to have secured its passage. It is undeniably the most infamous act which ever disgraced the legislative annals of this or any civilized country. It is now proposed to repeal it in full, and we are met with the argument that foreign consent is necessary. So far as the public record shows, neither foreign consent nor the consent of the people of this country was asked for its original enactment.

Now, as to sound money. The silver advocates argue that from the operation of fixed monetary laws sound money consists of both gold and silver, each equal before the law and each receivable for all debts, both public and private, one metal balancing and forming a complement for the other, as was the fact for one hundred years of our history. As money measures its value in property, and property, in turn, is measured in money, it follows that a limited money supply results in low prices for property or commodities. Hence, the destruction of silver as money, and the substitution of gold as the sole unit of value, has had a ruinous effect upon all forms of property, except accumulated wealth or investments yielding a fixed return in money.

If the best statistical information obtainable is to be relied upon, the quantity of gold and silver in use and available for use as money is about equal. The denial of the redemption quality of silver means the reduction of the quantity of actual money by one-half. It is impossible to do this without unfairly and enormously enhancing the value of fixed income, or nonproductive investments, at the expense of the workers or wealth producers of the country. A single gold standard is inequitable and is injurious to industry and real prosperity, inasmuch as it inevitably results in the concentration of wealth —too much where there should be little, and too little where there should be much. It means the payment of all debt in gold, an impossibility. The continuance of such a policy means bankruptcy.

As the basis of prosperity for employer and employe is the equitable adjustment of money, as well as a sufficient quantity of it, a single standard of gold currency cannot be for the best interests of either. ALBERT CHAPELLE.

The Money Question—Free Coinage—What it Means.

Editor Clay-Worker:

I have received a communication from Mr. Chas. F. Campbell, Monmouth, Ill., referring to my communication in the July number of the Clay-Worker. Mr. Campbell asks these questions: "First—If free silver is the dishonorable trick you seem to think, will it be any better or any more honorable if obtained by international agreement, as mentioned in the St. Louis platform? Second—If it is not good or right, why not come out honestly and say so, and not tack on such a rider of string as mentioned?"

The second question is not very clear, and I refer your readers to the article in the July Clay-Worker for my answer, if any is needed. Mr. Campell's first question, as to the effect of international agreement, is pertinent; although not directly raised by the article referred to, yet his question is entitled to a candid answer. Before proceeding to this let me say, in reply to his insinuation in his second question about "coming out honestly," that if he will be patient and read what I have to say I will try my best to accommodate him, and come out honestly and squarely in opposition to making this government dishonor its fair name by issuing an irredeemable currency and impair its credit in the eyes of the world. And as all experience has taught, both in this country and all others, that any money not backed by gold and that is not intrinsically worth its face value, will drive out or into concealment the better money, and this would virtually contract our circulation by the amount of gold now issued.

As to honesty, can Mr. C. suppose for a moment that it would be honest for our government to take Mr. Smith's bullion, coin it for him, and stamp every 53 cents' worth of it as worth 100 cents? Such dollars would bear a lie on their face, and the government become the liar for the sole benefit of Mr. Smith and other silver mine owners. Our conception of honesty does not embrace any such conduct, and if Mr. Campbell breathes freely of the ozone in the orthodox atmosphere of Monmouth, we cannot think that he will swallow the free coinage platform without a grimace. The fact is, the claims of the Greenbackers, years ago, however unsound, were far superior to the free silver men's "silver fad." The former offered a dollar that had the whole financial strength of the government back of it; the latter offer a dollar that has nothing back of it but the value of bullion in it, which is but little over half its face value.

Under free coinage the government becomes, as it were, a custom grist mill, grinding out the grists for the bullion owners and stamping the grist worth twice as much as its real value, and, by a fiat, compel you and I to take it at its face value. This would be about on a par with a miller putting twenty-five pounds of flour in a sack and branding it fifty pounds, and, not only that, but compel the hungry to pay for fifty pounds. This is where the honesty comes in, referred to in Mr. C.'s second question. Let not Mr. Campbell or any one else delude himself with the fallacy that under free coinage by this nation alone silver bullion would advance in price so that the 371¼ grains in a dollar would be worth a hundred cents. All previous experience has proved this will not be the case. The owners of silver mines argued in 1890 that if the government would enact to purchase 54,000,000 ounces of silver a year they would guarantee that the price of silver bullion would go to par. The government did purchase that amount of bullion, but the price of silver gradually declined till it reached 49 cents for the silver in a dollar. Mexico has free coinage and it don't raise the value of silver. The Mexican dollar, it is said, has more pure silver in it than our American dollar, and yet you can take one hundred gold dollars and exchange them for two hundred Mexican silver dollars. In Guatemala a gentleman from this city sold a twenty-dollar gold piece for $43.50 in their silver, and later could have had $47.50 for it. And gold for taxes costs $2.30 in silver for one in gold.

Now, as to his first question as to whether free coinage under international agreement would be any better or more honest than free coinage without international agreement, we answer that free coinage under international agreement would be strictly honest and honorable because the nations agree, each with the other, to coin silver at an agreed ratio and keep such coined silver on a parity with gold. This would be backed up by the financial strength of the nation. Under free coinage by this nation alone the coin would have no backing, either national or otherwise, beyond the bullion value of the silver in it.

International agreement would prevent one nation from dumping its silver on another, and there would be no inducement to do so, because silver would be on a parity with gold in all nations entering into the compact. The idea is that every dollar in circulation by the contracting nations, whether gold, silver or paper, shall be as good as any other dollar. This alone would keep our gold in circulation side by side with silver. We might ask Brother C. why the silver men cling so tenaciously to the ratio of 16 to 1, when, if they are honest and want to do the honest thing, they should make it 31 to 1, and then their dollar would be an honest dollar, and not bear a lie on its face. The reason why the 16 to 1 fraud under free coinage is advocated is because it will double the value of the mine owners' properties. We see by an itemized statement by a good authority that their properties aggregate in value $547,000,000. They want the government, by an act of Congress, to make their mines worth nearly double the above amount of their present value.

I think that Mr. C. will see that there is a vast difference between free coinage by this nation alone and under international agreement. Under free coinage by this nation alone the money issued would have no sponsor, nothing back of it, no one compelled to redeem it at any price, and yet an act (a legal tender act) must be passed compelling you and I to take such money at its face value, whether it is worth 25 cents or 50 cents on the dollar. It would seem that this were despotism enough, but this is not all the silver men ask. They demand a law forbidding you or I from selling a farm or its produce for anything but this new coined silver, if the buyer so elects. If you have a friend in Europe you want to send for, you must have gold; but under the new coinage proposition you cannot sell your potatoes, your brick, or your sewer pipe or anything else for gold. You must take silver, as that is the legal tender of the country. Of course, you could take gold if it was offered you, but it won't be offered you, as it is sure to be worth about double the face value of silver.

The despotism comes from the fact that you will be denied the liberty of selling your stuff for what you want. You must take silver, and then pay a premium of, say, 100 per cent. to get the gold. If this would not be a despotism equal to Russia or Turkey or any other country, I am at a loss to know what would be. Under the free coinage plank our mints must coin all the silver bullion offered. This silver may come from any or all countries in Europe, Asia, Africa, Mexico and South America, as well as from our own mines, and it were nonsense to suppose that the government would have any responsibility for this money after coinage.

The wickedness of this wicked transaction comes in the strong arm of the law compelling you and me to take this silver money at its face value for our hard-earned wages, whether it is worth 25, 50 or 60 cents on the dollar. No government can make 50 cents' worth of silver bullion worth 100 cents. This is a great and prosperous nation, and every citizen should take a pride in keeping it great and honest and true. But great as it is, it cannot make a blade of grass grow in violation of divine law; much less can it make silver bullion worth more than it is worth in the markets of the world.

J. K. CALDWELL.

OUR PRESIDENT.

Editor Clay-Worker:

No, I don't mean Cleveland, Bryan or McKinley, but I mean President R. B. Morrison, of Rome, Ga. When I state that Mr. Morrison is as well liked at Rome as anywhere in the United States I have stated the truth.

On last Wednesday I had the very warm (98 degrees in the shade) pleasure of visiting Rome, Ga., the home of Mr. Morrison, as well as many other good people, among whom are Messrs. J. L. Camp and H. H. McClure, of the Rome Brick Company. On arriving at Rome I went directly to the office of the above company, where I found Mr. Camp in the back room, busily engaged in reading Mr. Watson's (candidate for Vice President) speech. I was not long in rousing Mr. Camp. All you have to do in Georgia is to give the silver alarm, and you are admitted without further question. Mr. Camp sent for Mr. McClure and others, who, in turn, telephoned Mr. Morrison. The latter soon made his appearance in the best of health, full of good humor and a determination to vote for McKinley, no matter if the entire State besides goes for Bryan—which I haven't the least doubt it will do, unless Morrison does more "repeating" than I think he is capable of doing.

Mr. Morrison is not now with the Rome Brick Company, but is doing a magnificent business on his own account. The only substantial reason I could learn for the separation was that the company insisted upon making a shade of brick too light in color to please Mr. Morrison. He (Morrison) insisted on either red or a deep yellow, a gold color, while the remainder of the company would have the light silver gray. The company finally agreed to make sixteen of the gray to one of the gold color, but Morrison wouldn't yield, so they parted good friends.

Mr. Morrison could not go out to the company's works with the hurriedly made up party, but as we drove off he gave the guide strict instructions that he should show the writer one of the "horseless buggies" on the way out. Now, I have heard of the many devices for running "horseless buggies," and, of course, naturally looked forward with a great deal of expectation to the "latest but original" product of Rome. There, sure enough, just as we rounded a curve in the road, at the top of the hill, came one of these buggies in full view. Our driver slowed up a little, that we might have a better view of the running gear and motor power, together with the method of application.

The motor power consisted of a light frame work, having in front two long stationary guide arms. These arms were quite large and substantial at the end attached to the machine, but tapered, with a gentle curve, to points at the extreme ends. Perhaps it is well in passing to know that these arms were modeled after the old Egyptian shaft and chariot tongue, and served the double purpose of guiding and defending to some extent the vehicle. The motor power proper rested on four posts, somewhat enlarged at the base with a forward split dip. Each of these posts was supplied with a middle and upper hinge joint, which gave to each post, when properly oiled, a lifting and forward motion.

The internal arrangement of the machine was such that but the two posts on the same side of the machine could be moved at the same time. Thus, with this forward motion, alternating from side to side, the machine was made to move. The driver informed me that so far they had not been able to acquire a very high rate of speed. I wish I had time to describe this wonderful invention more in detail. Mr. Morrison assured me that the machine and buggy would be developed to a fuller state of perfection by the next Convention, at which time he hoped to present, in connection with his annual address, a full detailed description. He assures me that these buggies, with motor power, can be built strong enough to be of great service on a brickyard.

Suffice it to say that the most suitable fuel with which to run the machine is some kind of vegetable matter. Neither coal, wood nor crude oil is at all suitable, but natural gas works well at times.

Here we are, at last, in full view of the Rome Brick Company's works. We will drive around by the side of the large brick barn in order to hitch our team in the shade. On alighting we were first conducted a little further up to the top of a small hill, where we inspected the beautiful brick and terra cotta monument made by Mr. Morrison and the men at the works. This monument was erected

—"In Memory of Dave."—

All the men agreed that "Dave" was one of the most faithful and willing hands that ever worked on the yard. He began with the beginning of the plant, and continued without intermission until overtaken by his untimely death.

To my mind all brickmakers, including employers and employes, should be better men because of "Dave's" having lived and labored in such a way as to gain the esteem of all who knew him. He was never known to join a strike, yet was never called a "scab." He aided alike friend and foe. He made it his business to help the weak. He never shirked the heavy burden, never complained of over hours, was always on time. Though often weary and worn, he performed his daily task without grumbling. Though he expressed no hope of the future publicly, yet his conduct was always such as to indicate that restful peace of mind which only comes from a clear conscience. On that last fatal night he returned as usual, though perhaps a little later, to that humble bed of straw, some the worse for age. His was a modest home of one room, made of light pine boards, so that when the fire came in an instant the whole structure was enveloped in flame. It is not known that poor "Dave" even waked from his dreaming slumber sufficient to know of the fire until he was gone. But on the exact spot where he slept on his couch to wake no more stands his monument, with this inscription, "In Memory of Dave," below which is the emblem of his profession, the "bridle bit," drawn in bold relief.

The incidents surrounding "Dave's" life and service serve to illustrate much of the spirit pervading the entire works. I did not hear one harsh, boisterous or unkind word from man or manager while I was at the plant. There was that air of quietness and precision which always attends success. The Rome Brick Company's works is one of the largest in the South. It is well arranged, and has always done a good business. The plant has been increased from that of a common building brick plant to one turning out fine press brick of most all shade. The company is now beginning to make a very high grade of paving brick.

Mr. Morrison, as intimated above, has built a new works, which is located within the corporate limits. He is doing a good business, having sold several large orders of brick this season.

I forgot to mention that Rome is situated on three rivers, the Etawah, Oostanaula and Coosa. The Coosa began at Rome just in time to see the other two end. As soon as "Uncle Sam" removes the rapids now lying in the Coosa, about one hundred miles below, Rome will have navigable waters to the sea for heavy shipping.

Our President did not say one word about the Convention meeting in Rome this winter, but he did say that Boston was too far to one side these hard times. He offers very excellent reasons why we should have our Association's Convention in some more central city this winter. He suggested Cincinnati, but then, you know, we have had the Convention twice in Ohio and once in Cincinnati. And now that there is talk of doing away with the free "pow-wow," and as we have nothing but bad river water, I did not deem it advisable to encourage Mr. Morrison in his notion to call the meeting in Cincinnati, but, of course, if the Convention wants to come and provide its own haversack, we will do the best we can.

I know a man, Brush by name, who once declared that so long as the waters continued to fall at Niagara there was hope that the Convention might meet in Buffalo.

Our President is also anxious for another change in the "pow-wow." He wants the ladies present, so do I, so do we all. To get down to business, why cannot we put up one, two or three dollars per plate for the expenses of the "pow-wow," and have the ladies present? Morrison thinks we should. In fact, every one whom I have heard express himself is in favor of this plan. I know the ladies would be delighted, and certainly they are entitled to a share in all our festivities.

Personally, I would be delighted to attend a Convention at Boston, but cannot Brother Fiske and the other brethren consent to allow us to meet in some more central city before going to Boston? Perhaps by another year times will be better; certainly we shall either have more silver or less gold. In either event, we will be better off. For, having the former, we will be more liberal, and not having the latter, we will, by another year, have become contented with our lots, and, like the philosopher of old, "take things as they are, and not as they should be." Would it not be well to ask for expressions from the members of the craft as to the advisability of providing to some extent for our own entertainment at the next "pow-wow," and should we not have the ladies present? Also, would it not be wise to hold the next Convention in some central city? So thinks the President. W. A. EUDALY.

Cincinnati, Aug. 15.

Ohio Valley News.

Editor Clay-Worker:

Business is very quiet among the sewer pipe and brick works in the valley, very few of them running to their capacity, and all with immense stocks of pipe and brick on hand. The railroad people claim the business with the clay works has fallen off nearly 45 per cent.

Two more firms have withdrawn from the sewer pipe combination, otherwise the Central Sewer Pipe Company, within the last month. The Ohio Valley Fire Clay Company, of Toronto, and the Myers-Hartford Clay Company, of Malvern, have concluded to operate independent of the Central Company. The companies still composing the Central claim they are well pleased with the management, and are getting their share of the business, and at a satisfactory figure.

The firm of Garlick & Williamson, who have been operating the American Fire Brick Works at Freeman's Landing, W. Va., have dissolved partnership, Capt. T. J. Garlick purchasing the interest of Andrew Williamson.

J. M. Cooper, General Manager of the Central Sewer Pipe Company, of Pittsburg, and T. J. Evans, President of the Uhrichsville Fire Clay Company, of Uhrichsville, O., have been appointed by the court receivers of the Royal Clay Manufacturing Company, of Uhrichsville. The account of the failure was recorded in my last month's letter. Upon investigation the receivers have found the affairs of the concern in a much worse condition than was at first supposed. Instead of $30,000 worth of pipe on hand, they claim there is not $4,000 worth of marketable pipe. Owing to the fact that the steam was allowed to escape under the building the floors are all rotten and sinking, and the pillars resting on the floor and supporting the roof have sunk, causing the roof to sag. The general impression seems to be in Uhrichsville that the Royal Works will never again be a factor in the sewer pipe business, as it is estimated that it will cost at least $30,000 to repair it that it might be placed in operation.

The Congo Fire Clay Company's paving brick works at Empire, O., began operation on Aug. 3. These works were completely destroyed by fire last September, and the new works have a much larger capacity.

The main office of the Toronto Fire Clay Manufacturing Company, operating the old Jefferson Sewer Pipe Works, in Toronto, and the Markle Works, at Markle, O., has been transferred from Pittsburg to Toronto, O. The company are making extensive repairs at their Markle Works, putting in two new wet pans and generally increasing their capacity. Ever since these works were started the clay for the sewer pipe press had been mixed in pug mills. They are now convinced that the only proper way to mix the clay is in wet pans, which plan they have adopted.

The jury in the case of the administrator of Archibald Putnam vs. John Lythe's Sons brought in a verdict for the defendant, which ends an important damage suit. Archibald Putnam was a miner employed in the mine of John Lythe's Sons, sewer pipe manufacturers in Wellsville, O., and was killed about three years ago by falling slate. The administrator brought suit for $10,000 damages, claiming the mine was known to have been in an unsafe condition. BUCKEYE.

THE STRIKE AT LIMOGES AND ITS EFFECTS.

THE STRIKE of pottery employes at Limoges has come to an end on the basis of conditions existing on May 30—ante-strike. The number of porcelain furnaces fired during the month of June was, on account of the strike, reduced to ninety-two, instead of 198 fired in June, 1895. This reduction represents a direct loss to the workmen of 500,000 francs ($100,000), and proportional loss to the commerce of the city. But this is not all; for, on account of the strike, the centennial exhibition of the porcelain industry, heretofore mentioned in the Clay-Worker, has been postponed for one year.

WHY TRADE IS DULL.

A Kansas City subscriber, in a recent letter, says: "Trade with us has been remarkably good so far this year. Just at this time we find ourselves in a very peculiar predicament. We have orders on our books which would test our utmost capacity to fill, provided we ran through the entire season every day, including a good part of the winter. Notwithstanding this fact, we are shut down, and the 'silver man' is to blame for it. Our bricks are paid for from the proceeds of bonds, tax bills, etc., issued by municipalities. Up to within a few weeks ago these bonds have been eagerly sought for and sold at a premium. Now, for the reasons stated above, it is found impossible to place a single bond at any price. This being the case, we have preferred to hold on to our material rather than to carry a number of large accounts, the ultimate payment of which would be more or less doubtful.

"I am sure that this locality, being on the border line, so to speak, between the sound money and the free coinage camps, is feeling a greater stringency than almost any other part of the country, so it occurs to me to suggest that if you can hit upon some lucky brickmaker whom you can ask to send his photograph and an elaborate description of his method of collecting his accounts for bricks sold, you will furnish your readers (by publishing the data suggested) with matter that will interest them a great deal more than a description of the humdrum process of squeezing out bricks per thousand."

BLAINE WAS FOR SOUND MONEY.

There is being used by advocates of "free silver" a paragraph or two from a speech by Mr. Jas. G. Blaine, by which they aim to show that that great man was in favor of the free coinage of silver. The following is the closing paragraph of the speech referred to, which was delivered in the United States Senate in 1878. We commend the sentiment expressed to every thinking voter, regardless of party affiliation:

"The question of beginning anew the coinage of silver dollars has aroused much discussion as to its effect on the public credit. My own views on this question can be stated briefly. I believe the public creditor can be paid in any silver dollar that the United States can afford to coin and circulate. We have $40,000,000,000 of property in this country, and a wise self-interest will not permit us to overturn its relations by seeking an inferior dollar wherewith to settle the dues and demands of any creditor. The question might be different from merely a selfish point of view if, on paying the dollar to the public creditor, it would disappear after performing that function. But the trouble is that the inferior dollar you pay the public creditor remains in circulation, to the exclusion of the better dollar. That which you pay at home will stay there; that which you spend abroad will come back. The interest of the public creditor is indissolubly bound up with the interest of the whole people. Whatever affects him affects us all, and the evil that we might inflict on him by paying an inferior dollar would recoil on us with a vengeance as manifold as the aggregate wealth of the republic transcends the comparatively small limits of our bonded debt."

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PROS AND CONS.

We are in receipt of a very welcome letter from Professor Orton, Jr., commending the editorial in our July issue on the "Money Question," in which he says: "I have read your remarks in the editorial column on the money question, and congratulate you on the soundness and good sense of your position. The free silver craze will run its course, like the measles and itch, and the people will go up to the polls and stand by the safe and conservative methods, I am sure." This last sentence, to be sure, smacks a wee bit of stump oratory, but it is more than balanced by much of the same sort on the other side in the letter of our esteemed friend, Mr. Chapelle. We are free to confess that the commendation of Professor Orton goes a great way toward offsetting the criticism of Brother Chapelle, though we have not expressed any opinion upon the political bearings of the facts in the case, aiming only at a statement of facts, leaving political deductions to each individual reader.

Aiming only at facts, we confess to a mistake in our statement that the first ratio attempted in the United States was 11½ to 1. It should have been 15.25 to 1, a mistake that any mere tyro in history might easily correct, and which could not possibly affect the present discussions one way or the other. It grew out of an accidental transposition of figures in the preparation of copy. . We thank Brother Chapelle for calling attention to it. But his criticism of our statement that "every silver dollar that had escaped the artisan and exporter retained its full legal tender character" involves quite another question, for, according to his paper, we would have escaped almost every calamity, except the St. Louis cyclone, if this had been so. Our authority for the statement is the law itself. The act of 1873 says: "The silver coins of the United States shall be the trade dollar, the half, the quarter, dimes and half dimes, and these are made legal tender to the amount of $5 only." The standard silver dollar is not included in this category at all—a very unimportant fact, however, as there are probably not 10,000 of them in all the country; what, with the artisan and the exporter, there were next to none in circulation as currency, only a few here and there as keepsakes. The act of 1874 repeated the provisions of that of 1873 by saying: "The silver coins of the United States shall be legal tender only to the amount of $5," not naming any of them, as the act of 1873 had expressly stated what was included in the phrase "silver coins." That no one understood the law to include the standard silver dollar is evident from the fact that no living being ever heard of such a construction of it in any commercial transaction of that period. It had been demintized, but not demonetized. No more were to be coined, but all were to be good at their face value in any amount, if any could be found. The wisdom or unwisdom of demintization is not the question now. As to that, we have no controversy with Brother Chapelle or anybody else. Our readers will judge for themselves as to the soundness of his argument, which, as he shows, hinges altogether on his mistake about the demonetization of the few standard dollars then in circulation.

By the way, our readers can get more valuable information on this subject by addressing a postal card to Hon. J. G. Carlisle, Secretary of the Treasury, at Washington, D. C., asking for a copy of the recent digest of all laws upon this subject, than from any other reliable source. It will cost only the postal card, and is worth a dozen stump speeches, in which historic facts are tortured and garbled. Ask for the book entitled "Information," then read it and preserve it for future reference. It will confirm this statement.

In this connection we wish to remark that our columns, for the present, are open to the discussion of this money question, which is the most important now before the people of this country, but we must insist on brevity, and that the writer indulge in nothing personal, partisan or political.

FIRE-PROOFING.

There is always a counterfeit for the really good article, and, strange to say, there is always some one ready to buy the "green goods." As we all know, the ideal material for fire-proofing is burned clay in its various forms. The hollow tile has not been found wanting. Nevertheless, corrugated iron and cement fire-proofing have had many able advocates, and have received some support from investors in fire-proofing properties. We speak of these advocates as being able, but in no sense as being sincere. No one questions the efficacy of hollow tile for fire-proofing. In the very nature of things little can be expected from corrugated metal, with cement and plastic coverings. The metal is readily affected by the heat, and the cement itself has neither the insulating qualities nor the thickness from points of exposure to afford protection. This counterfeit fire-proofing has been devised and executed on the grounds of cheapness. As yet, no one has claimed its superiority over hollow tile, but the owners of buildings have frequently taken up with it merely because it has a name. They feel that if they can save a little money they will be able to call their buildings fire-proof, without serious care as to the exactness of the term. By such means they can deceive their tenants. Now, as a matter of fact, it is only a very little cheaper and worth much less than the genuine fire-proofing. In a courthouse let in this State recently there is a difference of only about $1,800 in a $130,000 contract, certainly a very trifling saving when we consider the difference in intrinsic merit between the two materials. From time to time we note the derision with which fire-proof buildings are received when one of these counterfeits is destroyed. Because of this the high character of hollow tile suffers. A few years ago a so-called fire-proof structure of Boston was destroyed, and another great howl against the efficacy of fire-proofing in general was raised. The first two stories of this building were of granite veneering, inclosing steel columns. A little fire in the show window peeled off the granite like paper, and the steel collapsed. The upper part of this building was adequately constructed with hollow tile, but that counted for nothing when it was a heap of ruins from the failure of the granite. A certain "fire-proof" hotel in Chicago has wooden joists, stud partitions lightly covered and filled with legitimate fire-proofing. Some day when it fails the world will hear another cry against the inadequacy of fire-proofing materials. Steel, adequately covered with hollow tile, is the legitimate fire-proof building material.

THE MONEY QUESTION IN A NUTSHELL.

At the request of several of our readers we present the following outline of the money question. It is necessarily brief, yet we hope it may throw some light upon a question which too few Americans have studied. We have carefully avoided the discussion of any phase of it which is involved in party disputes further than a mere statement of facts and principles concerning the general question may be so regarded.

WHAT IS MONEY?

The Standard Dictionary answers: "Any material that serves as a common medium of exchange and measure of value in trade." It is obvious from this that it is optional with any nation or tribe to adopt whatever material it may choose. In the exercise of this right tin, and iron, and copper, and gold, and silver, and other metals have been used; and so have leather, and cattle, and slaves, and the skins of animals. In the early settlement of Illinois coon skins were given a fixed value by the settlers and used as money in all commercial transactions, while in this Northwestern Territory, in 1792, a quart of shelled corn was by law made worth one cent, and could be collected of a debtor at that rate in lieu of other money, because, as the law states, "a dollar varies in its real value in the several counties"—a pretty sound reason. If there is any one quality of money more to be desired than another it is a uniform value everywhere. It is equally obvious that as long as a people have no commercial dealings with any other people it makes very little difference whether they use tin or gold, coon skins or shelled corn. As civilization advances and men reach out to trade with other people a common material must be used, or the coon skin or shelled corn, or the tin, or iron, or silver must be converted into the money of the people from whom one would buy—and always at the expense of the purchaser. In the progress of civilization all these primitive materials have practically been abandoned, and gold and silver have become the sole materials out of which money is made, except banknotes and government certificates of indebtedness, redeemable in coin made of these metals.

THE FUNCTION OF MONEY.

It is not difficult to see that if the shoemaker could exchange his work with the tailor, and if the price of making a pair of boots was just equal to the price of making a coat, and that if the tailor wanted a pair of boots every time the shoemaker wanted a coat, there would be no need of money in their dealings; but as this cannot always be, there arises the need for some token to represent the balance one way or the other, and this should be something which, by common consent, would be taken by the merchant or the butcher for his goods. Whatever does this is money—a "medium of exchange and measure of value in trade"—and to do this is the sole function of money. This material need not be of itself valuable, as coon skins and shelled corn are, for a very thin piece of paper, with appropriate writing on it, will answer the purpose, but it should be something that any man at home or abroad of whom we may wish to purchase will take just at the price it was taken at the first transaction. The man who receives as money what will not buy at its face value whatever he needs, whether he buys it directly of the producer or through a dozen middlemen, is the loser by just so much as he fails to realize the face value of his so-called money.

WHO MAKES THE MONEY?

Coining money and fixing its value is the sole prerogative of the sovereign, and yet the sovereign can fix the value of its own coin and notes in only one of their offices, and that the very least—the debt paying. The purchasing value of any given coin or note is always conventional. The seller may at any time refuse any species of money, with or without giving a reason; hence, after all, the much used and much abused word, "fiat," is very limited in its practical application, for the paying of debts constitutes a very small part of the business transaction of the commercial world. It is only since the adoption of the present monetary system of our country that any considerable portion of the money in common use became a legal tender. The bulk of the money prior to 1863 was banknotes, ostensibly based on deposits of coin or something else, but so rarely was it sufficiently secured that comparatively few of them ever redeemed all these issues of paper. The harmful consequences of this state of affairs can hardly be exaggerated. It affected all classes, but especially the wage earner and the farmer. The least reliable banknote was always the first to be paid out, and the poor man was the first victim. But what was even worse, the dollar of the people was not the dollar of the merchant and the banker.

GOOD MONEY AND BAD MONEY.

That is good money which is money everywhere or readily convertible into "a measure of value in trade." Coon skins and shelled corn were good for their times and localities, but they would cut a sorry figure in these days of railroads and steamships, when every one wishes to buy of everybody and travel everywhere. Good money to-day must be just as good in Japan as in New York, and just as good in New York as in Indianapolis, and just as good to-morrow as to-day. The American money of this period is of this class, every dollar of which is as good as any dollar at home, and is easily convertible into what is money anywhere on earth. It was not always so. In the days of free banking what was money in one State was often no money at all in another, and what was a dollar to-day might not be worth a cent to-morrow. Not the least triumph of the present monetary system is the rendering of such a condition impossible.

PRICES AND THE VOLUME OF MONEY.

When the money of commerce was easily doubled or quadrupled in a trice by unlimited free bankage, one of the most obvious early effects was a marked increase in prices as measured by the increased worthless currency, and this gave rise to the financial dogma that prices depended upon the volume of money. But this advance was always fictitious. The situation gave occasion for an industry not known since 1879, when specie payment was resumed. Every town and city, and almost every cross-road, had its broker, whose business it was to buy and sell depreciated banknotes and specie. The premium was the difference between the value of the money of the neighborhood and the money of the commercial world, and this was always greater than the advance in the price of labor and its products. In this dicker the laborer and farmer were always the greatest sufferers. The broker grew fat at their expense.

That the increase of sound money does not advance prices is too plain to be disputed. Our space will not allow more than this simple statement. In 1870 the per capita circulation was $17.50; in 1894 it was $24.33. This means more than double the number of dollars in circulation, yet, as a fact to be deplored, prices have steadily declined all these years, so that everybody knows, to his sorrow, that the average price of everything, interest included, is only about half the price of twenty to twenty-five years ago. Whatever may be the cause of this calamity the decrease of the volume of money can have had nothing to do with it. Yet it is possible that any sudden multiplication of our currency by the creation of a money which, like the irredeemable banknotes of forty years ago, would have only a local value as money, might, as that did, temporarily advance prices as measured by depreciated money, while the real purchasing power of a day's work or of a bushel of wheat or corn would be less than now. It might enable the debtor to liquidate his debt, if he could find any way to get it from those who own it, but debtors constitute too small a fraction of the people to justify such an experience as the country passed through in the fifties, caused by a flood of money which had no general exchangeable value.

OUR MONEY ABROAD.

We are a great Nation, and can make anything money we choose. We can go back to coon skins or to shelled corn, or we may keep up with the march of civilization and commerce, and use silver exclusively, as they do in Mexico, or gold exclusively, as they do in many prosperous European countries, or we may continue our traditional policy of using both gold and silver in such relative quantities and ratios as shall preserve their parity as debt-paying and purchasing agents; but there is one thing we cannot do; we cannot make our money, whether it be coon skins or shelled corn, gold or silver, the money of any other people. There is another thing we cannot now do; it is too late to build a Chinese wall around us and shut ourselves in and others out. We must buy of other people and sell to them, and the balance of trade must be paid in the money of the seller, not of the buyer. We must turn our coon skins or shelled corn into the silver coin of Mexico, if dealing with Mexico, or into gold coin of the particular European nation we are dealing with, if we buy of an European nation, just as now we must turn our gold or silver money into it—no more, no less. If we use both gold and silver it is entirely competent for us to fix the ratio at 16 to 1 or at 60 to 1, but the countries we deal with know nothing about our ratios or about our values, and they care not a fig whether our gold and silver are coined or uncoined; gold and silver have a commercial value in other countries, as measured by their respective units of value, and they weigh our coin just as they weigh bullion, not caring a farthing for the stamp of the mint upon them, and they settle with us by pounds avoirdupois, not by dollars, just as, in return, we take the gold and silver coins of other nations only as bullion. Under this method of reckoning values our gold half eagle, measured by the commercial value of gold in England, is worth some ten or twelve cents more than a pound sterling, their unit of value, while the bullion in five silver dollars is worth only about eleven shillings, varying, like cotton or wheat, from day to day, according to that inexorable law of commerce supply and demand. As a business transaction, therefore, an English merchant would as soon receive his pay for goods in silver as in gold, except for its bulkiness, for, like pork or cotton or gold, it is weighed and taken only at its current market value. This works no special hardship now on the farmer or laborer who receives silver for his labor or produce, for it can at present readily be converted into gold, but if the time ever comes that this cannot be done it will be hard on all who wish to buy tea or coffee or any kind of foreign goods with silver dollars. To have the five silver dollars they received for wages or wheat reduced to about two, 60 to 2, 70 in their purchasing value, will be a discount on their money which will remind old men of the days of free banks and high prices.

FREE SILVER AND ITS RESULTS.

If the Clay-Worker understands the political situation involved, all the present confusion on the silver question grows out of the fear that the free and unlimited coinage of the silver, which is so abundant in all lands that it now takes about thirty-one pounds of it to buy a pound of gold, would make silver dollars, of 16 to 1 standard fineness, so numerous that they could no longer be exchanged for gold dollars as now, and that, therefore, in all dealings with other nations, our silver dollars would be worth only what the bullion in them would bring in market. As the units of value in nearly all other commercial nations are all in gold this would reduce the purchasing value of a silver dollar nearly 50 per cent. The Clay-Worker expresses no opinion upon this fear. Its readers are men of business sense, and quite able to form their own opinions and act upon them. We have sought to give nothing but a short statement of what money is and what are its functions, with a few incidental observations, which seem necessary to a correct understanding of the whole subject. We must not be understood as teaching that an abundance of money is a calamity because under the great increase of the last twenty years prices have steadily and greatly declined. The volume of money has had nothing to do with this decline; no more will an increase of good money restore prices. Neither must we be understood as inveighing against that supposed result of free coinage, the immense profit it would be to the millionaire mine owners, for, as we understand the question, they would realize but little profit from it. The first effect of such a coinage would be the demonetization of the 500,000,000 of present silver dollars, except as to debts already contracted, for, being no longer convertible into gold, they would, like gold, be worth only their bullion value to the merchant who must pay for goods in gold or its equivalent. No, the profit to the owner of silver bullion would be insignificant, for this debased condition of silver is already foreshadowed by the requiring of gold notes and bonds in all transactions having a long time to run. He is more to be pitied than envied, for he can get bullion prices now for his silver, and that is all any one will get whenever, from free coinage or any other cause, a silver dollar may not readily be converted into a gold dollar.

NONE SO BLIND AS THOSE WHO WILL NOT SEE.

Our contemporary, "Stone," seeks comfort for the material which it represents from the results of the St. Louis cyclone, claiming that stone structures withstood the fury of the storm better than those of brick. This is not true. Few stone structures were wrecked, for the simple reason that there were none in the path of the storm. St. Louis is essentially a brick city. Whatever merit stone may have as a building material, the St. Louis cyclone proved nothing, unless that it was an improper material improperly used. There can be no question but that a wall properly bonded together, as is usual and necessary, as in the use of small pieces of burned clay in terra cotta and brick, will better withstand the forces of nature than stone, as ordinarily used. History has proved that burned clay is the only building material which will stand a great conflagration or the various climatic changes. Fire, water or frost have no effect whatever upon it. All of these elements are injurious to stone. We refer our readers to what our correspondent has to say about brick and stone in St. Louis in a preceding column.

TRADE LITERATURE.

"GALESBURG BRICK" is the title of an ornate little brochure received with the compliments of the Purington Paving Brick Company. Its mission is to impart information concerning the use of vitrified brick as a paving material, and it does it quite effectively. We presume the Purington Paving Brick Company, Galesburg, Ill., will cheerfully mail a copy to any of our readers requesting it, but would suggest that a stamp be inclosed with the request. These little amenities make more bearable the burdens and cares of business.

ZWERMANN & CO., consulting engineers and chemists, Baltimore, Md., have favored us with a copy of a neat little pamphlet, in which they give some interesting information on enameling and glazing brick, tile, etc. It also tells how to make the silver gray ware, so popular in Germany. They have a compound which prevents brick and tile from whitewashing, either directly after firing or when laid in the wall, and mention several other matters of interest to clayworkers. If you write them for a copy, give their exact address, Allen and Clement streets, as Baltimore is a large city, and mention the Clay-Worker.

THE FERNHOLTZ BRICK PRESS COMPANY, St. Louis, is mailing a large four-page circular, showing illustrations of their new "Standard" press and the Meyers balanced up and down-draft kiln. If you have not received one, drop them a postal card to 1214-1216 Poplar street, especially if you are interested in the manufacture of fine pressed brick.

WHEN JASPER GOES TO SLEEP.

I knows he ain't so speedy, sah,
He's lookin' kind o' poah,
But den he's putty lively, an'
He'll go er mile in foah.
But dat dere beast is good as gole,
He's knowin', sah, an' deep,
But den yo' can't do nuttin, sah,
When Jasper goes ter sleep.

He goes ter sleep right on de road,
An' den yo' got ter wait;
Doan' make no diffrunce ef he trows
Yo' back an hour late.

He likes to git upon er hill
What ain't so very steep,
An' den yo' might ez well git down,
Fer Jasper's gone ter sleep.

Yo' kin pull an' tug him all aroun',
An' whip him all yo' please,
Yo' kin slash him hahd across de nose,
An' cut him roun' de knees.
He'll have his nap, an' have it out,
An' not er step he'll creep,
An' yer got ter be a patient man
When Jasper goes ter sleep.
—Jean C. Havez, in Chicago Tribune.

A WHISTLING SONG.

When times are bad, and folks are sad
An' gloomy every day,
Jest try your best at lookin' glad
An' whistle 'em away!
Don't mind how troubles bristle;
Jest take a rose or thistle,
Hold your own
An' change your tone,
An' whistle! whistle! whistle!

A song is worth a world o' sighs;
When red the lightnin's play,
Look for the rainbow in the skies
An' whistle 'em away!
Don't mind how troubles bristle;
Each rose has got its thistle;
Hold your own
An' change your tone,
An' whistle! whistle! whistle!
—Atlanta Constitution.

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Brickmakers.

IT IS pretty generally conceded that wonderful progress is being made in the ancient and heretofore unprogressive art of brickmaking. Among the best evidences of this is the fact that the brickmaking craft is no longer without a literature of its own. There are now some good practical books treating on the manipulation of clay—the making, drying and burning of brick. The list is not so large but that every brickmaker can afford to have them all. Get them and read them.

"BRICKMAKERS' MANUAL," Morrison and Reep	$3.00
"BRICKMAKING AND BURNING," J. W. Crary, Sr	2.50
"TABLE OF ANALYSES OF CLAYS," Alfred Crossley	1.00
"VITRIFIED PAVING BRICK," H. A. Wheeler, E. M	1.00
"PRACTICAL FARM DRAINAGE," J. J. W. Billingsley	1.00

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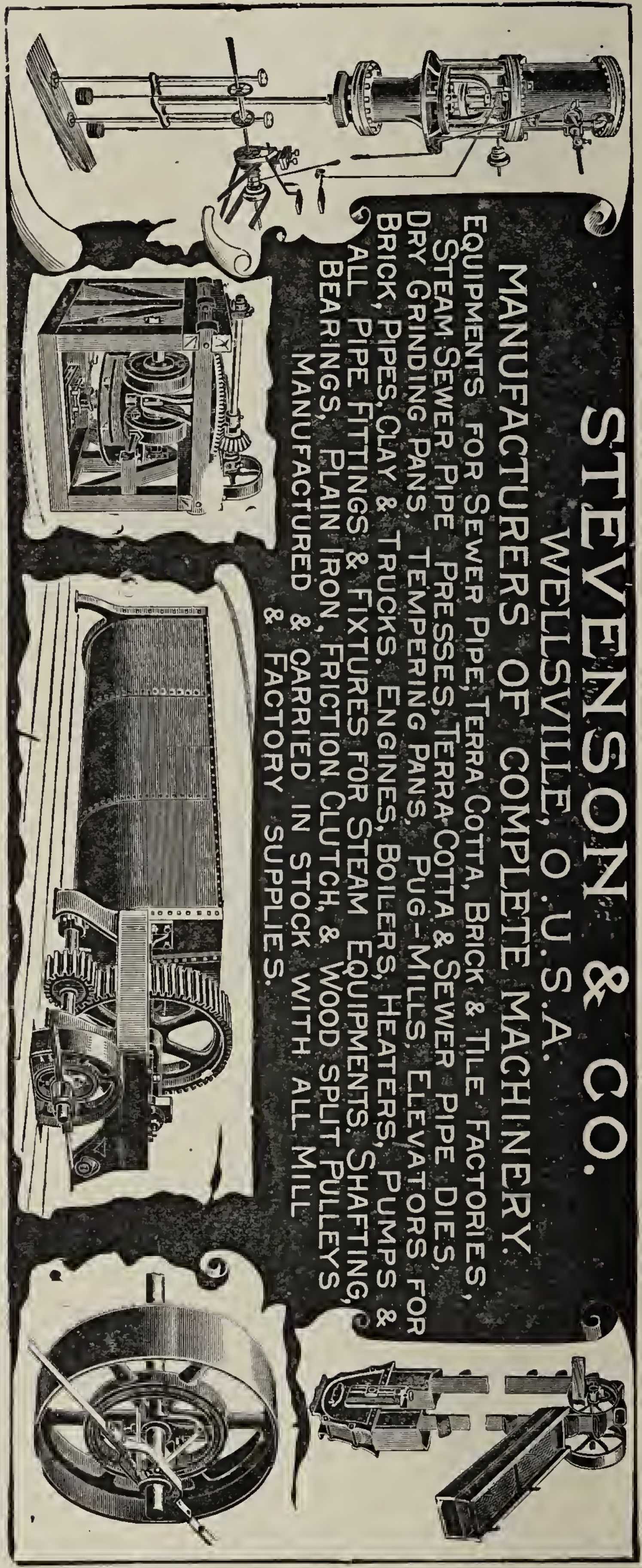

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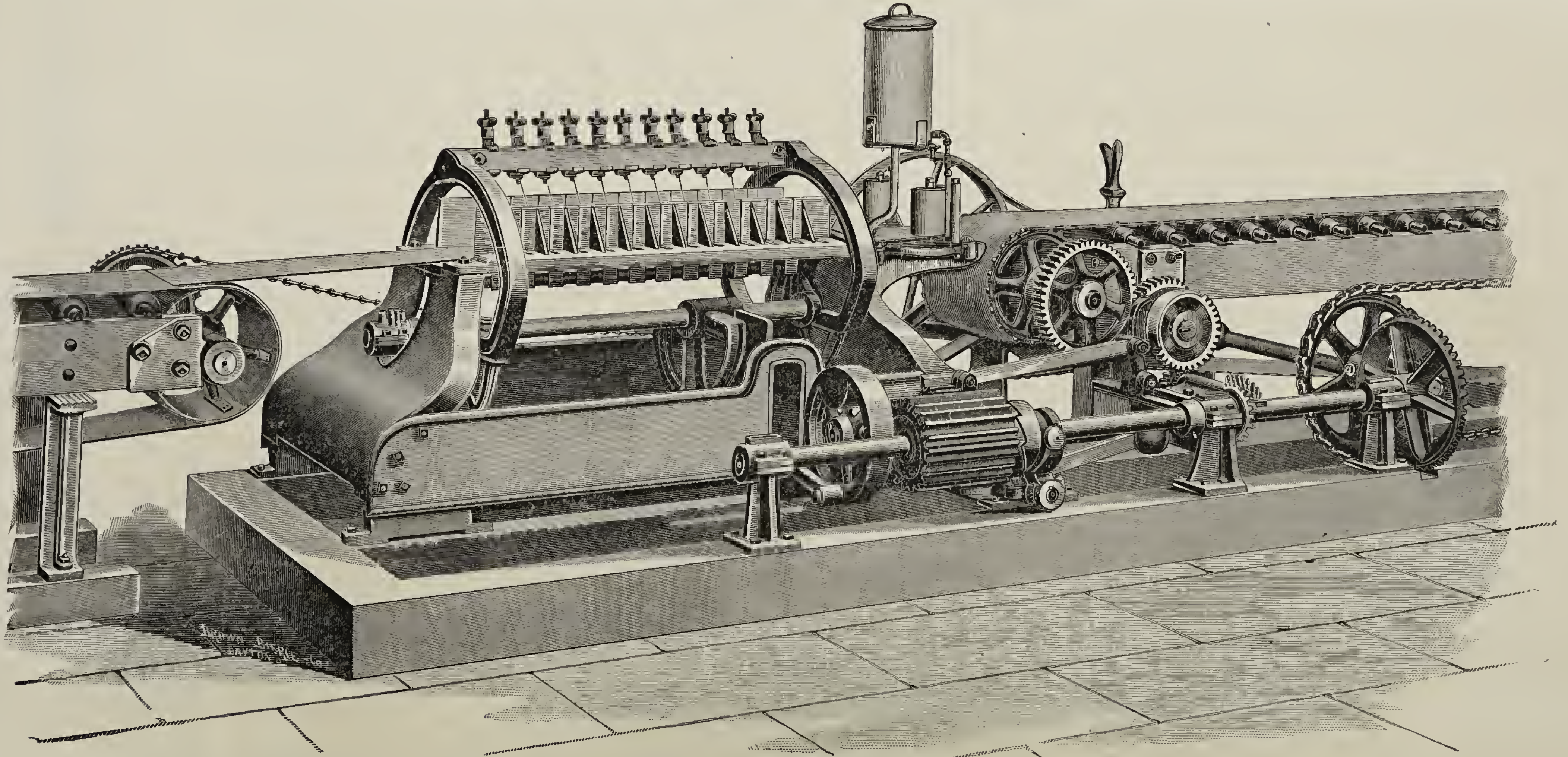

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Messrs. C. W. Raymond & Co., Dayton, Ohio.

P. O. Verona, Pa., July 9, 1896.

Gentlemen—We take pleasure in saying that we are perfectly satisfied and well pleased with your Automatic Cutting Table furnished with our second Daytonian No. 1 Brick Machine. Having confidence in your ability to turn out first-class work we purchased your Automatic Cutting Table and in so doing we were not disappointed, as we have every reason to believe it the only perfect one on the market. We therefore gladly recommend it to do splendid work and to accomplish all that you claim for it. It is no experiment, as our experience for the last five months has been such as to prove to us beyond a doubt that it is a pronounced success. We look upon it as the most perfect and wonderful piece of machinery in our whole Brick Plant and we express our wish that your efforts may be crowned with a rich reward.

We will be pleased to answer any inquiries we may receive.

Yours very truly,

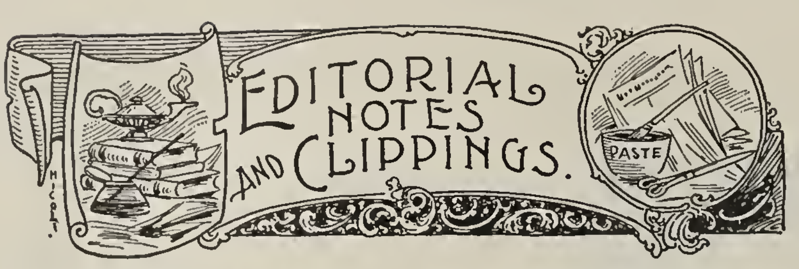
(signed) BLATCHFORD, MEEDS BRICK CO.

H. P. Meeds, Jr., Treasurer.

C. W. RAYMOND & CO.,

Send for Catalogue.

DAYTON, OHIO.



EDITORIAL NOTES AND CLIPPINGS.

N. B. Holt has started a new brickyard at Redlands, Cal.

R. H. Jellard, Birmingham, Ala., is in the market for fire and pipe clays.

A new brickyard is soon to be started at Poplar Ridge, O., by Ross Hapner.

Carmichael & Co., Wellsburg, W. Va., desire catalogues and prices on brick machinery.

A. D. Longhouse & Son, of Dunkirk, N. Y., are in the market for some fancy building blocks.

The Ohio Land and Clay Company, Columbus, O., are in the market for a second-hand dry press.

C. Webber, Palms, Mich., reports as doing a splendid business, having sold all the brick he can make.

The tile factory of Wallace & Son, at Creswell, Ore., was damaged to the extent of $1,000 by fire recently.

The Michigan Clay Roofing Tile Company has been incorporated at Grand Rapids, Mich., with a capital stock of $25,000.

J. C. Hundley has discovered a fine bed of clay on his property at Stein, N. C., and is making preparations to develop the same.

Ferguson's Tile Factory, at Crawfordsville, Ind., was burned to the ground July 17. The loss is total, as there was no insurance.

Saugerties, N. Y., is to have a new shale brick plant, with a daily capacity of 60,000. New York and Philadelphia capitalists are interested.

L. Watkins and C. L. Turley have taken charge of the Kentucky Fire Brick Company, Portsmouth, O., and will operate the same in the future.

During the recent heavy rains the yard of the Arcadia (Ind.) Brick Company was flooded with six feet of water, causing a damage of about $4,000.

Oscar Johnson is making arrangements preparatory to opening up a new brick plant at Idaho Falls, Ida., that will have a daily capacity of 200,000.

The Jamison-French Fire Clay Company, of St. Louis, Mo., has been incorporated by Wm. and Jas. Jamison and E. E. French, with $21,000 capital.

The Darlington (O.) Fire Brick Company has been organized and work started on the new plant, which, it is hoped, will be completed in a short time.

Jas. Hutton and Jas. Kivalahan have formed a partnership and will manufacture brick at Cuba City, Wis. The firm will be known as Hutton & Kivalahan.

The explosion of a boiler at the brickyard of Chase & Anderson, at Harrisville, R. I., has necessitated the closing down of the works until repairs can be made.

E. L. Pegram and F. W. Caldwell have purchased the brickyard of M. Cavenaugh, Decatur, Ill., which was recently sold at sheriff's sale, and will operate the same.

Glendale, Ariz., is said to be a good location for a first-class brickyard, as there is quite a demand for brick there and there is no yard, all brick being shipped from Phoenix.

It is with regret that we announce the failure of H. C. Dunn, the well-known brick manufacturer, of Erie, Pa. We trust Mr. Dunn may be able to weather his difficulties.

The stables at the brickyard of W. K. Hammond, at Cold Spring Harbor, Long Island, N. Y., were destroyed by fire Aug. 5, entailing a loss of $12,000, on which there was a full insurance.

Tramp Bros., formerly of Audubon, Ia., will erect a new brickmaking plant at Creston, Ia. They have tested the clay at Creston, and found it to be of superior quality for fine pressed brick.

On the afternoon of the 8th the brick plant of Hart & Shear, at Waverly, N. J., was destroyed by fire, all the main buildings being burned to the ground. The loss is partly covered by insurance.

A company to supplant the Steelton Brick Company is to be incorporated at Steelton, Pa., and will be known as the Steelton and Harrisburg Brick Company. The incorporators are Luther S. Bent, S. M. Brightbill, W. H. Seibert, J. E. Rutherford, George W. Cumbler, W. Abercrombie, M. A. Cumbler, E. E. Fiese, George Z. Zimerman and S. H. Rutherford.

A boiler explosion at the plant of the Louisville (O.) Brick and Tile Company, Aug. 13, totally wrecked the works, killing two men and seriously injuring the rest of the employes. The damage to the plant is estimated at about $10,000.

Jas. Costello, an employe at the Hydraulic Press Brick Works, St. Louis, Mo., met with a fearful accident last month. His left arm was caught in the machinery and torn from its socket, and for a time the man was in a critical condition.

Thos. Coady, a well-known brick manufacturer at Montowese, Conn., died at his home in that city July 21. Mr. Coady was stricken with paralysis some six years ago, from which he had suffered continuously up to the time of his demise.

The esteemed President of the N. B. M. A., R. B. Morrison, writes that they have been fairly busy at their new plant at Rome, Ga., having shipped nearly a half million brick, besides filling local contracts, and is feeling well satisfied with the season's trade.

C. C. Frampton, in renewing his subscription, says he has sold out his brick plant at Los Angeles, Cal., and will establish a vitrified brick plant at Vancouver, Wash., where he has an abundance of clay suitable for pavers and a good market for his product.

The brick works of Hugh Morrow, near Lisbon, O., were badly demolished by a boiler explosion, which occurred Aug. 1, killing one of the employes, Jno. McGeehan, and injuring another employe and a bystander. The cause of the explosion is unknown.

H. R. English advises us that there are excellent deposits of both pure china clay and fine fire clay at Jackson, Mo., and that that city offers splendid facilities for manufacturing interests. He will be pleased to correspond with any one desiring detailed information.

The brick plant at the Soldiers' Home, Leavenworth, Kan., has been purchased by Nash & Carr, and they will operate the same on the old location until December, at which time the plant will be removed from the grounds of the home to a good site within the city limits.

J. W. Hornsey, formerly connected with the Ball Bearing Car Wheel and Manufacturing Company, Cleveland, O., wishes to communicate with parties desirous of establishing a new plant. Mr. Hornsey has some capital to invest, and is competent to take charge of a plant.

A new firm, to be known as the East Coast Brick Company, has been incorporated for the purpose of manufacturing brick at Jacksonville, Fla. The capital stock of the company is $30,000. Among those interested are T. V. Cashen, T. Murphy, J. S. Smith, P. E. McMurray and J. E. Hartridge.

C. J. Ward, Manager of the Elizabeth City (N. C.) Brick Works, in a recent letter inclosing a year's subscription, says that they have just placed some new machinery in their plant, and hopes to send us a full description of the same, with photographs, which will appear in the Clay-Worker in due time.

The Mendota (Ill.) Tile Company advise us that they are making a superior quality of paving, sidewalk and building brick, and have just contracted to furnish sidewalk brick for that town and pavers for all crossings. They have a half million brick still on hand which they expect to dispose of before the season closes.

The Seattle Brick and Tile Company, the Puget Sound Brick, Tile and Terra Cotta Company and Henry Lohse, of Seattle, Wash., have formed an organization, not to raise prices, but for the purpose of keeping prices up to a point that will be a profit to all concerned. They want it understood that this is not a trust, but simply a combine for mutual assistance.

The Trenton (N. J.) Fire Clay and Porcelain Works were completely destroyed by fire Aug. 6. While the firemen were battling with the flames the roof and a wall fell in, burying several firemen, some of whom were seriously injured, one poor fellow being dead when his comrades reached him. The loss, which is partially covered by insurance, is about $200,000. This is the third fire this company has had in the last twenty-five years.

E. P. Keeley, of Royer's Ford, Pa., for many years a member of the N. B. M. A., died July 24. Mr. Keeley was in his seventieth year, and had been engaged in the manufacture of brick quite extensively for a long time. A local paper says of him: "Mr. Keeley was one of the most public spirited and enterprising men of the Schuylkill valley, and he was identified

[CONTINUED ON PAGE 142.]

Ancient and Modern Wonders.

THE story goes that Pygmalian fell in love with a beautiful statue called Galatea and prayed that she might come to life which prayer was answered, and which placed Pygmalian, who was a married man, in a peculiar position; he being the first man and a fine looking fellow that Galatea ever saw, she fell in love with him at first sight. A noted actress playing the role of Galatea, said to Pygmalian "am I not virtuous, am I not beautiful," was "given the laugh" by a large portion of the audience. They were justified in doing so because they were not familiar with the play and the leading lady was of questionable reputation and they failed to see that she was representing a character that was beautiful and came to life fully developed and with a mind as pure and innocent as a new born babe.

That is the trouble with a great many brickmakers who never read "Trade Journals" and information contained in catalogues of improved machinery, when they purchase machinery they do not take improved methods and true merits into consideration, but are governed by price alone. It is **LITTLE WONDER** they make mistakes and a **BIG WONDER** they do not fail, all of which can be avoided by using improved brick machinery made by

THE WALLACE M'F'G. CO.,

FRANKFORT, IND.

EDITORIAL NOTES AND CLIPPINGS.—Continued.

with many of the enterprises that contributed to the development and growth of the community. He held various offices of trust in Royer's Ford, and was always known as a man of most excellent judgment, and his advice and counsel were sought by many who looked upon him as an example among his neighbors." Allen L. Keeley, the only surviving son, will continue the brick business.

A company, of which the officers are Jno. Gibney, A. W. Twigger, H. D. Swain, S. Lent and H. Morehouse, has been organized at Sing Sing for the manufacture of glazed and enameled brick at Croton Point, N. Y.

Jas. McCleaster, a prominent resident of Harrisburg, Pa., died very suddenly, July 24, from heart disease. Mr. McCleaster first engaged in the brick business in 1853, and, with the exception of five years, has manufactured brick ever since, first as Manager of C. F. Muench's yard, afterward as a partner, and finally as sole proprietor. Mr. McCleaster had lived a busy and useful life, and by his death the city loses one of its best citizens.

Quite a serious accident occurred at the yards of the Clinton (Ind.) Paving and Building Brick Co. recently. Two of the men who were on night duty, after tending the fires, went to an empty kiln to keep out of a heavy rain, when the roof caved in on them, burying them beneath a mass of brick. Two hours later the night engineer noticed the fires were going down and went in search of the men. When the men were finally extricated one of them was suffering from a broken leg and a number of bad bruises, while the other was only shaken up badly.

The boiler shed at J. E. Murphy's tileyard, at North Salem, Ore., caught fire on the afternoon of July 15, and before the flames could be gotten under control they had spread to the rest of the yard, and all the buildings constructed of wood and ninety cords of wood piled around the kilns were completely destroyed. Mr. Murphy estimates his loss at about $2,000. There was no insurance on the plant, but, notwithstanding the heavy loss, Mr. Murphy will at once rebuild his sheds and lay in a new stock of fuel. He has nearly 85,000 feet of tiling in stock, which was not damaged in the least.

The plant of the Iowa Pipe and Tile Works, East Des Moines, Ia., was damaged to the extent of $25,000 by fire on the 8th inst. The main structure, containing the machinery, was completely destroyed, the dry house suffered in a like manner, and fifteen kilns were badly damaged. The engine room was only scorched, while the office alone escaped the flames entirely, which are thought to have started in the kiln sheds. Large quantities of green tile and pipe were ruined by the heat and water. The loss is partly covered by insurance, and the officers of the company say they will probably be rebuilt at once.

ERRATA.

'Tis said, "accidents will happen in the best of regulated families." When a mistake occurs in the Clay-Worker, it is in the nature of an accident. Our readers know that our pages are remarkably free from typographical errors. How-beit, there are "a few" in Mr. Tiffany's interesting paper entitled "Roofing Tiles," on page 110, that escaped the proof-reader's eye, to-wit: In the twenty-third line of the first column, the word "repressed" should be "expressed," and in the twenty-fifth line, "repressing" should be "expressing." The last word of the twenty-second line of the second column should be "utility" not "vitality," the word "one" should precede the word "piece" in the thirty-first line, and in the last column the word "span" in the third line should be "space."

A GOOD GUESS.

Editor Clay-Worker:

We have just shipped, and are shipping two machines to Virginia, three to South Carolina, three to Georgia, three to North Carolina, two to Texas, one to Kentucky, and one to Utah. This is the third shipment to Utah this season. Is it Bryan or McKinley that is doing this? I believe it is J. C. Steele & Son with the help of the Clay-Worker.

Statesville, N. C. J. C. STEELE & SON.

A PAYING INVESTMENT.

Editor Clay-Worker:

Please find inclosed $2 subscription for Clay-Worker. I am an occasional subscriber to the Clay-Worker for the reason that I am not a brick manufacturer, but a builder, and I have found the reading matter in the Clay-Worker well worth the subscription paid for it to those that are not brickmakers, if they are in any way connected with the building trade.

Emporia, Kan. WM. CORBETT.

A GOOD ADVERTISING MEDIUM.

Editor Clay-Worker:

In reply to our recent "ad." in the Clay-Worker for a superintendent we have received applications from nearly a hundred persons, and we say the full truth when we tell you that they came from the whole United States, also Canada; from Canada to New Orleans and from Maine to San Francisco, each party having taken our address from the Clay-Worker. We are truly glad that your valuable book is circulated so widely, and wish you the best of success.

M. S. NEWSOM'S SONS.

A NEW DEPARTURE IN BRICKMAKING.

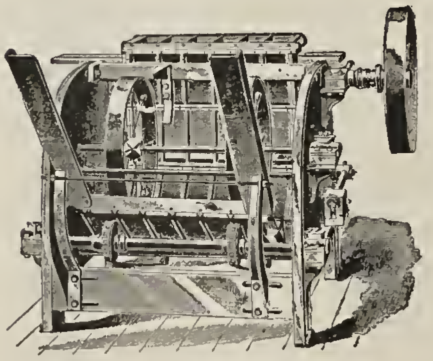
The work of making 200,000 brick for the South Danville Congregational Church has been commenced. The labor for doing the work has been donated, and Washington Smith is superintending the work.—Exchange.

WANTED—Parties who can organize a Manufacturing and Contracting Co. Patent Pavement at Chicago; to the right party special inducements, Address with reference,
81cm LOCK BOX 303, Syracuse, N. Y.

WANTED—Position as superintendent by a practical tile and brick maker also understand the handling of down draft kilns and all kinds of brick and tile machinery, boilers and engines. Have had 14 years experience. Address BOX 370,
81c DeKalb, Illinois.

FOR SALE AT A BARGAIN!

A new and complete dry-press brick plant in vicinity of Baltimore. Plenty of finest of clays for red, buff and other colored brick, also vitrified brick. Reason for selling, the failing health of principal owner.
81cm Address GREAT BARGAIN, care Clay-Worker.



Your Best Friends

Are to be Found in

The Only Sander,
That will sand any size of mold. No expense to keep in repair.

The Jumbo Barrow
Which holds 150 brick is the best and cheapest. Is perfectly balanced.

The Disintegrator
Which saves your more and costs you less than inferior machines, and our

First-Class Supplies
Such as Barrows, Trucks, Molds, Dump Tables, Dump Carts, Conveyors, Pug Mills, Brick Wagons. Grates, Doors, etc.

No expensive Belts to Wear out. Our Prices are away down to Rock Bottom. Give us a Trial. Send for Catalogues.

The HORTON M'F'G. CO., Painesville, Ohio.

WANTED:

To Give
Information About,

The "Monarch" Brick Machine, (Horizontal,)

It is big, strong and simple. Weighs almost 12,000 pounds.

Has double pug-mills giving 14 feet of tempering capacity; double presses, which produce the most powerful pressure of any machine, and being "all in the mud," don't wear a bit; bearings where clay **cannot** get into them.

It is the only "soft mud" machine put on the market for years that had a new **fundamental** idea in it. All others have been improvements or modifications only of fundamentally **wrong principles.** Fully explained in circular. Seventy-five in daily use.

The "Iron Quaker" Brick Machines, Horse and Steam Power.

For 15 years, the acknowledged leading Upright Machines. Comparitively low in price. List of hundreds in circular.

The "Wellington" Mould-Sanding Machine.

A new one. The simplest, best, and at same time, lowest priced.

Ball Bearing Brick Barrows.

These good things don't need even pushing along. Load them, balance them, and then a slight inclination carries them along. Wheelers increase their days work 20 to 30 per cent. Order a sample one.

Double-Deck Pallet Trucks. The best of all.

Moulds. All kinds. Machine; hand; shapes; lined, etc., etc.

Cast Iron Dryer Cars. The best pattern. Roller bearings. Low prices.

Kiln Castings. Doors and frames. Furnace fronts. All kinds grate bars.

FOR SALE.

Odd sizes of molds. Have not been used:
5 Molds, 8¾ x 4¼ x 2⅜.
12 Molds, 9¼ x 4½ x 2¾.
20 Molds, 8 13-16 x 4 3-16 x 2 7-16.

Second-hand, but used a few days only:
19 Molds, 9½ x 4⅝ x 2 9-16.
10 Molds, 9½ x 4⅝ x 2¾.
20 Molds, 9¼ x 4½ x 2 ¾.
All six-brick molds, with 9-16 partitions.

**Elevators, Dump Tables, Sand Barrows,
All Styles of Trucks, Dump Carts, Represses,
Disintegrators, Engines, Boilers,
Shafting, Pulleys, Hangers, Etc.**

The Wellington Machine Co.,
Wellington, Ohio.

THE NEW YORK MARKET.

WHAT HAVE THE POOR MORTALS who work on the brickyards, and the bosses as well, done to offend Jupiter, that he bears so heavily on them this summer? Some say it is a benefit to the manufacturer, as it reduces the output. Yes, and a big one, but only puts him in a still deeper hole. When he takes the chance of a ray of sunshine in the morning and starts his machines, before the next morning he will have them washed, and, in most instances, very badly.

June was considered by all as having reached the limit, but July is far ahead on rainfall, with no let-up up to date. The engineers have to pump the water out of the bank, the men loaf and growl, and the boss don't say much, but keeps up a great deal of thinking.

One of the yards, the middle of June, wanted twenty arches of green brick to fill the shed, and then stop molding. The hacks were all full, and the intentions were that the day of the 3d of July would finish molding and let the single men go. The 30th of July saw the last of those twenty arches molded, and the yard has stopped for the season, as well as the one next to it. A short season.

It is remarkable that it should take a month to make that number of brick—not that the boss would not mold only when the weather and yard was O. K., but he run his machines when other yards lay still.

The present outlook for the trade this year is not golden. The silver lining of the cloud, that we are told is behind all depressions of business, does not contain for the brick men, especially in this section, a bright and prosperous year. Otherwise it has assumed a color of darkness which the trade will soon begin to feel, to judge by the events in the real estate world, to which the brick trade must look for the consumption of its output. In New York city men who were about to build and had made arrangement for loans to construct with, and had made preparations to commence operations, were told by those who were to furnish the capital that the mortgages must contain a clause payable in a metal that will pass current all over the world. It stopped operations at once, and no doubt many more instances of like nature in cases of new structures will arise to delay, if not wholly stop, many jobs.

Within the past week there have been several cases where the landlord has notified the agent not to rent or lease any buildings beyond next May, on the basis that if by possible chance the silver lining of the cloud, which many seem to think will set dollars running along the highway, will be the beginning of an advance in rents.

—Local Trade—

Is very dull, with the prospects of it still becoming worse. The yard which supplies most of the brick around the town and surrounding section is still drawing brick which were made last year. Last season, with the usual amount of other years under the shed, they molded three weeks later than the rest, as said, so that they would not get out of stock. In the interval of the close of the season and the beginning of molding this year they shipped three-quarters of a million of brick to the New York market, at a figure below what they would have sold for at the close of the making season, and still have old stock on hand, which goes to show that some one made a mistake without warrant.

—Restless Paving Brick.—

The city of Brooklyn is in doubt as to what to do with the pavement on McDonough street. Whether, like Banquo's ghost, it will not down, or from some other cause, it is a source of trouble to the Commissioner. A defect must be there certainly. Probably some of the readers of the Clay-Worker may be able to explain the cause. I give the account. "The Brooklyn City Works Commissioner and all his engineers are apparently unable to silence the rumbling noise which annoys the residents on the line of the vitrified brick pavement on McDonough street. They have tried hard to remedy it, but have failed. Every passing wagon wakes the echoes as when the first complaint was made. The theory of the engineers was that the pavement had sprung in the center, leaving a hollow space between the brick and the concrete foundation. So it was decided to run a heavy roller over the street and crush the brick down. The fifteen-ton roller of the department ran over the pavement on Thursday afternoon, and nearly ran away in the bargain. It did not remedy the defect, however, and again another delegation of citizens from the neighborhood called on Mr. Willis and told him that the annoying noise still continued. Mr. Willis has about decided that brick pavement in Brooklyn is a failure.

—The Situation—

In the New York market, between the Dealers' Consolidated Brick Company and the commission men, remains about the same. Of one thing the brickmaker, whether he is a company man or not, can rest assured—that the rates he has received thus far this year or since the company has opened its office is to be credited to their efforts or the support its members have given by sticking together and selling on such lines as the market will stand. Let them withdraw and the drop in rates would be to a figure that would cause the manufacturer to exclaim, "Where are they going to?" As it is, the market keeps shrinking from sheer weight of shipments. On the other hand, there is a holding back at points of shipment, as well as a compulsory holding in market of loaded boats, as mentioned in my last, by the dealers buying from the commission men, and, when they choose to pick up a cargo from the company, do so. If mention is made of the fact, the cry is supply and demand does it. In this case the demand reaches a side that is not in favor of a combination, and in some individual cases have said what they would do.

It is a very peculiar state of demand and supply, your readers will say; that the same grade of brick, being on the market and for sale at same rates, should lay in market for three weeks and longer, waiting sale as company brick, while the commission men's brick are supplying the demand. The supply and demand never have been equal, and never will be, but in the present case it looks as if the commission men were filling the demand, while the Consolidated Company was holding the supply. History repeats itself is an old story. Perhaps some may, before the chimes of '97 ring from old Trinity bells, awake to the fact that they have made a mistake this year that will be lasting.

—A Proposition—

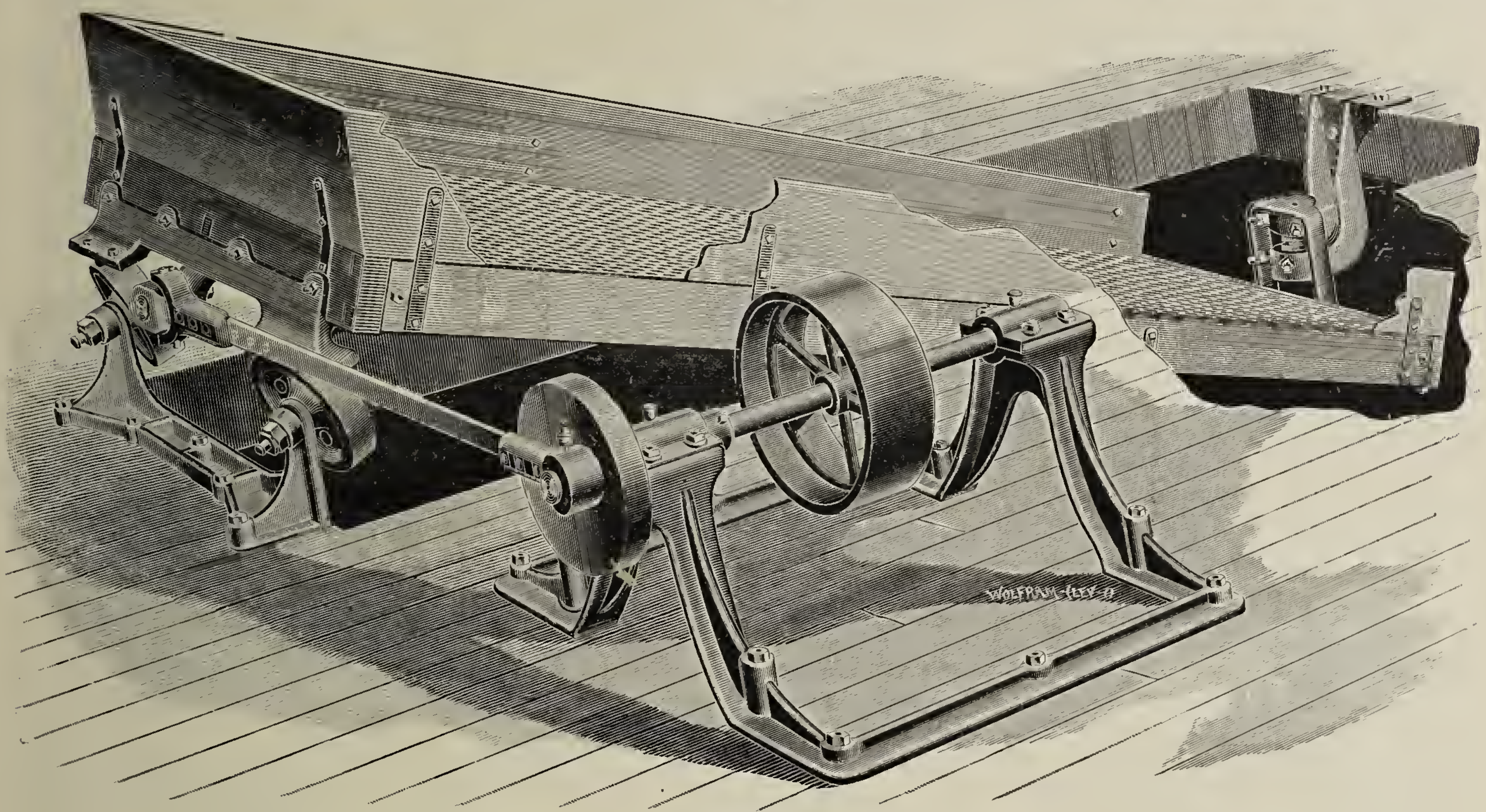
Was sent out in the form of a letter to each stockholder, about the first of July, asking them to give their opinion and how they felt in the matter in regard to a cut in prices by the company, or make a drop of a dollar per thousand. It did not result in any action, but it certainly would have been a good move, and would have forced an issue as it never was so effected before, and there is not a doubt but that such a course is the true one. There were two Haverstraw men who were willing, the one to sell three million at $3 per thousand and the other two million at the same rate, if there was a concerted movement to reduce rates. If the trade had more such men in it it would soon reach a plane that the manufacturer would be the one who would control his business. One of the men, Mr. McGuire, is old in years, and has made his money in the manufacture of brick. Beginning at the bottom of the ladder, he reached the top, and he is one of the few men in this generation whose word is his bond. The other gentleman, Denton Fowler, Jr., is a younger man, but has full knowledge of the trade, learning it on his father's yard. He is one who will "stay" in a fight till the last. When "Dent" drops out it will be because there is nothing left to fight for.

—The Market.—

As mentioned last month, there was an advance of an eighth in the special grade, with no grade feeling the call. It would seem as if all grades would be advanced with them, but it was the other way; they gradually fell off, and at present writing the specials have reached not to any marked extent, but still a loss. The specials may be quoted at $5.12½; ordinary quality at $4@4.50; other grades, $4.62½@5; New Jerseys, $3.50@4.25; Haverstraws, $4.25@4.75; Fishkills, $4.50@4.75; uprivers, $4@4.37½; Hackensacks, none in market; pale, $2.50@3.

A. N. OLDTIMER.

The Richardson Shaking Screen.



PATENTED.

The best and the cheapest screen for clayworkers.

Is guaranteed to screen more fine clay with less cost for repairs and attention than any Screen ever offered for sale in this country.

Send for prices and testimonials of prominent brickmakers using this Screen.

W. D. Richardson & Co.,

Engineers and Manufacturers of
Improved Clayworking Machinery,

809 Cuyahoga Building,
CLEVELAND, OHIO.

PROMPT PEOPLE.

Don't live a single hour of your life without doing exactly what is to be done in it, and going straight through it from beginning to end. Work, play, study, whatever it is, take hold at once, and finish it up squarely; then to the next thing, without letting any moments drop between. It is wonderful to see how many hours these prompt people contrive to make of a day; it is as if they picked up the moments which the dawdlers lost. And if ever you find yourself where you have so many things pressing upon you that you hardly know how to begin, let me tell you a secret: Take hold of the very first one that comes to hand, and you will find the rest all fall into file and follow after, like a company of well-drilled soldiers, and though work may be hard to meet when it charges in a squad, it is easily vanquished if you can bring it into line. You may have often seen the anecdote of the man who was asked how he had accomplished so much in his life. "My father taught me," was the reply, "when I had anything to do, go and do it." There is the secret—the magic word, now! Make sure, however, that what is to be done ought to be done. "Never put off till to-morrow what you can do to-day" is a good proverb, but don't do what you may regret.—Merchant Sentinel.

GLAZING ROOFING TILE.

A correspondent requests that we give through the columns of the Journal a formula for glazing roofing tile. There are requisite conditions necessary to success that need to be considered in order to succeed in glazing ware.

First, the quality of the clay. Will it bear a sufficient heat?

Second, the kiln. Is it so constructed that it may be closed so as to retain the heat?

Third, the setting of the ware.

We give the following method for salt glazing drain tile, which, we conclude, will apply quite as well to the glazing of roofing tile:

Treat the ware in every particular as if to burn without glazing until the tile are brought to the requisite heat to insure a good burn. On the last fires throw into each fire a common shovel of salt, passing around the kiln twice, using a shovel of salt to each fire each time; then quickly close the kiln, bottom and top, and let it stand for a few hours, and the work is done.

If the tile are not glazed when taken out it is because the heat was not sufficient. If the heat is increased and the ware melts down before a glaze will form it is clear that the clay will not stand a sufficient heat to glaze. If the clay will stand a sufficient heat to glaze the expense is very light—from one and a half to two bushels of salt being required to glaze a common sized kiln.

In glazing earthenware the ingredients which are used are red lead, white lead, feldspar, ground flints, ground flint glass, cornish stone, clay, soda, nitre and borax. Various compositions are made for glazing by mixing some of these substances together in different proportions, according to the nature of the material which is to be glazed and the purpose for which the article is intended. Thus, in the glaze of common earthenware, white lead and ground flints predominate.

The use of the salt glaze is probably the best to glaze roofing tile, supposing that the clay used will stand a sufficient heat to salt glaze. It may require some time and experimenting to get the best results, as to the quantity of salt and conditions needful to secure a good glaze.

The use of slip clay to glaze a cheap class of earthenware is quite common. Slip clay may be had at Albany, N. Y.

We have the following formula in the use of clay: One part carbonate of soda (common soda), two parts fine or powdered sand, two parts slip clay. Mix to the consistency of cream, into which dip the tile, then dry and burn.

Mention the CLAY-WORKER,
When writing to Advertisers,
Mention the CLAY-WORKER.

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

WANTED. One second hand, hand repress. One second hand automatic cutting table, end cut.
BOX 83,
8 1 d care Clay-Worker.

FOR SALE—Good, first-class Bonnot pug mill. Inquire
MONMOUTH POTTERY CO.,
8 1 d Monmouth, Ill.

WANTED—Six good men for enameled brick works, to make, dry stock, dip, set and burn. Address
KILMAMOCK,
8 1 d Care Clay-Worker.

WANTED—Position as superintendent or manager of dry pressed or stiff mud plant, by first-class brick man; many years' experience and best of references. Address
SAINT LOUIS,
8 1 c Care Clay-Worker.

WANTED—To buy or lease clay lands or plant for the manufacture of brick, either common or paving. Must be near good market. Eastern location and buff clay preferred. Address C. B.,
8 1 d Care of Clay-Worker.

WANTED—To invest small amount in good brick company, either new or established, by man well posted in the erection of plants and manufacture of all kinds of brick. Desire to assume office of manager or superintendent. Address
8 1 d P. B., care of Clay-Worker.

NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
6 t f d Wellsburg, W. Va.

WANTED—Re-engagement as manager or superintendent of fire brick works. Advertiser has had a long practical experience in first class work. Address
6 3 d F. B. care Clay-Worker.

FOR SALE—170 acres of fine shale land adjoining Springfield Paving Brick Company, where the best shale brick are made. Railroad trackage.
EDWIN A. WILSON,
7 3 dm Springfield, Ill.

WANTED—To serve somebody who is in need of a vigorous man, capable of assuming full control of soft or stiff-mud brick plant. Drilled in every department. Twelve years' experience. Best of references as to character and ability. Address,
YOUNG GRIMES,
4 3 L Care Clay-Worker.

FOR SALE—Two Simpson presses, one Plymouth brick and tile machine, Plymouth board delivery, brick cutting table, Plymouth tile cutting table, Freese "A Special" brick machine, Stevenson pug mill and Emens granulator. For description of this machinery see page 579, June Clay-Worker, or address
CLEVELAND VITRIFIED PRESSED BRICK CO., 809 Cuyahoga Bldg.,
7 tf d Cleveland, O.

FOR SALE—One large 4-mold Eureka dry pressed brick machine, very little used. One No. 2 Worrell dryer; quite new; excellent for drying clay of all kinds. One Ross disintegrator, about 48 inches in diameter; suitable for mixing and puddling clays for tilemakers, etc. Five tubular boilers, 16 feet and 18 feet lengths; 5 feet and 6 feet diameters, with all fittings complete; these have been used some time, and some of the flues need repairs. One 6-foot Sturtevant blower. Twenty 7-foot disc fans. One straight-line engine, cylinder 14 x14; excellent order; 100-horse-power. All the above will be sold at extremely low prices. Address C. SIEDLER, President,
94 Liberty street, New York.

Fire Brick Works at Public Sale.

The long established and well-known fire brick works of W. H. Berry & Co., at Woodbridge, N. J., will be sold by the undersigned, at public vendue, on the premises to be sold, on Tuesday, the 25th day of August next, at the hour of 2 o'clock in the afternoon.

The sale will include the lands on which the works are erected, docks, factory buildings, kilns, machinery, storage sheds, tools, supplies, etc., etc. A large stock of fire brick, clay, sand, etc., will be sold at the same time. The privilege is reserved of offering the personal property for sale, either separately or in connection with the real estate. For further particulars apply to the undersigned.

JAMES E. BERRY,
MARCUS A. BROWN,
Surviving Partners,
8 1 d Woodbridge, N. J.
Dated July 22, 1896.

PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

A Handsome Book for a Two-Cent Stamp—New Publication by the D. & C. Line.

To those who contemplate taking a summer outing we will mail for 2 cents postage our illustrated pamphlet, which contains a large number of fine engravings of every summer resort between Cleveland, Toledo, Detroit and picturesque Mackinac. It has many artistic half-tones of points of interest of the upper lake region. Information regarding both short and extended tours, costs of transportation and hotel fare, etc. Address A. A. SCHANTZ, G. P. A.,
Detroit, Mich.

FOR SALE OR RENT ON ROYALTY—Brickyard on James river, in Charles City County, Virginia, consisting of 16 acres, 25 feet depth of clay, formerly operated by Snead & Scott, of Lynchburg, Va.; in close proximity to Newport News, Richmond and Petersburg. Clay unsurpassed and will vitrify. Address

BALTIMORE,
7 2 d Care Clay-Worker.

WANTED — SUPERINTENDENT — Must understand the manufacture of terra cotta and conduits, and must be able to either invest or procure us $10,000. We own 100 acres of the finest clay deposit in the country and have a five-year contract from one of the largest firms in the country for our entire conduit production at a large profit. Satisfactory references given and required. Good salary and permanent position for the right man. Address

PROSPERITY,
7 2 dm Care Clay-Worker.

FAST TIME AND THROUGH SERVICE TO SOUTH BEND.

Commencing June 22, through parlor cars will be operated between Indianapolis and South Bend daily, except Sunday, on Big Four train No. 3, leaving Indianapolis at 5 p. m., making immediate connection with Vandalia line fast train at Colfax, which passes through Frankfort, Logansport, Lake Maxinkuckee and Plymouth, arriving at South Bend at 10:45 p. m. G. E. ROCKWELL, D. P. A., for details.

WANTED—Position by man with nineteen years' experience in enameled brick, pottery and terra cotta. Is practical and thoroughly understands the compounding of bodies and glazes. Also competent to erect plants and kilns, and is a good burner. Can refer to buildings containing enameled brick and glazed terra cotta of his manufacture. Address

ENAMEL-TERRA COTTA,
7 tf d Care Clay-Worker.

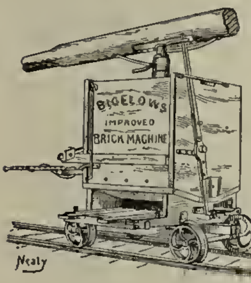
A BRICKMAKER, with long practical experience and knowledge of every up-to-date method, especially on paving bricks, having patent kilns and dryer, can bricks, using patent kilns and dryer, can draw plans, test and analyze clays, with best refernces, is open for engagement with a good firm, where he can take charge of a plant or an equally responsible position. Address

LAUZ,
Care Clay-Worker.

TO ST. PAUL AND MINNEAPOLIS VIA BURLINGTON ROUTE.

Two splendid through trains daily from St. Louis, Chicago or Kansas City to the North, with free chair cars, dining cars and sleepers. Trains from St. Louis and Chicago are via the Mississippi River scenic route; from Kansas City via Burlington Route and Sioux City line. Consult ticket agent.

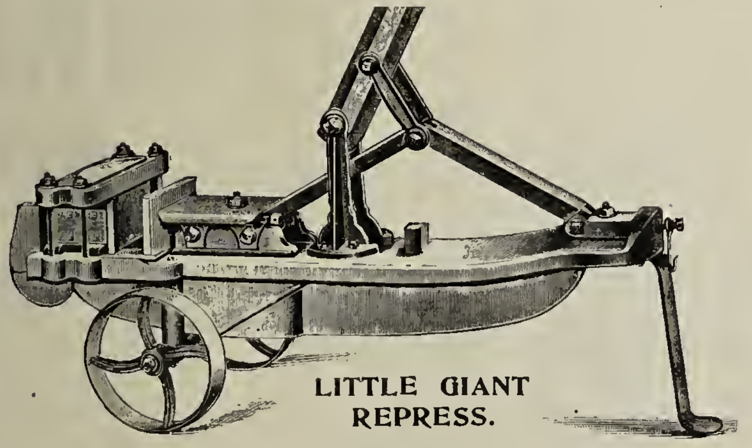
L. W. WAKELEY, Gen'l Pass. Agt.,
St. Louis, Mo.



BRICK MACHINERY.

One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

A. E. BIGELOW, Spaulding, Ill.



LITTLE GIANT REPRESS.

ELI Auger Machine, Capacity 45,000 to 70,000.

ELI Jr. Auger Machine, Capacity 30,000 to 40,000.

LITTLE ELI Auger Machine, Capacity 15,000 to 20,000.

No. 1 A, Auger Machine, Capacity 25,000 to 35,000.

No. 2 B, Auger Machine, Capacity 12,000 to 20,000.

THE No. 1 A and No. 2 B Machines furnished with Square Hopper in place of Upright Pug Mill if desired.

DISINTEGRATORS, HORIZONTAL CONVEYORS,
GRANULATORS—SINGLE AND DOUBLE SHAFT,
UP-RIGHT PUG-MILLS, WINDING DRUMS,
BRICK TILE AND HOLLOW BLOCK TABLES.
TRUCKS, WHEELBARROWS, ETC.

Manufactured and fully warranted by

Michigan Brick and Tile Machine Co.,
MORENCI, MICH.

FOR SALE—The best equipped roofing tile plant in the United States. It is on a paying basis, and a party understanding the business can make big money out of it. The business is established and can sell its capacity easily every year. The right party can clear his investment the first year. He will have no reputation to make, as the goods have already the best reputation of any made in this country and have been on the market several years. Plant, machinery, kilns, etc., all new, most of them put in this past year, and are of the best and modern. The owner will sell an interest to a good, first-class clay man who understands the business thoroughly if he can't sell out complete. The heason for selling is simply owner is interested in other business and knows nothing about running a clay plant, and is not adapted to the business. After getting into it he finds it will take all his time and more clay knowledge than he possesses to make a success of it such as the business is possible of attaining, and for that reason wishes to sell out cheap, part cash, balance long time, or will sell interest to desirable party. Located in Illinois near Chicago. Address

3 tf d ARTHUR, care Clay-Worker.

FOR SALE AT A BARGAIN.

A complete brick plant, including nine acres of finest clay land, one good engine and one Henry Martin Soft-mud Machine, with crusher and disintegrator; also stone and earthenware and drain-tile plant, including two large kilns and good engine. For information address

STONEWARE MFG. CO.,
Or EDWARD ZEA, Sec'y,
7 2 c Strasburg, Va.

EXPERT IN ROOFING TILE.

Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address,

CHARLES STOLP, Box 166,
3 tf 1 5p Chicago Heights, Ill.

NOTICE.

Parties wishing formulas for the manufacture of enameled or glaze brick (once or twice burning), either on clay or burnt brick, with full instructions, also, pure white dull enamel, or other colors, for terra cotta, new process, can obtain same by inclosing five dollars. Parties ordering must state nature and quality of clay they wish to enamel or glaze. In such cases, if instructions sent are strictly followed, a guarantee given that results will be obtained equal to anything manufactured, or money refunded. Address,

4 tf L EUREKA, care Clay-Worker.

BRICK MACHINERY FOR SALE.

One 2-mold Whittaker dry-press brick machine.
One 2-mold Whittaker semi-dry-press brick machine.
One 1-mold ornamental Whittaker brick machine.
One 4-mold dry-press brick machine, Simpson make.
One 4-mold dry-press Eureka brick machine.
Two repress brick machines.
One stiff-mud brick machine.
One brick and tile machine combined.
One dryer.
Also disintegrators, breakers, screens, trucks, etc.

SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

FROM ST. LOUIS, CHICAGO AND PEORIA TO THE WEST VIA BURLINGTON ROUTE.

The traveling public is sure to find the best equipped fast vestibuled trains from the East to the Missouri river, Nebraska, Colorado and Montana via the Burlington Route. Elaborate compartment sleepers (same rate as standard sleepers), free chair cars of luxurious pattern, St. Louis to Kansas City; standard sleepers, free chair cars and dining car from Chicago. Ask ticket agent for tickets via BURLINGTON ROUTE LIMITED TRAINS.

L. W. WAKELEY, Gen'l Pass. Agt.,
St. Louis, Mo.

WANTED—Situation as superintendent, foreman, or charge of setting, burning, repair and erection of kilns, either dry clay, stiff clay or vitrified street paver works. Can superintend erection of works. Practical in every branch. Also a kiln builder. Good references. Address, SUCCESS,
6 t f, 75 p Care Clay-Worker.

ENGINES FOR SALE.

One 200-horse-power Corliss engine.
One 150-horse-power Corliss engine.
One 125-horse-power cut-off engine.
One 100-horse-power slide-valve engine.
One 80-horse-power slide-valve engine.
One 75-horse-power automatic cut-off engine.
One 60-horse-power center-crank engine.
One 55-horse-power self-contained engine.
One 50-horse-power self-contained engine.
One 40-horse-power self-contained engine.
One 35-horse-power slide-valve engine.
One 30-horse-power slide-valve engine.
One 25-horse-power slide-valve engine.
One 20-horse-power slide-valve engine.
One 15-horse-power slide-valve engine.
One 12-horse-power upright engine.
One 10-horse-power upright engine.
One 8-horse-power upright engine.
One 12-horse-power engine and boiler combined.
One 10-horse-power engine and boiler combined.
One 8-horse-power engine and boiler combined.
Two hoisting engines.
Three steam elevator engines.
Four pair of mining engines.
One Ingersol steam drill.
SCHOELLHORN-ALBRECHT MACH. CO.,
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Davis's Brick, Tiles and Terra-Cotta. Third Edition. Revised, Improved and Enlarged.

RECENTLY PUBLISHED.

A Practical Treatise on the Manufacture of

BRICK, TILES AND TERRA-COTTA,

Including Stiff Clay, Dry Clay, Hand Made, Pressed or Front, and Roadway Paving Brick, Enameled Brick, with Glazes and Colors, Fire Brick and Blocks, Silica Brick, Carbon Brick, Glass Pots, Retorts, Architectural Terra Cotta, Drain Tile, Glazed and Unglazed Roofing Tile, Art Tile, Mosaics and Imitation of Intarsia or Inlaid Surfaces. Comprising every product of Clay employed in Architecture, Engineering and the Blast Furnace. With a detailed description of the different Clays employed, the Most Modern Machinery, Tools and Kilns used, and the Processes for Handling, Disintegrating, Tempering and Molding the Clay into Shape. Drying, Setting and Burning. By Charles Thomas Davis. Third Edition. Revised and in great part rewritten. Illustrated by 261 engravings, 662 pages, 8 vo.

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Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years.

Write for prices.

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National Fire Clay ... Mining & Mfg. Co.,

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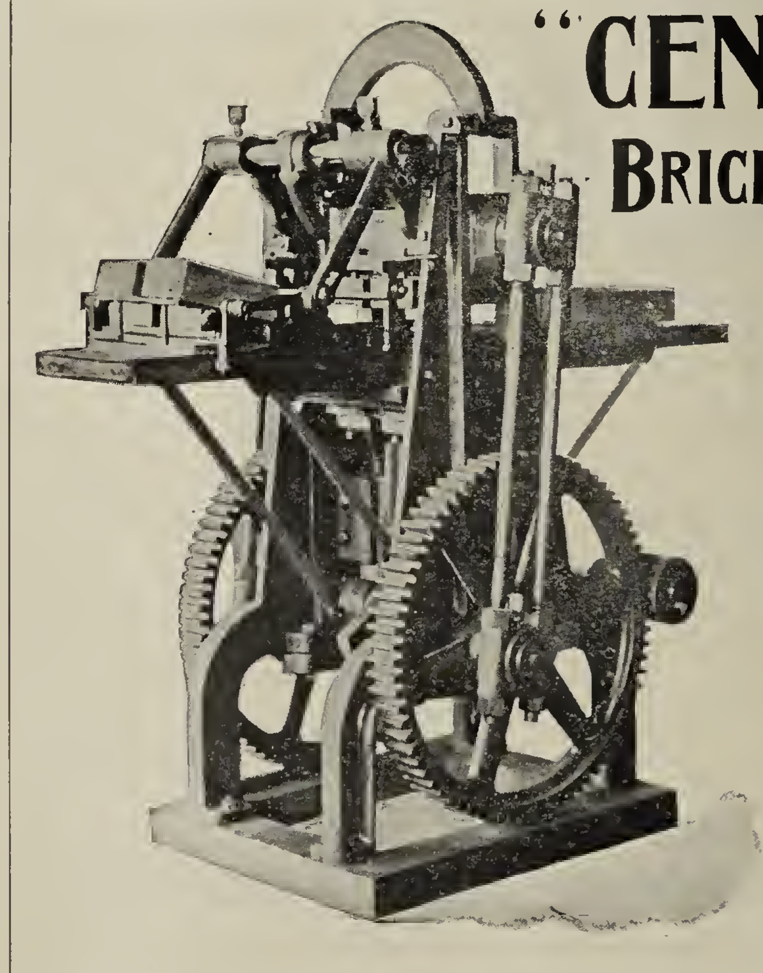
THE highest quality of Clay for Glass House Pots, Fire Brick, Tank and Furnace Blocks and all articles of Fire Clay used in the construction of Glass and Metallurgical Furnaces.

Read the analysis carefully and note that our clay is the superior of the imported article.

Silica	45.24
Alumina	39.31
Oxide Iron	.37
Lime	.29
Magnesia	.10
Alkalies	.27
Water	14.54
Total	100.12

"CENTRAL" BRICK REPRESS.



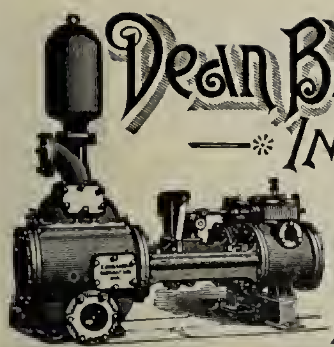
This cut shows our double die machine, which is acknowledged to be the simplest and best repress on the market.

It is no experiment, having been in use over two years with best results. Will do same work as others of twice the size and cost.

For particulars address

Central Machine Works,
236 Abbey Street,
Cleveland, Ohio.

We furnish all supplies and repairs for any make of the "SWORD" Brick machine.



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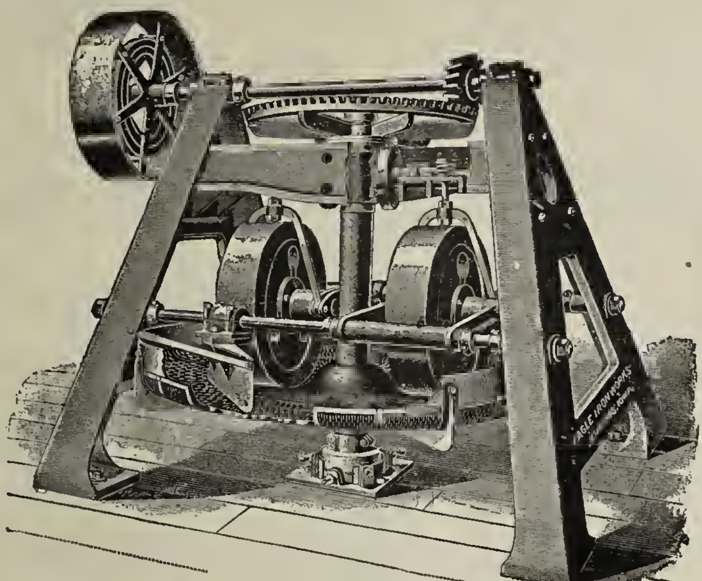
SINGLE & DUPLEX PUMPS.
HORIZONTAL AND VERTICAL PUMPS.
Best Design & Workmanship.
PRICES REDUCED *Send for CATALOGUE.*

OUR NEW 9 Ft. IRON FRAME DRY PAN

SEND for catalogue and read up on our patented features of this machine. Our motto in its construction and design is

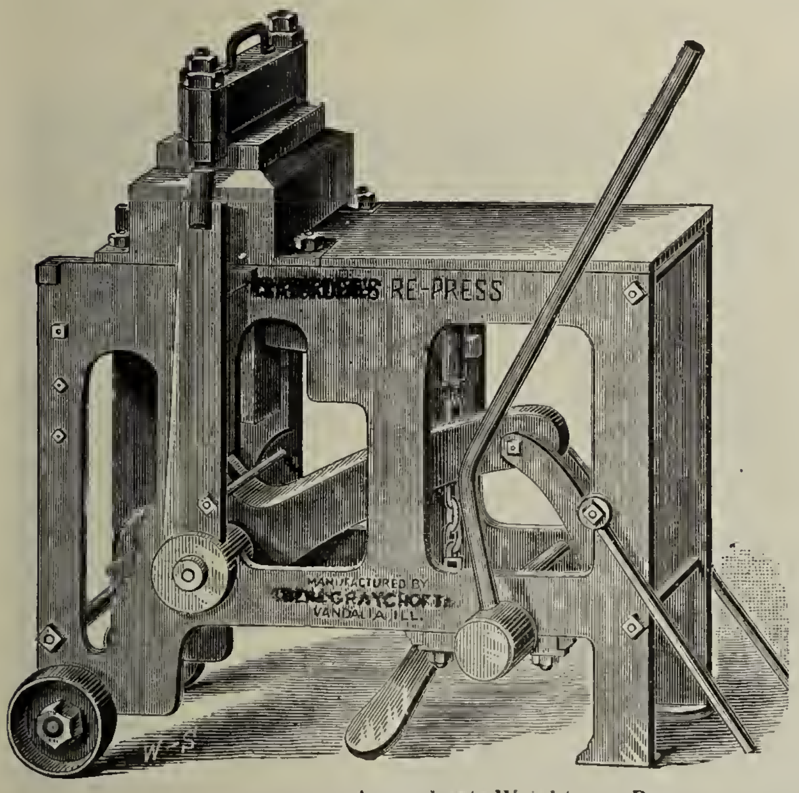
"NOT HOW CHEAP, BUT HOW GOOD."



EAGLE IRON WORKS, Des Moines, Ia.

The CRAYCROFT RE-PRESS BRICK PRESS

FOR RE-PRESSING RED AND FIRE BRICK.



This Re-press, Fully Guaranteed, will be shipped to Responsible Parties on Trial for a Reasonable Time.

This press has all modern improvements, and is equal to any in the market.

It is manufactured of steel, wrought and cast iron, and combines strength, power and durability.

It is used for repressing red brick, which are used for the fronts of fine buildings, and enables the manufacturer to make good pressed brick at a slight advance over the cost of ordinary red brick.

The press is also used to repress fire brick.

Sample bricks from this machine furnished on application.

Approximate Weight, 900 Pound

Address, BENJ. CRAYCROFT, Vandalia, Ill.

THE IMPROVED
Interlocking Brick,
For Hollow Walls and Ventilating.
Send for pamphlet.
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We have a large bank of a superior quality of SLIP CLAY. Price very low by barrel or carload. Best of reference as to quality.

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Successor to JACKSON BROS.,
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Established 1852.

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Plans furnished for kilns and complete manufacturing plants, also system of bookkeeping to ascertain daily cost of manufacture.

Address by letter only
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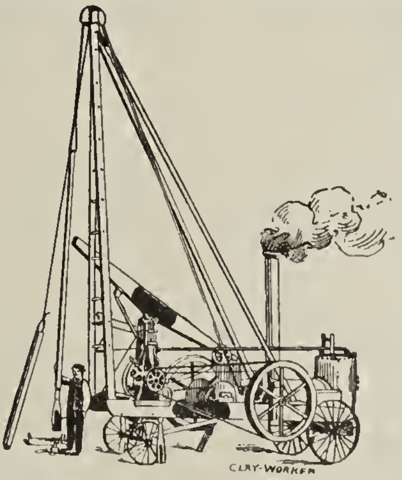
Artesian Wells of any Diameter.



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Tanks of any size from 100 to 100,000 gallons capacity.

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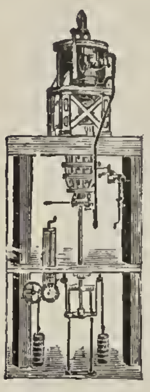

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Making From 2 to 30-Inch Pipe Inclusive.

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Clay Grinding and Tempering Pans and Pug Mills.

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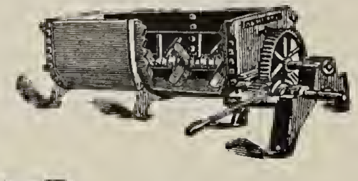

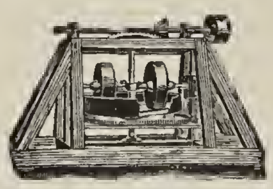

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NEW DISCOVERY KILN

Patented April 18, 1886, June 1888 Nov. 7 1891.

More Than 1,000 Now Stand as Monuments of Fame to its Inventor

It is neat, compact, durable, easy to handle, constructed on scientific principles. Has been improved and now burning almost everything made from clay, such as Sewer Pipe, Vitrified Pavers, Etc., to Pottery and finer wares. Built any size up to 100,000. In short it leads the way.

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CAPT. G. H. ETTLA, Agt. }
Marietta, Pa.

Chenoa, Ill.

Elevators

For handling
CLAY,
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SAND,
BRICK,
TILE,
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Also Furnish
RUBBER,
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Brick-Glazes
ready prepared
to burn successfully
in all kiln-systems,
we furnish for every
kind of material.

In general use
in Germany!

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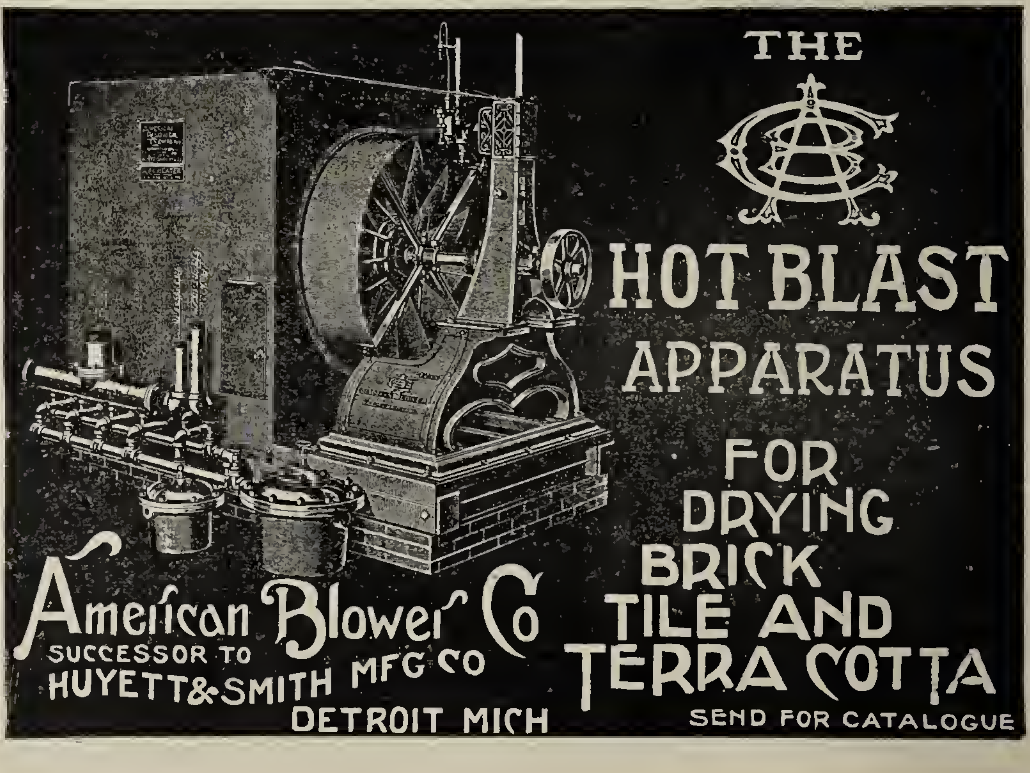

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HOT BLAST APPARATUS
FOR DRYING BRICK TILE AND TERRA COTTA

American Blower Co
SUCCESSOR TO
HUYETT & SMITH MFG CO
DETROIT MICH

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DO NOT BUY A FOUNDED 1879.]

SOFT CLAY BRICK MACHINE

Until You Have Investigated Ours.

Send for Photo. W. E. TALLCOT & CO., Croton-on-Hudson, N. Y.

NEW AND NOVEL,

The Columbian Pottery and Brick Kiln.

No waste of fuel, labor or time.
All perfect goods.
Thorough Regulation of heat.
Output uniform as to time and quality.

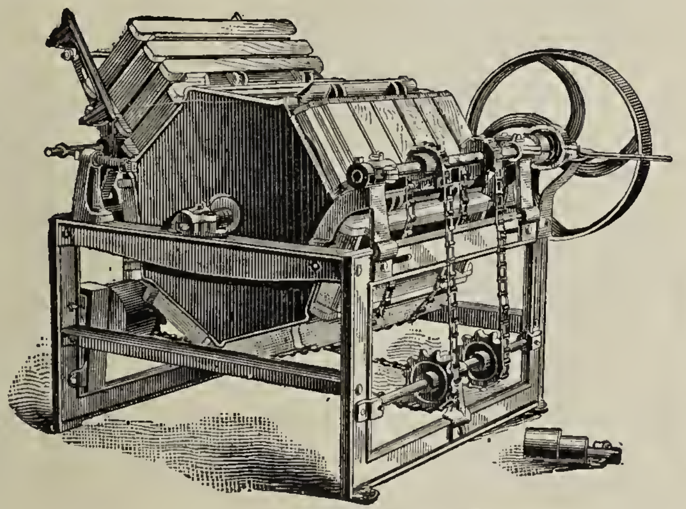
The fires remain in one division ONLY and are continuous. Goods move on a ROTATING FLOOR to and from the fires. Radiating heat and spare heat are used for drying and heating air for combustion.

A perfect and reliable factory Winter and Summer. Kiln and dryer combined. The best kiln for vitrifying Paving brick and glazing

Full information on application.

COLUMBIAN POTTERY & BRICK KILN CO., Dexter B'ld'g., 84 Adams St., CHICAGO, ILL.

CHAMPION Brick Mould SANDING MACHINES.



This cut represents the latest improved Champion. No belts, apron or gearing. Simple, strong, and Serviceable.

A. H. NEWTON,
Manager and Sole Agent,
HAVERSTRAW, N. Y.

THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

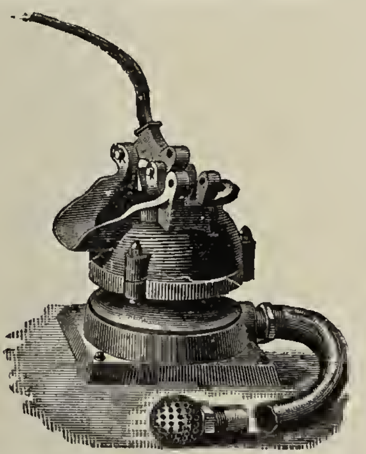
All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

4000 TO 5500

(Gallons of Water per hour.)

BY HAND-POWER.

Pumps, Hand-power Pumps,



(LOUD'S PATENT.)

These Pumps are simple, durable and low-priced.

A large capacity and easy working pump for **Brick Yards, Water Works, Sewer Contractors, Foundation Builders, Miners, Quarries** or wherever it is desired to raise a *large quantity* of water by *Hand-power.* The pump has large valves (*acessible by hand*) and will pump water containing *sand, gravel, mud, sewage matter, etc.,* without *choking* or any *perceptible wear.*

Send for circular and price list. Manufactured by

THE UNION HARDWARE CO.,
TORRINGTON, CONNECTICUT.

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Ready Made Cutting Wires,

Always give Satisfaction.

EAST LIVERPOOL, OHIO.
Send for Samples and Prices.

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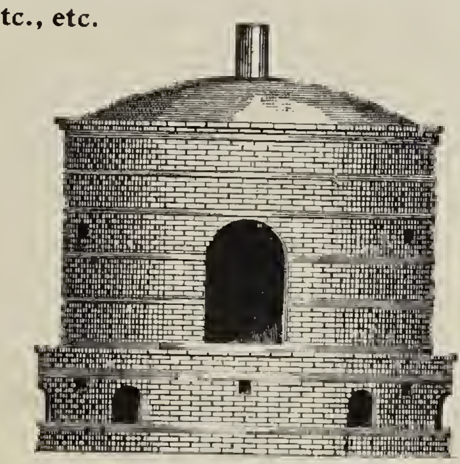
AN IMPROVED MUFFLED KILN

For Burning Terra Cotta, Fine Front Brick, Enameled Brick, Encaustic Tile, etc., etc.



WE have had many years experience in building terra cotta, brick and tile kilns of different kinds and can guarantee successful and satisfactory results being practical Kiln Builders. Our terms are reasonable. Write for particulars stating character and capacity of kilns desired.

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CINCINNATI SEWER PIPE CO.

(Successors to J. V. Nicolai.)

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Besides making Vitrified Stone sewer Pipe we manufacture and keep in stock a full line of

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MANY KINDS OF RAW MATERIAL

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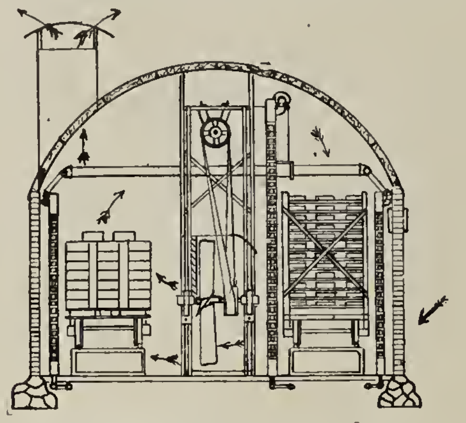
The Detroit and Cleveland Steam Nav. Co.

The Safety Dryer,

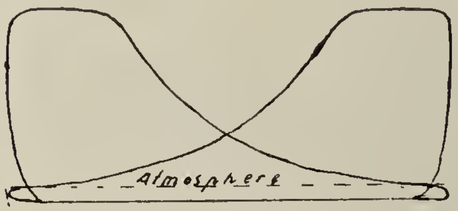
Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.

U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.

WORKS:—Delaware Ave. and O St., S. W.
OFFICE:—Tenth and F Sts., N. W.

WASHINGTON, D. C., June 7th, 1895.

S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our ——

You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

FORDS, N. J., April 9th, 1894.

MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.

MR. S. G. PHILLIPS, Woodbridge, N. J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

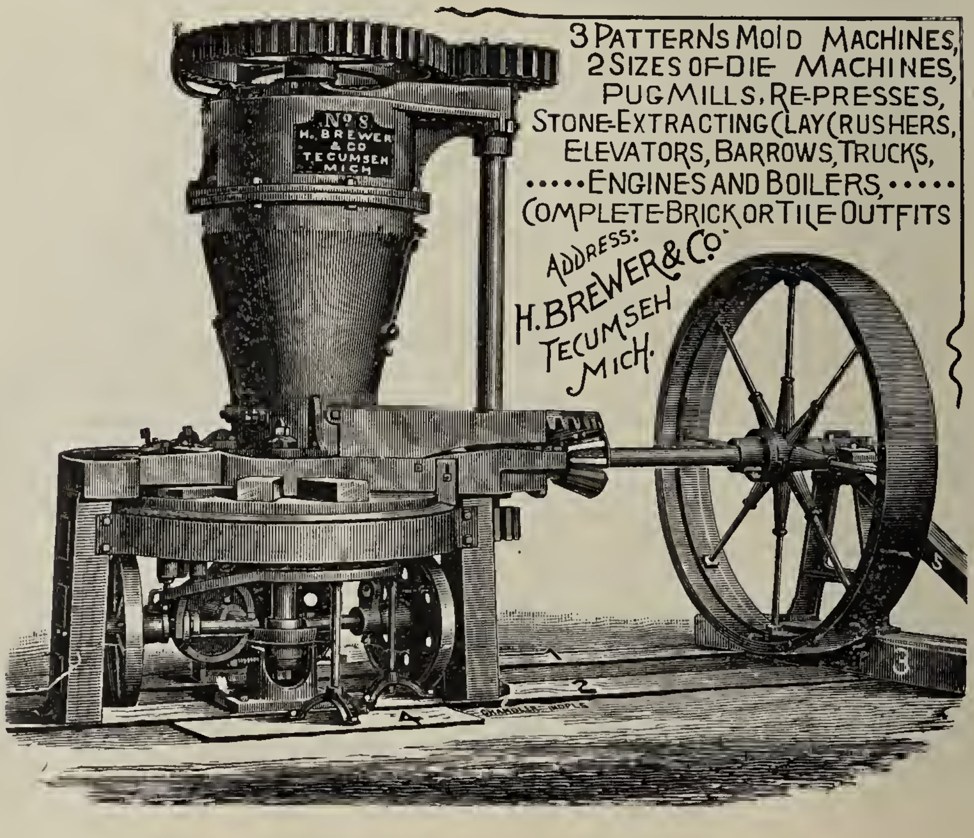
Yours respectfully,
CHAMBERS BROTHERS CO.,
J. H. Chambers, Gen'l Mgr.

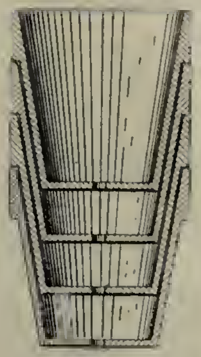
S. G. PHILLIPS

Agent and Patentee,

161 Grand Street.

Rahway, N. J.





Make Money

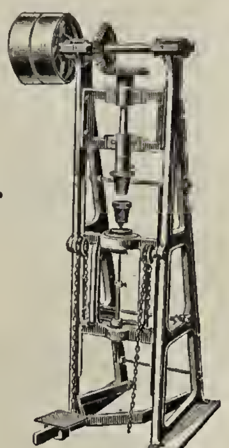
WITH THE ONLY SUCCESSFUL

Flower Pot Machine.

(PATENTED.)

No expert workmen required.
Capacity in 10 hours:
6,000 two-inch Pots; 3,500 five-inch Pots;
4,000 four-inch " 2,000 seven-inch "
Write for Circular and prices.

The Rockwood Mfg. Co.,
78 South Pennsylvania St., INDIANAPOLIS, IND.



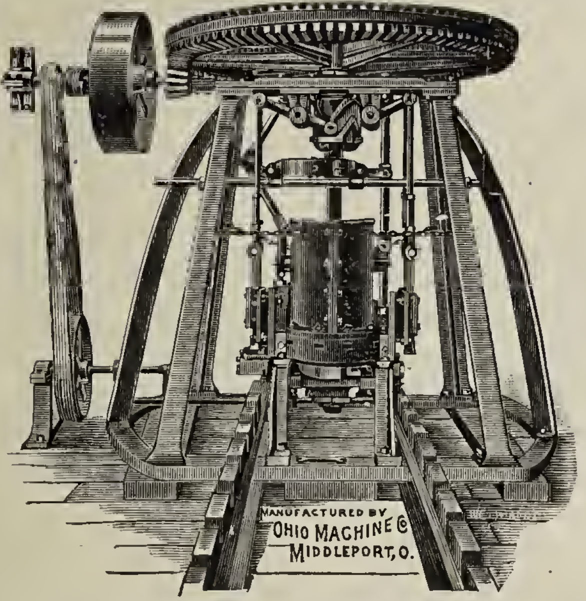
THE "AJAX" BRICK MACHINE

MANUFACTURED BY

Ohio Machine Co.,

Middleport, Ohio.

Under the very Latest Improved Grant-Murray Patent.



This machine is constructed with the object of giving to purchasers the very best results obtainable for the money invested. It is at once Simple, Durable, Convenient, and Easily operated. We claim these machines make the strongest brick in the market, a brick that is very superior for Street Paving and building purposes. Their superior quality as pavers may be ascertained by reference to some of the leading cities of Ohio and West Virginia. This machine works the clay very stiff, pressing all the clay into each brick that it will possibly contain, thus imparting the quality requisite to a No. 1 Paving Brick. We guarantee these machines to our customers, and solicit investigation as to their merits. For further particulars please correspond with

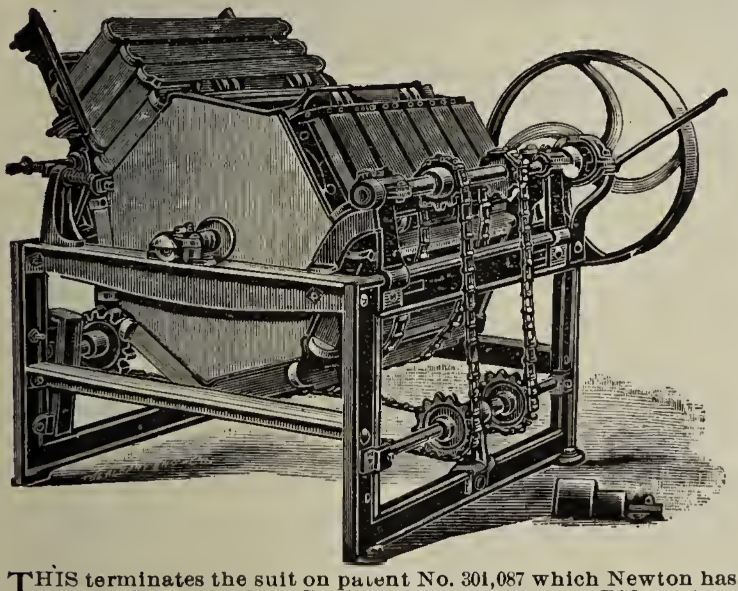
OHIO MACHINE CO.,

MANUFACTURERS,
Middleport, Ohio

We manufacture the Grant & Murray Patent Repress Brick Machine, pressing 4 brick each revolution and 40,000 per 10 hour day.

BUCK'S NEW CHAMPION

Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.
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No. 23 Passenger	2:50 p. m.
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Accommodation	10.40 a m
Mail and Express	4.50 p m

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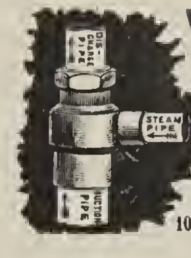

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THE BEST IN THE WORLD.
Pumps Any Kind of Liquid.
Always in Order, never Clogs nor freezes. Every Pump Guaranteed.
—10 SIZES.—
200 to 12000 Gallons per Hour.
Cost $7 to $75 each. Address
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Only three days and three nights. Every meal in dining cars. For further information write to
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THE WEST
NORTHWEST
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3 DAILY TRAINS
LEAVE INDIANAPOLIS,
7:00 am, 3:45 pm, 12:40 Night
SERVICE UNSURPASSED.

Pullman Buffet Sleepers. Vestibuled Trains. Elegant Parlor Cars.

An "Up-To-Date" Line.

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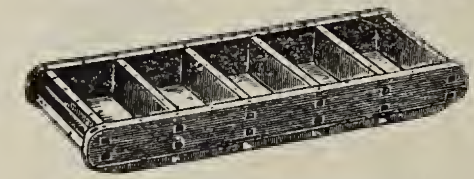
FIRE BRICK
Dover Fire Brick Co.,
INCORPORATED 1870. MANUFACTURERS OF
Dover and Buckeye Fire Brick,
Unexcelled for Kiln Purposes.
44 Mercantile Bank Bldg., Cleveland, Ohio.

G. COLDEWE & CO.,



MANUFACTURERS OF ALL KINDS AND SHAPES OF
HAND and.... MACHINE MOULDS
We manufacture the the most substantial Moulds known, and guarantee every Mould to be first-class in material and workmanship.

A Special Discount on all orders received on or before March 1st.

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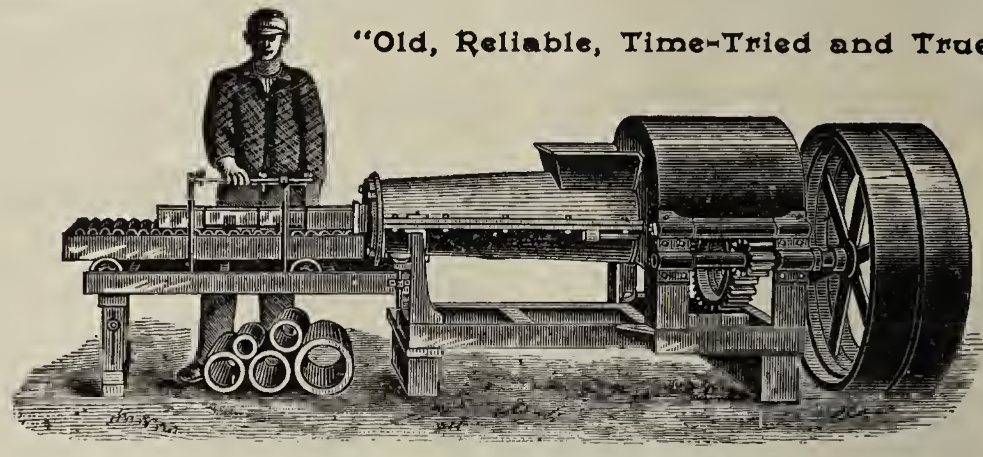
ESTABLISHED NINE YEARS.

KELLS & SON'S IMPROVED BRICK AND .... TILE MACHINES.

"Old, Reliable, Time-Tried and True."



P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

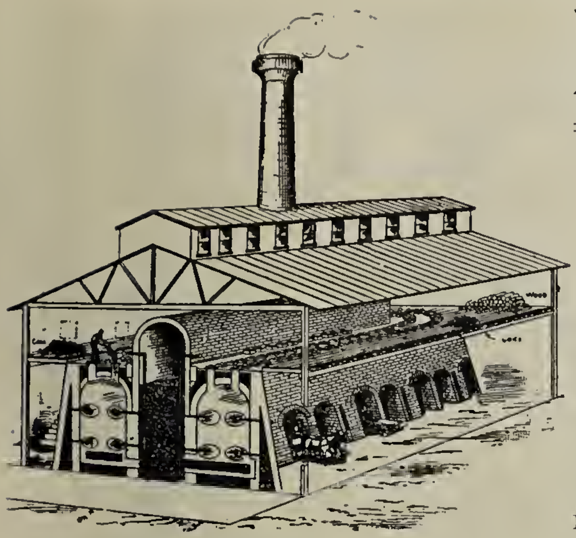
☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,
PARKHILL, ONTARIO,

Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.

Firestone's Continuous Kiln and Dryer.



THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

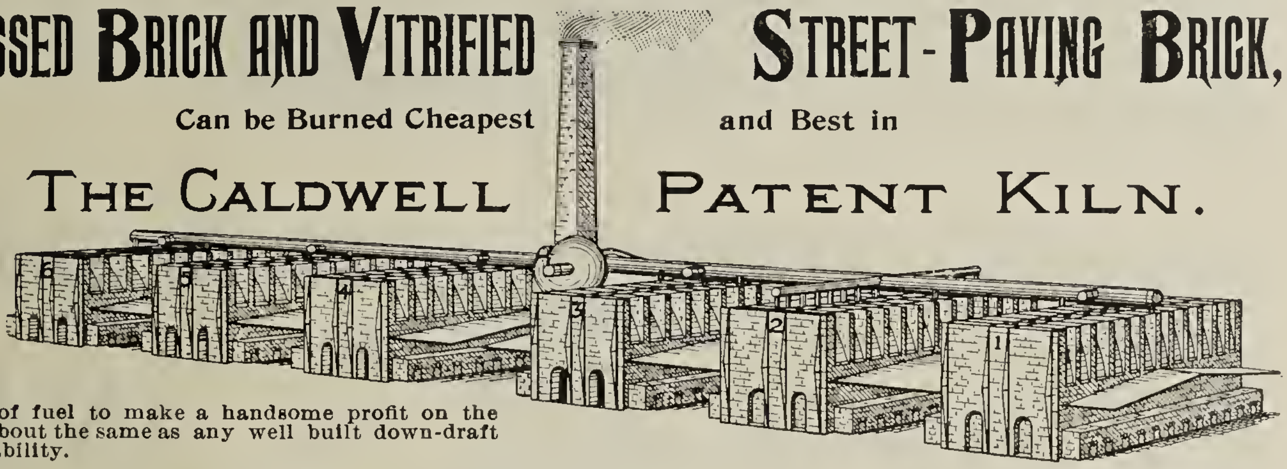
GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.



Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

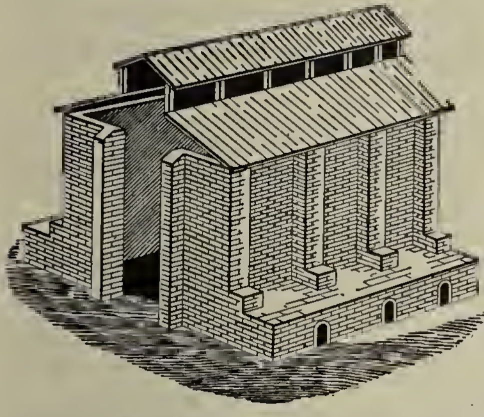
Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., *Minneapolis, Minn.*

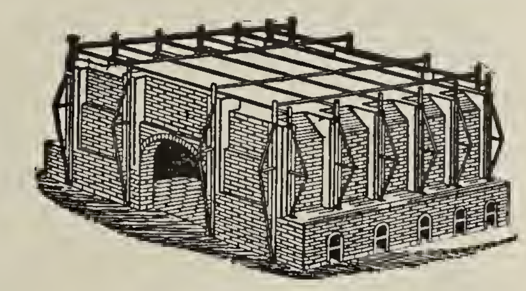
LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Up-Draft Kiln.



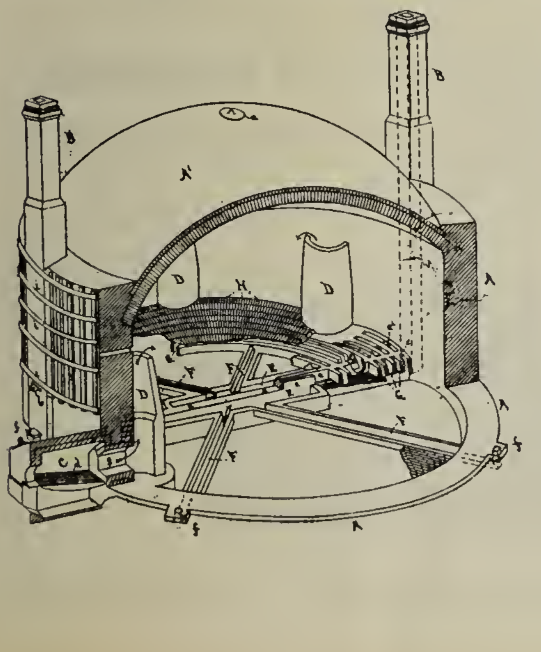
Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., *Kansas City, Mo.*



BURNING MADE EASY

BY USING

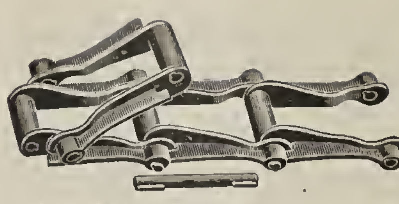
Holman's Down Draft Kiln.

Cheaply and easily built, and Fully demonstrated to be one of the most perfect kilns on the market.

.... All Parts of the Kiln Fully Under Control.

SEND FOR ILLUSTRATED CIRCULAR.

C. J. HOLMAN, Sargeant's Bluff, Iowa.



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

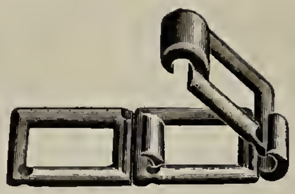
F. H. C. MEY,

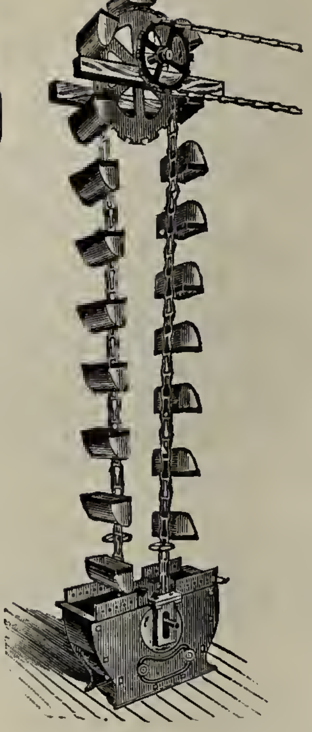
Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.



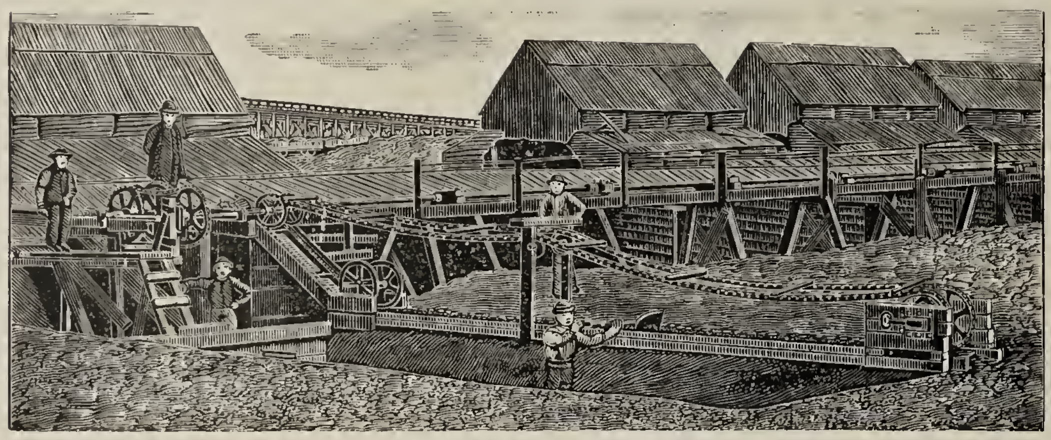


THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker.

It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.



MEY PATENT CLAY ELEVATOR.

SEND FOR CATALOGUE.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

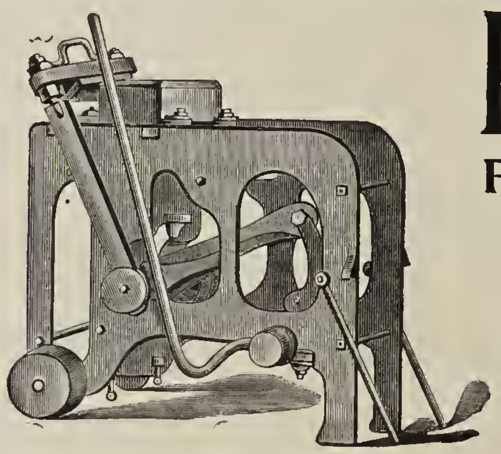
[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

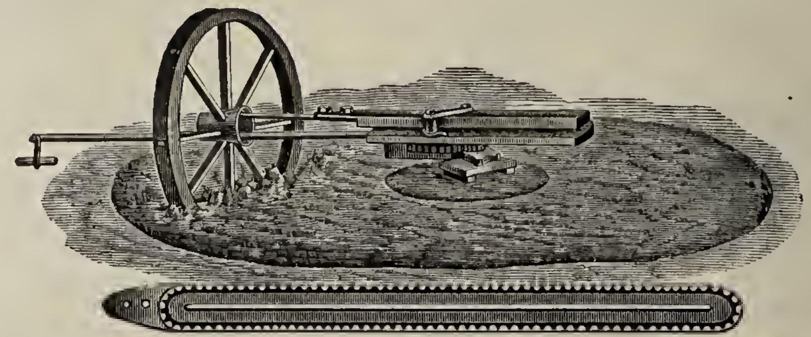


RED BRICK PRESS.

GEORGE CARNELL,

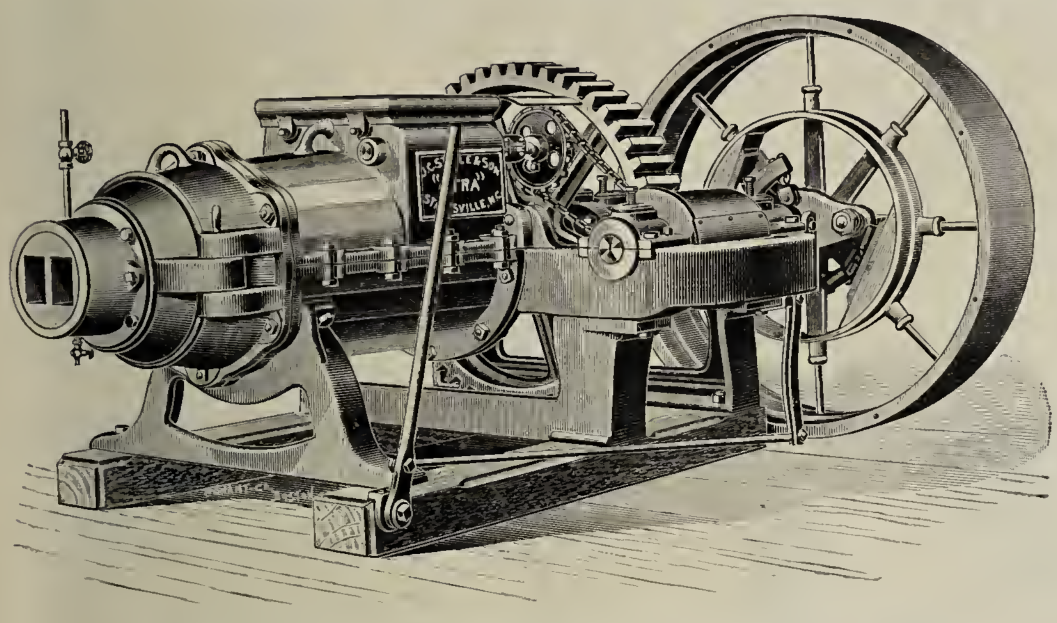
Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

☞ Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.

The New South Brick Machinery



X-tra Machine. Capacity 25,000.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion or constipation.** No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

DENMARK, S. C., May 28, 1896.

J. C. STEELE & SON, Statesville, N. C.

Gentlemen:—I have just started the X-tra machine and it works finely, I think the Automatic Cutter perfect.

I have just closed my first kiln of brick.

Yours truly,
H. G. DRIGG.

Strictly modern machinery at the lowest price.

Send for Catalogue.

J. C. STEELE & SON,
Statesville, N. C.

---

15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

• • •

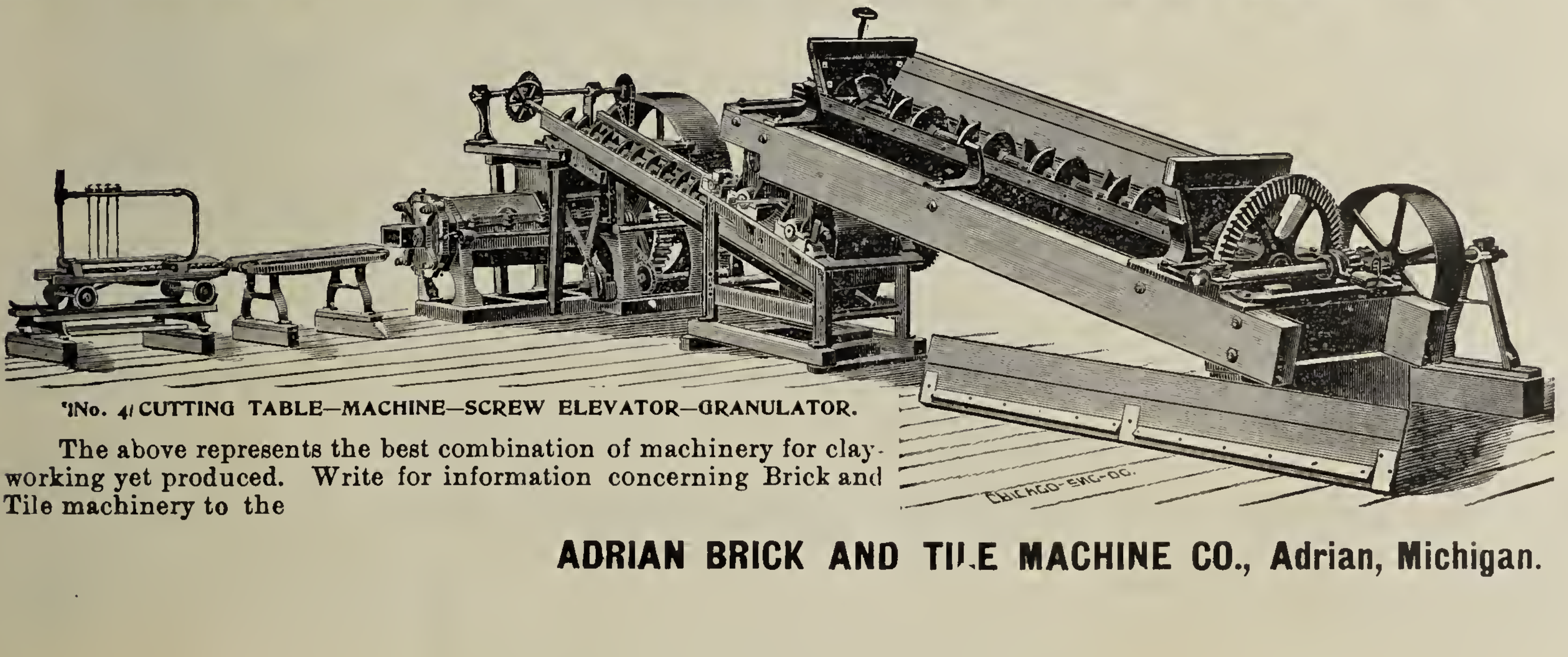
12 Second Hand Machines.

Brick Machines. Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER MANUFACTURING CO

DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.
SEND FOR PRINTED MATTER.

ADRIAN BRICK AND TILE MACHINE CO.


CHICAGO-ENG-CO.

No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

Prof. Dr. H. Seger and E. Cramer,

6 Krupp Street, BERLIN, GERMANY,

CHEMICAL LABORATORY FOR THE CLAY INDUSTRY.

Raw materials and products of the Brick, Stoneware, China, Lime and Cement industries examined and advice given.

Flaws in the methods of manufacture corrected.

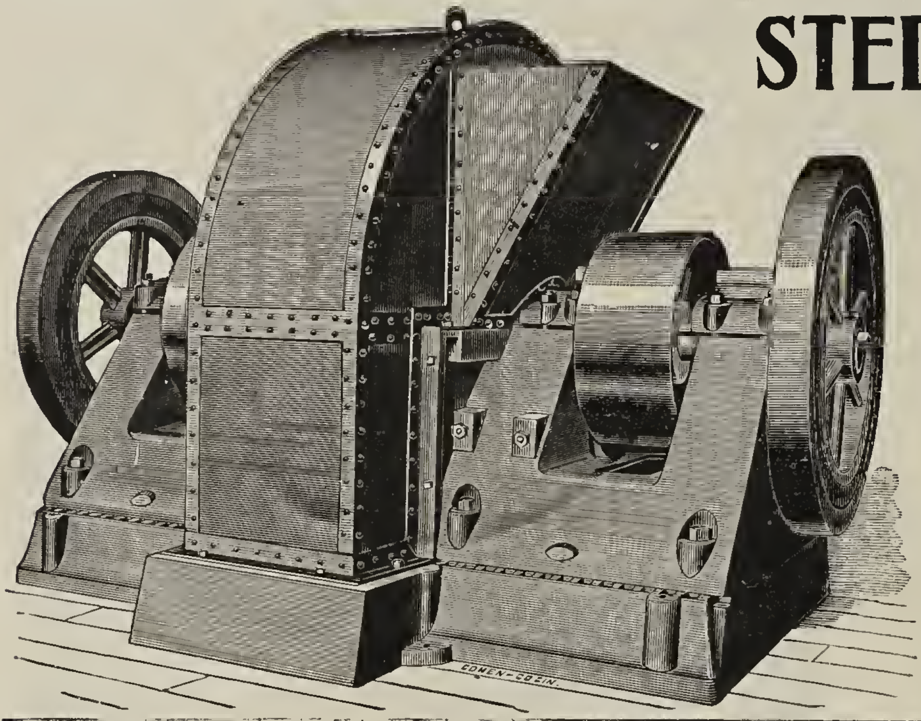
Many years experience.

Laboratory for the German Association of Refractory Clay Ware Manufacturers.

Manufacturers of the Seger pyrometrical cones.

Publishers of **Die Thonindustrie Zeitung**, the leading Ceramic weekly of Germany.

Organ of the German Association of Brick, Clay Ware, Lime and Cement Manufacturers; of the German Association of Refractory Clay Ware Manufacturers; of the Association of German Portland Cement Manufacturers, and of the Brick Trade Assembly.



STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

Would You Buy

A BRICK MACHINE
.....A DRY PAN
....A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King

A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

The Woolley Pug Mill,

All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
...AND...
SLIP PRESSES

For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue.

ANDERSON, IND.

"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

ZANESVILLE, OHIO, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. BURTON, Secretary and Treasurer.

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

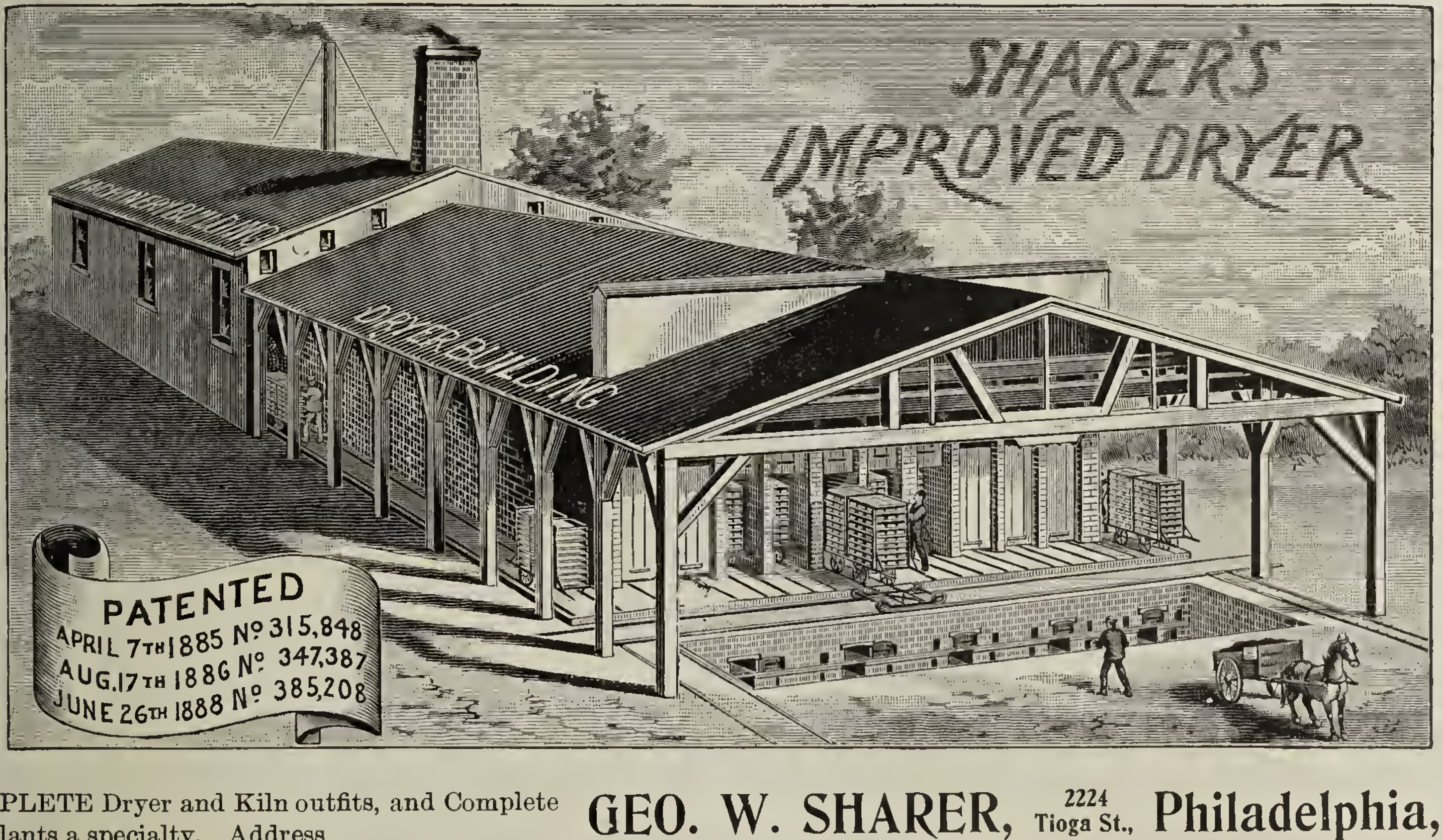
PHILADELPHIA:
1219 Carpenter Street.

248 Randolph St., CHICAGO, ILL.

BOSTON:
120 Pearl Street.

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.

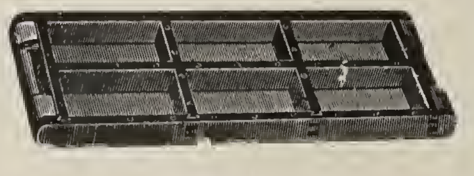

SHARER'S IMPROVED DRYER
DRYER BUILDING
PATENTED
APRIL 7TH 1885 No 315,848
AUG. 17TH 1886 No 347,387
JUNE 26TH 1888 No 385,208

COMPLETE Dryer and Kiln outfits, and Complete Plants a specialty. Address **GEO. W. SHARER, 2224 Tioga St., Philadelphia, Pa.**

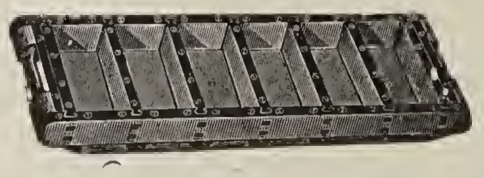
ARNOLD'S BRICKYARD SUPPLIES.

••They are the BEST that are Made.••

3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds.

A large stock of Hand and Machine moluds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you **have the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS

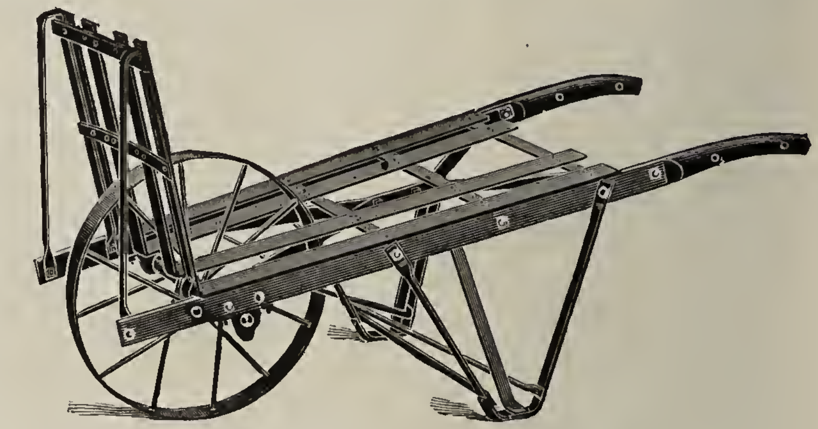
For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

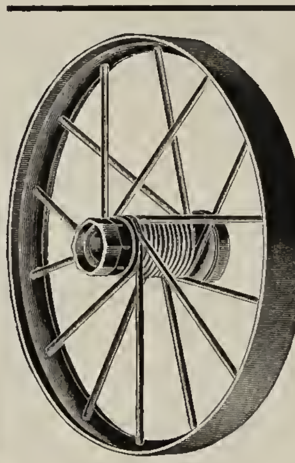
All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.





METAL WAGON WHEELS

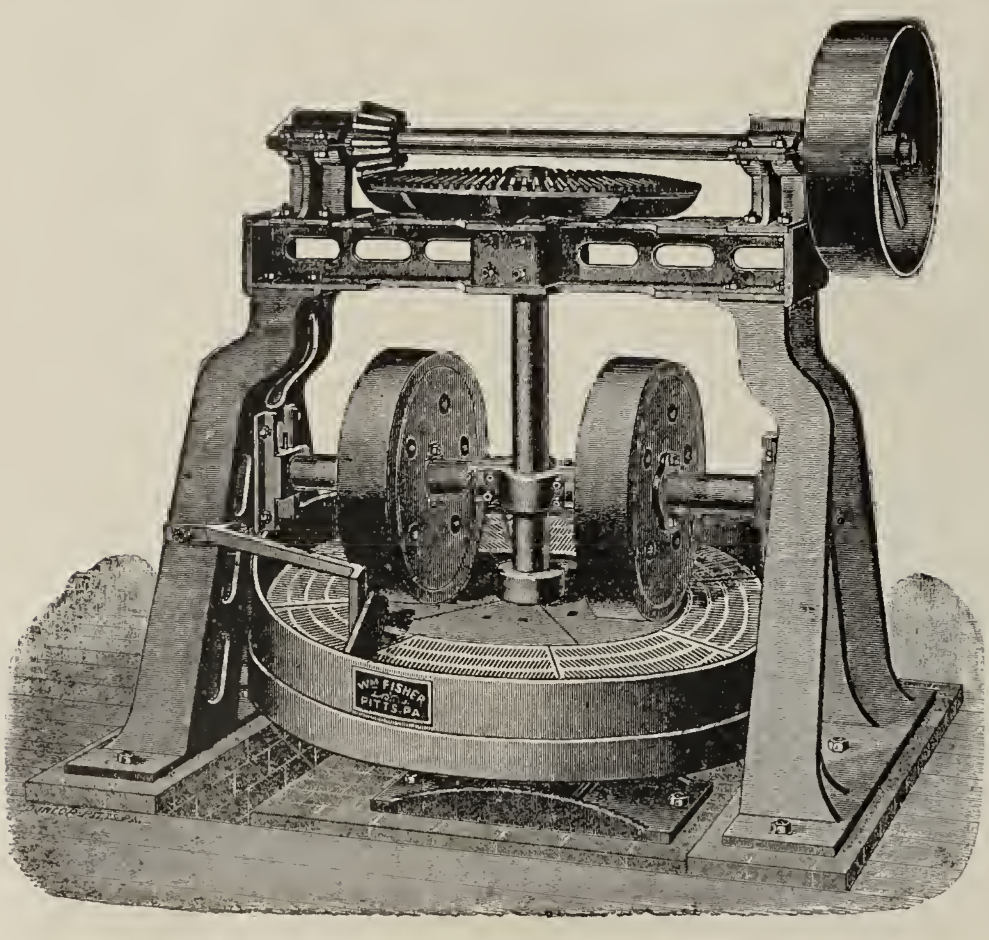
MADE in all sizes from 24-inch diameter up varying by 2 inches. Any width of tire. The **strongest** wheels made in proportion to **weight.** Just the thing for Brickmakers delivery wagons. No tire to set, no spokes getting loose, no trouble whatever. Try a set and be convinced.

Circular and prices sent on application. Address

The Arnold
Metal Wheel Co.,
NEW LONDON, OHIO.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Proprietors,

23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

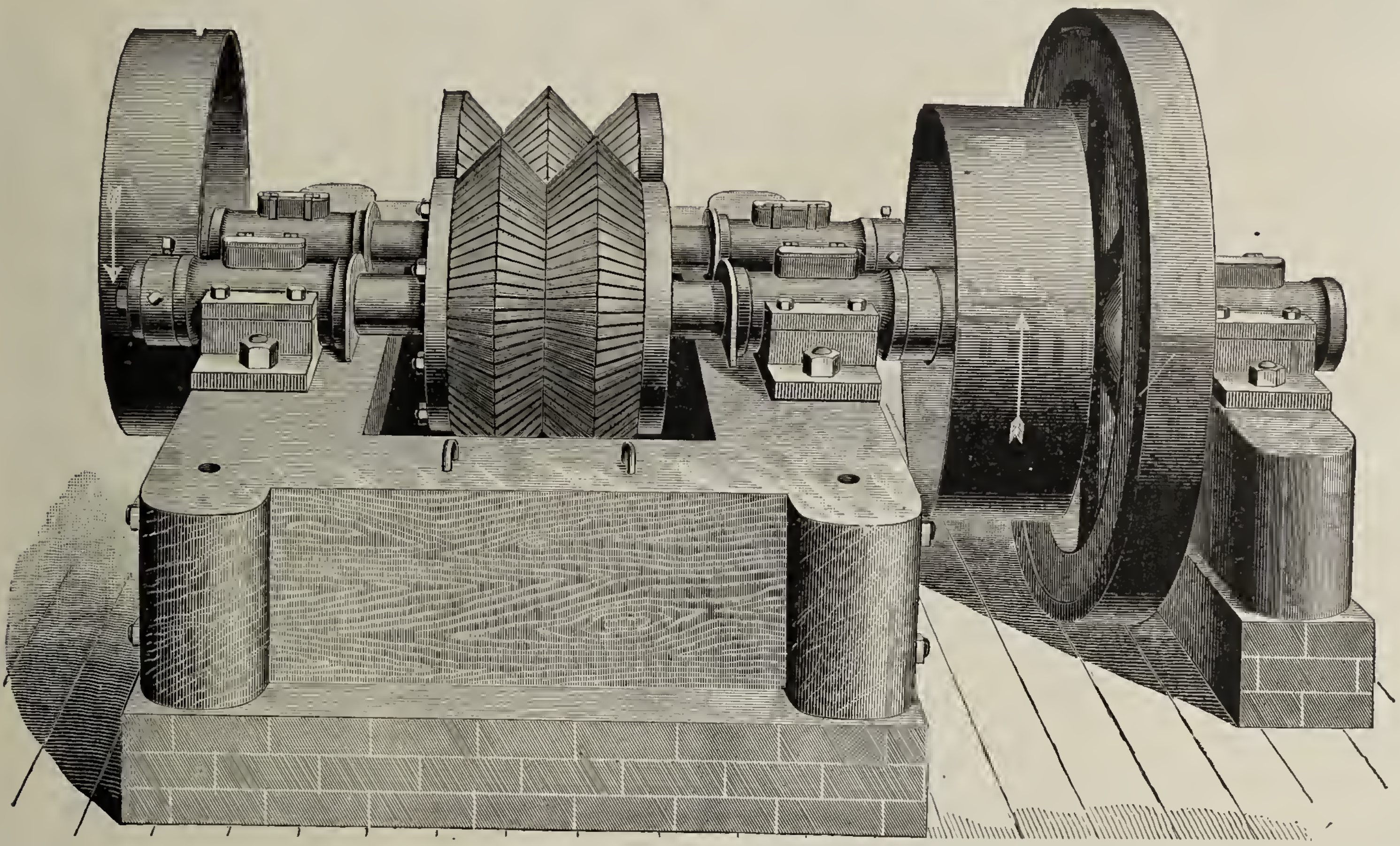
We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

NEWELL IMPROVED CLAY PULVERIZER

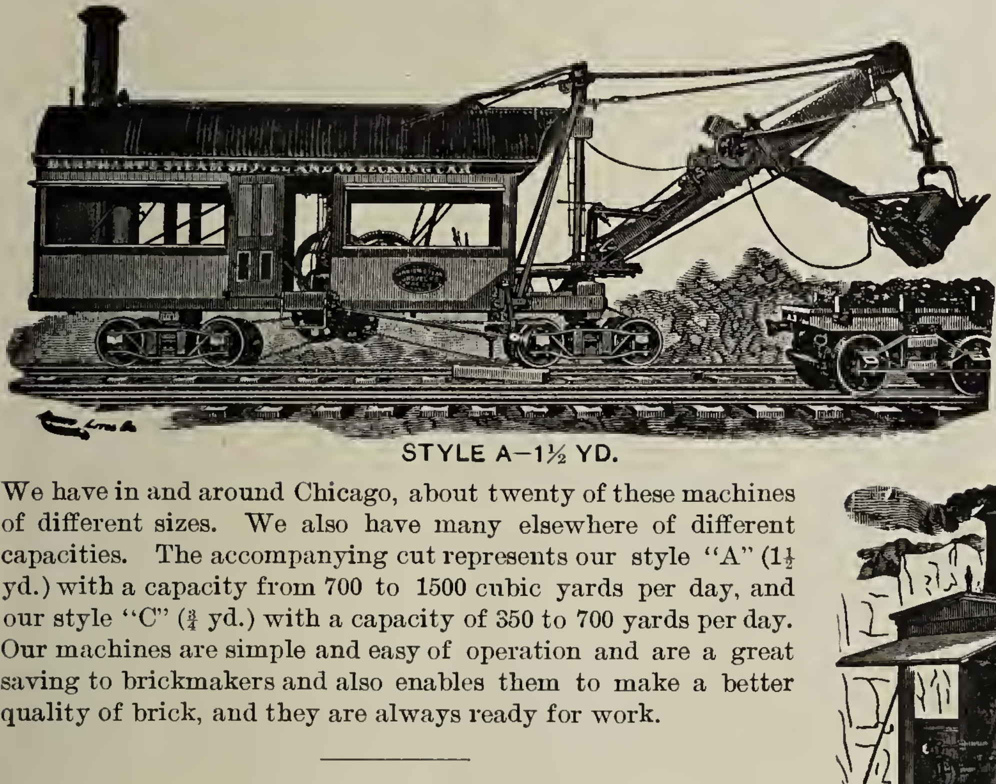
Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building 26 Cortland and 21 Dey Streets, **New York, U. S. A.**

Steam Shovels for Brickyards.



STYLE A—1½ YD.

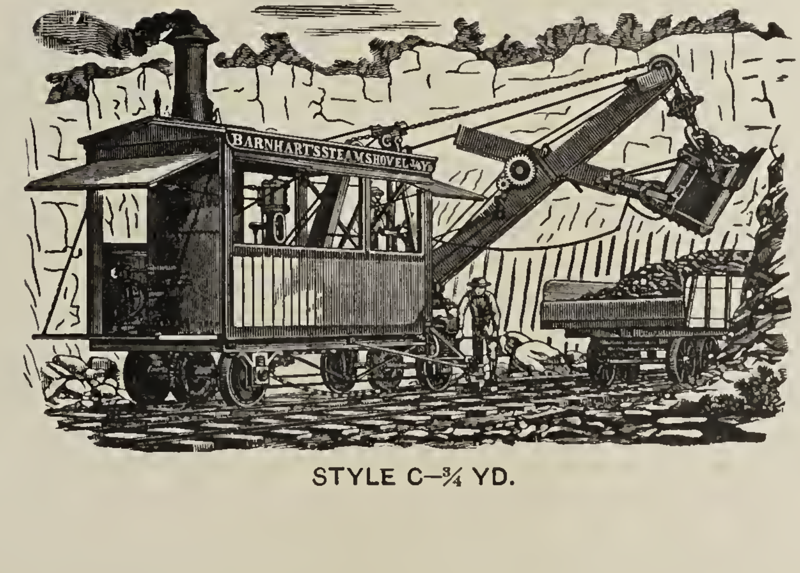
OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

603 West Center Street, - **MARION, OHIO.**



STYLE C—¾ YD.

ALSIP'S LATEST IMPROVED

Down and Up-draft Kiln.

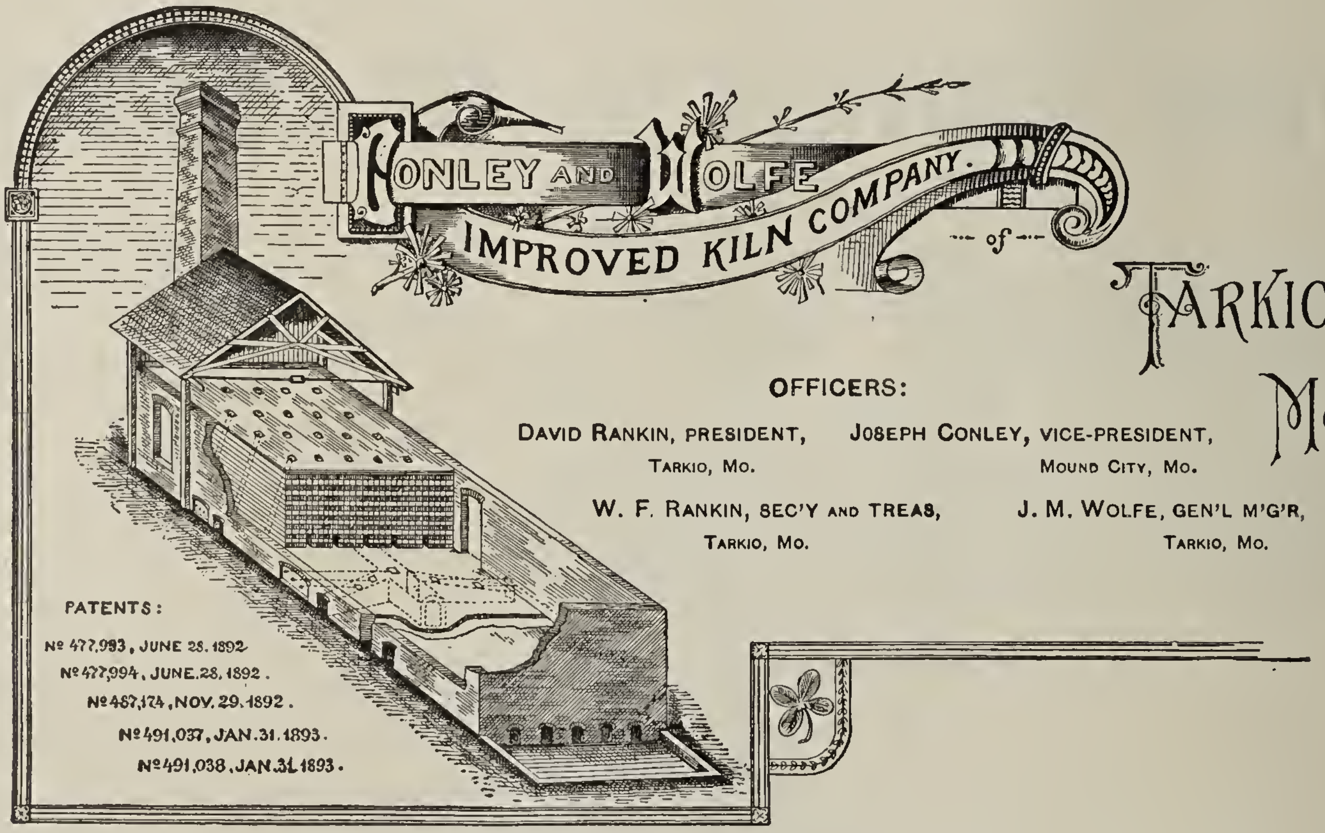
The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**


CONLEY AND WOLFE
IMPROVED KILN COMPANY.
of
TARKIO,
MO.
PATENTS:
Nº 477,993, JUNE 28. 1892.
Nº 477,994, JUNE. 28. 1892.
Nº 487,174, NOV. 29. 1892.
Nº 491,037, JAN. 31. 1893.
Nº 491,038, JAN. 31. 1893.

OFFICERS:

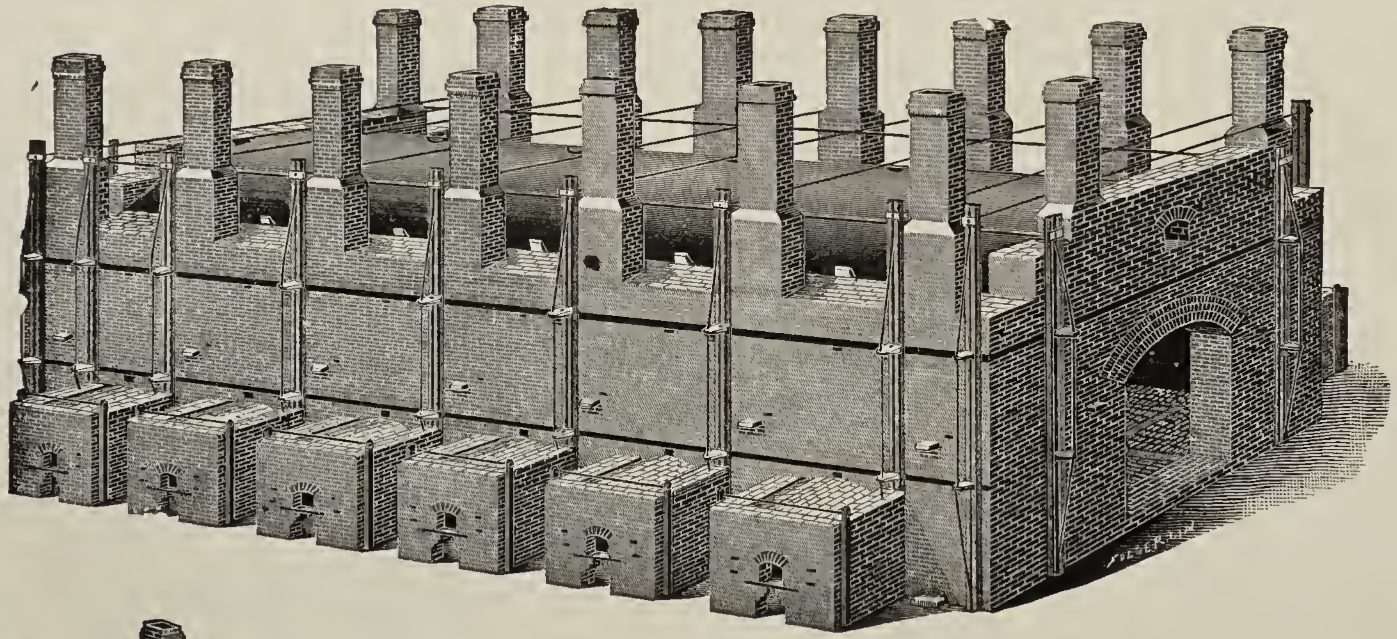
DAVID RANKIN, PRESIDENT, TARKIO, MO.
JOSEPH CONLEY, VICE-PRESIDENT, MOUND CITY, MO.
W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.
J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

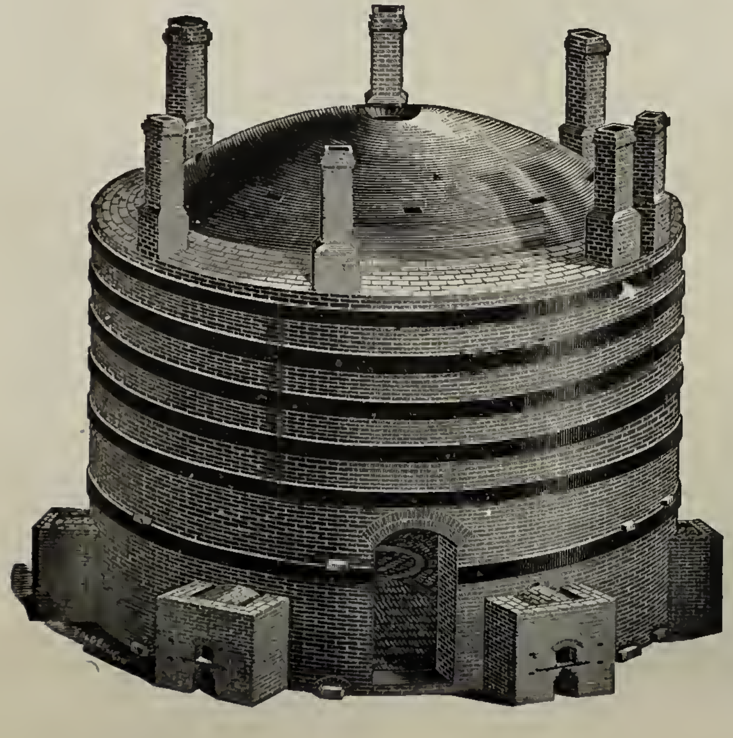
THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ⁘ YOU NEED THIS KILN. ⁘ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

The Eudaly Improved Down-Draft Kiln.





A VERY large number of manufacturers are now using the **EUDALY KILN** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of **large capacity** on account of **economy** in cost of construction and **space** occupied on the plant; while the Round Kiln is better adapted to plants of **small capacity,** drain tile, sewer pipe and fire brick in small quantities. **These Kilns have gained a reputation for burning all hard and uniform.** The Kiln is easily controlled and is in every way practical and desirable. We will be glad to hear from any who contemplate going into the clay manufacturing business and will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY,

64 Johnston Buildings, **Cincinnati, Ohio.**

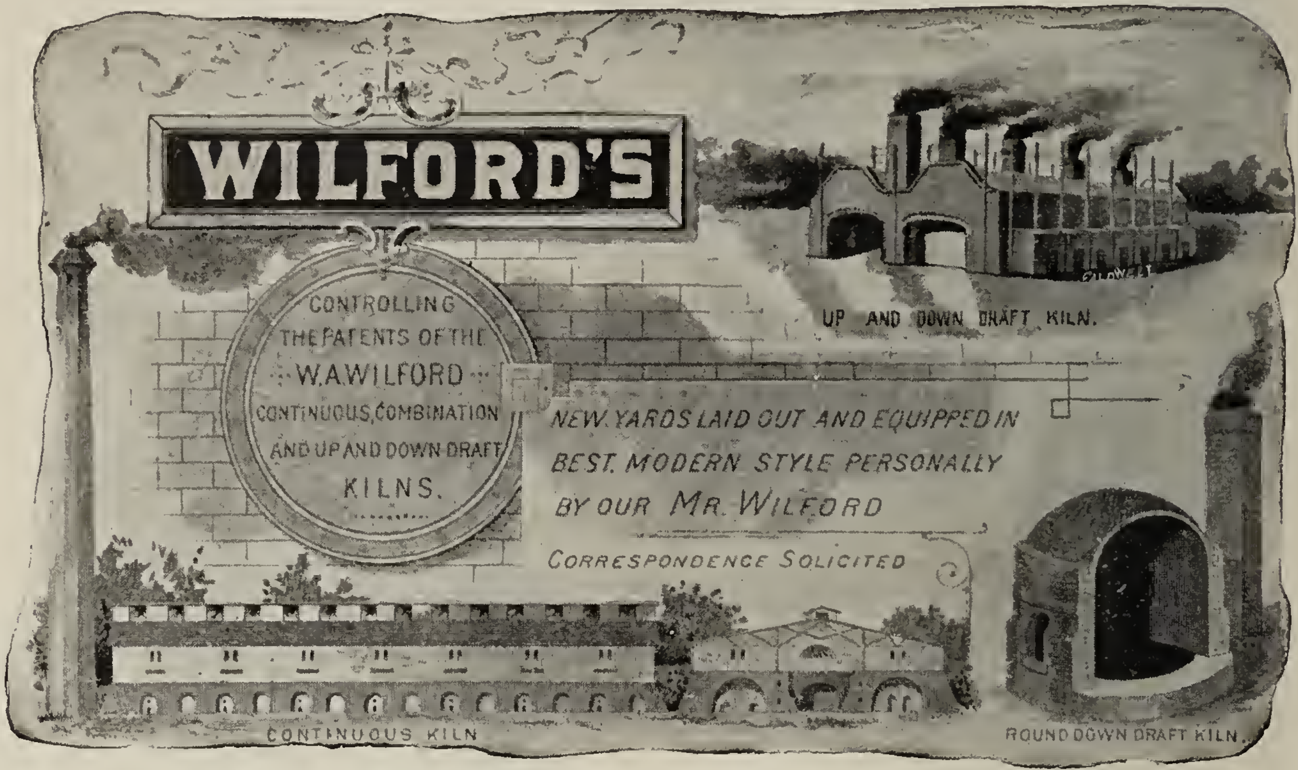
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS,COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

ROCHESTER BRICK & TILE M'F'G. CO.,
Brick and Drain Tiles, Hollow Brick, Etc.
243 *Power's Block.*

ROCHESTER, N. Y., June 19, 1896.

WILFORD PATENT KILN CO.

Dear Sir:—In answer to your inquiry as to what we can say in reference to your kiln recently constructed on our yard, we are very much pleased with it.

At the present time we have burned once and a half round, and we not only find it to be very economical in fuel, but the brick are coming out well burned, in first-class condition and very little waste.

After a little longer use we hope to make a still better showing.

Truly yours,
ROCHESTER BRICK & TILE M'F'G. CO.,
Per IRA L. OTIS, Pres.

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and 2 Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

Let us give you full Particulars.

The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

Any Draft So Its Up-Draft.

◆

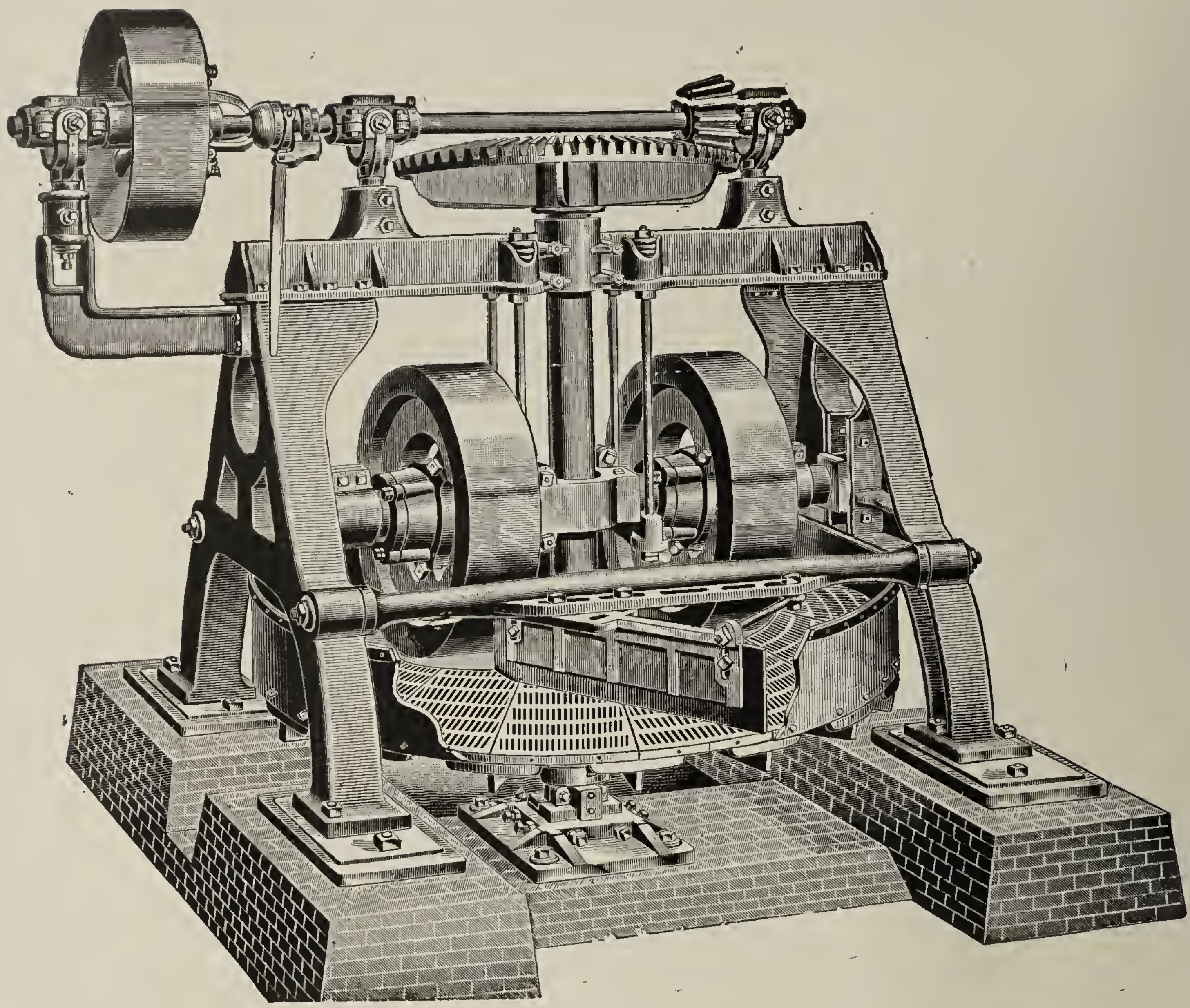
WE WILL furnish you plans, and license to use our unrivalled Up-draft Kilns at moderate cost.

Manufacturers of Building Brick can get nothing better.

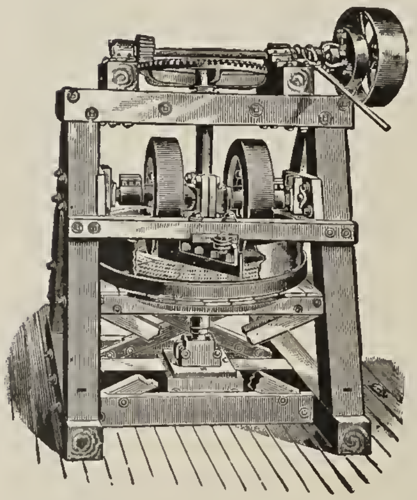
For all information desired address

R. B. MORRISON & CO.,
P. O. Box 335,
Rome, Ga., U. S. A.

PROPRIETORS
Morrison's Latest Improved Kilns.

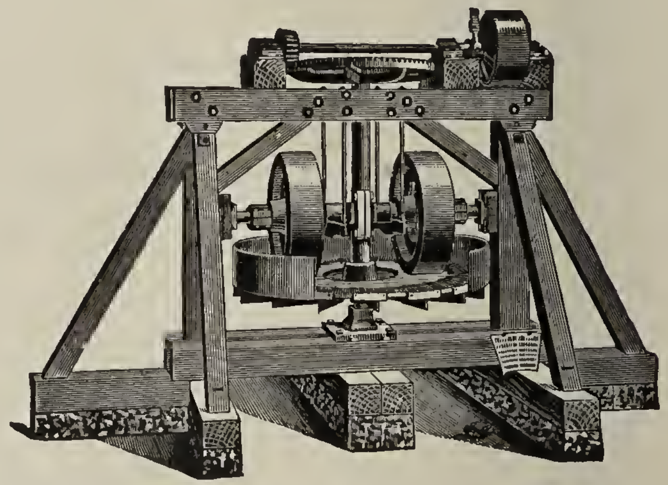


OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



......SEND FOR NEW ILLUSTRATED CATALOGUE......

FROST ENGINE CO., Galesburg, Ill., U. S. A.

THE above is a photograph of four cars loaded with Clayworking Machinery, manufactured by **C. & A. Potts & Co., Indianapolis, Ind.,** for the National Brick and Terra Cotta Co. at Passaic, N. J., this was shipped July 18th, and consisted of

One Iron Horizontal Stock Brick Machine, Disintegrators,
Granulators, Winding Drum, Wire Rope Mould Sanders,
Clay Cars, Barrows, Trucks, Moulds, "T" Rails, Switches,
Shafting, Hangers, Pulleys, Belting, 100 H. P. Engine,
Two 100 H. P. Boilers. Making a Complete Plant.

We are prepared to make estimates on complete plants of any desired capacity. We being manufacturers can save you money, as there are no commissions to pay.

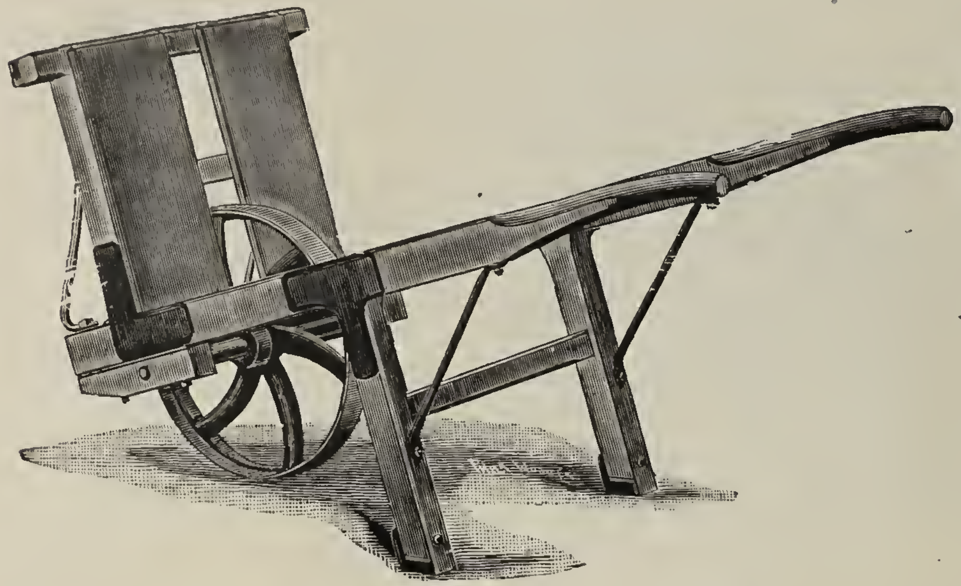
We guarantee results and erect subject to guarantee and trial. It will pay to have our Catalogue and Prices. We are always pleased to quote prices on anything you need.

* * *

C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.

Use "Martin's" White Oak

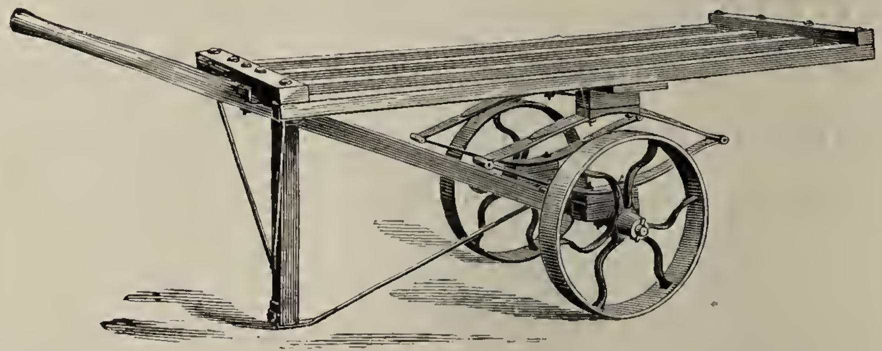


Barrows

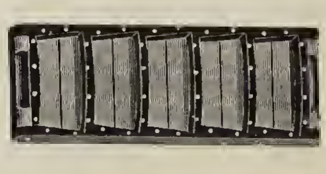
..and..

Trucks.

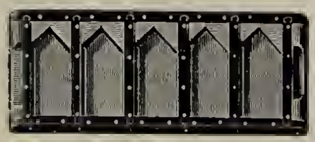
We respectfully solicit a trial order. . . . . . .

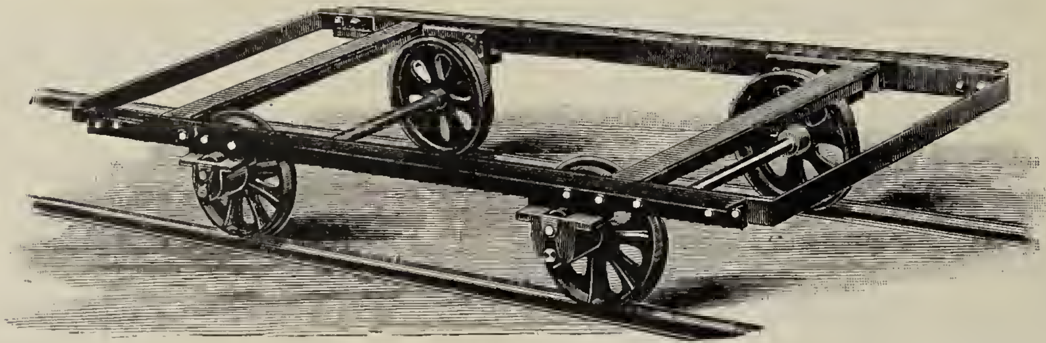


BRICK MOULDS.



ALL SHAPES AND SIZES,
With or without Panel Bottoms and Name Plates.





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Of all Kinds

A Specialty.

The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

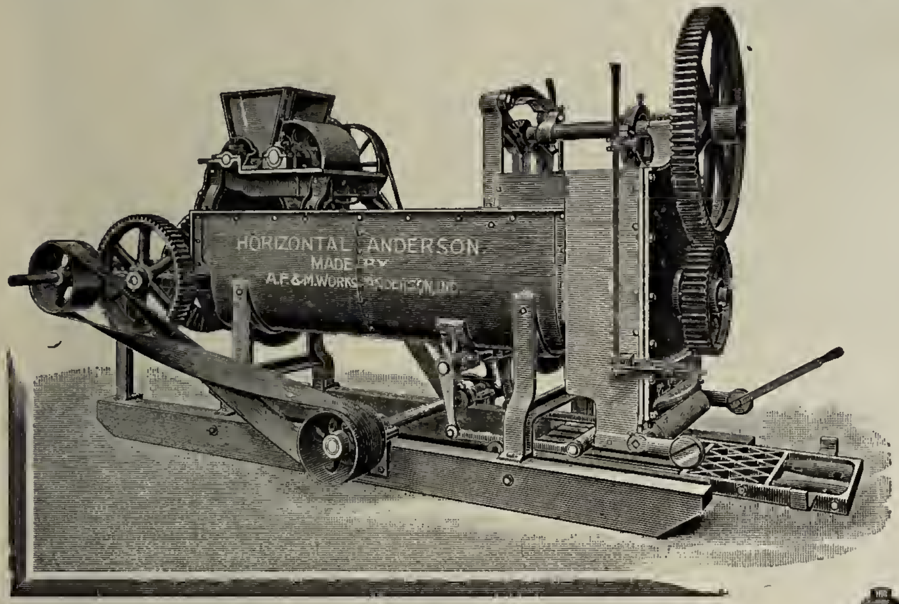
Manufacturers of the Famous "Henry Martin"
Brick Machines and Brickyard Supplies. . .

Lancaster, Penna., U. S. A.

A New Departure in Brick Machinery

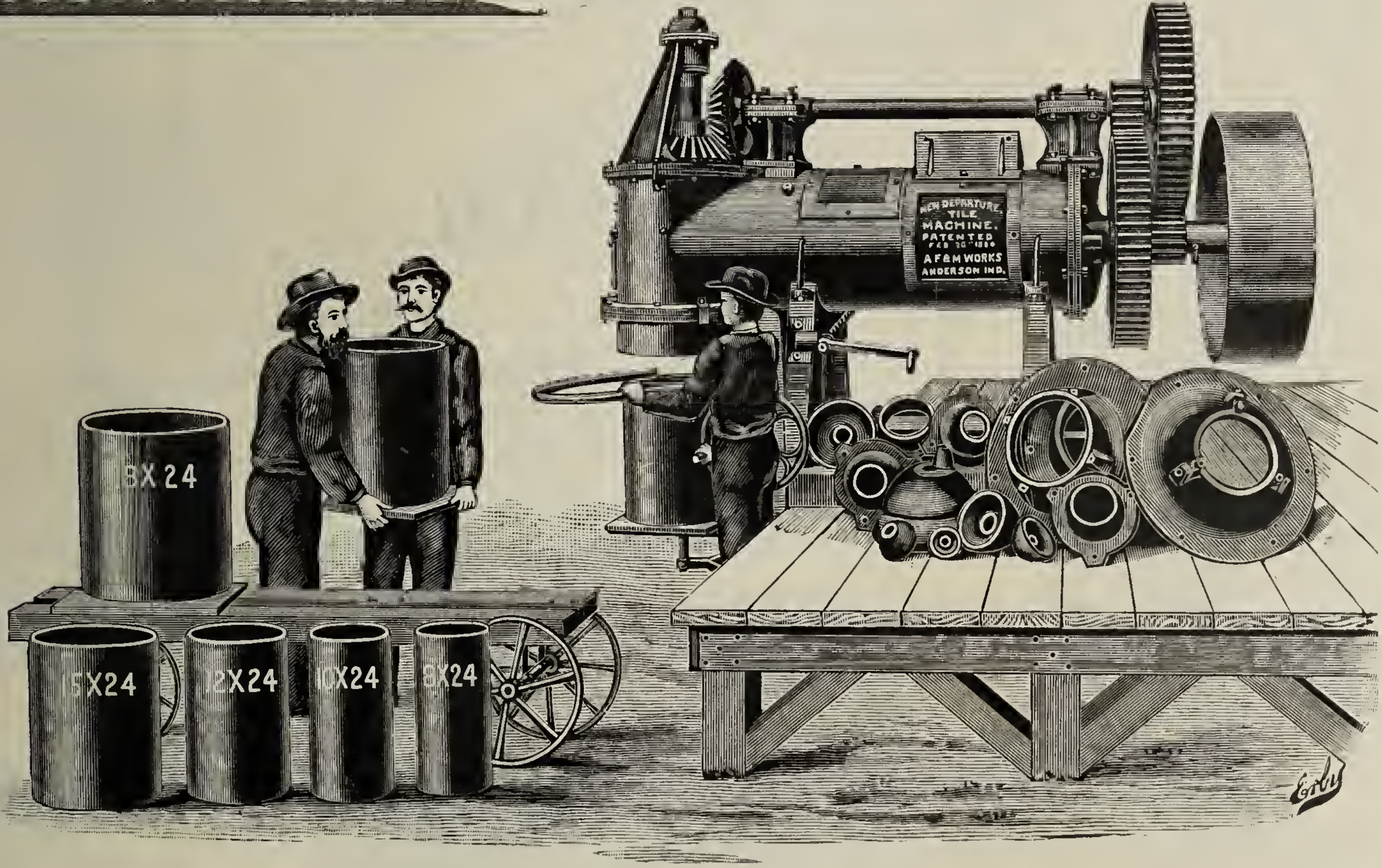
THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.



This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.

◆



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We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.

DOWN DELIVERY FOR LARGE TILE. SIDE DELIVERY FOR SMALL TILE.

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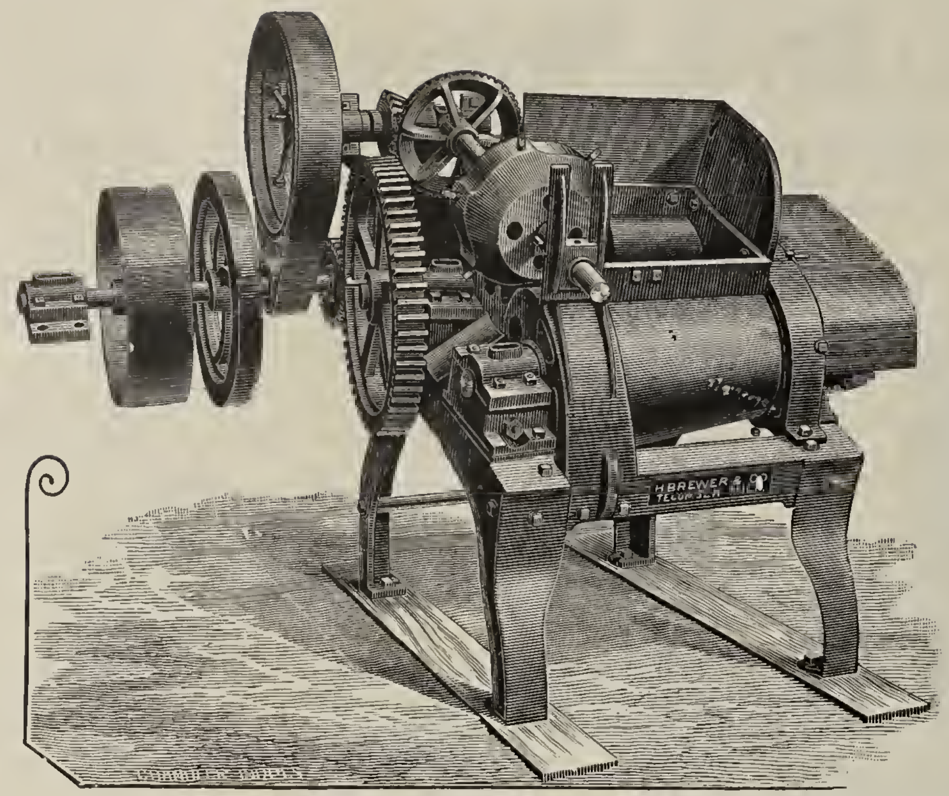
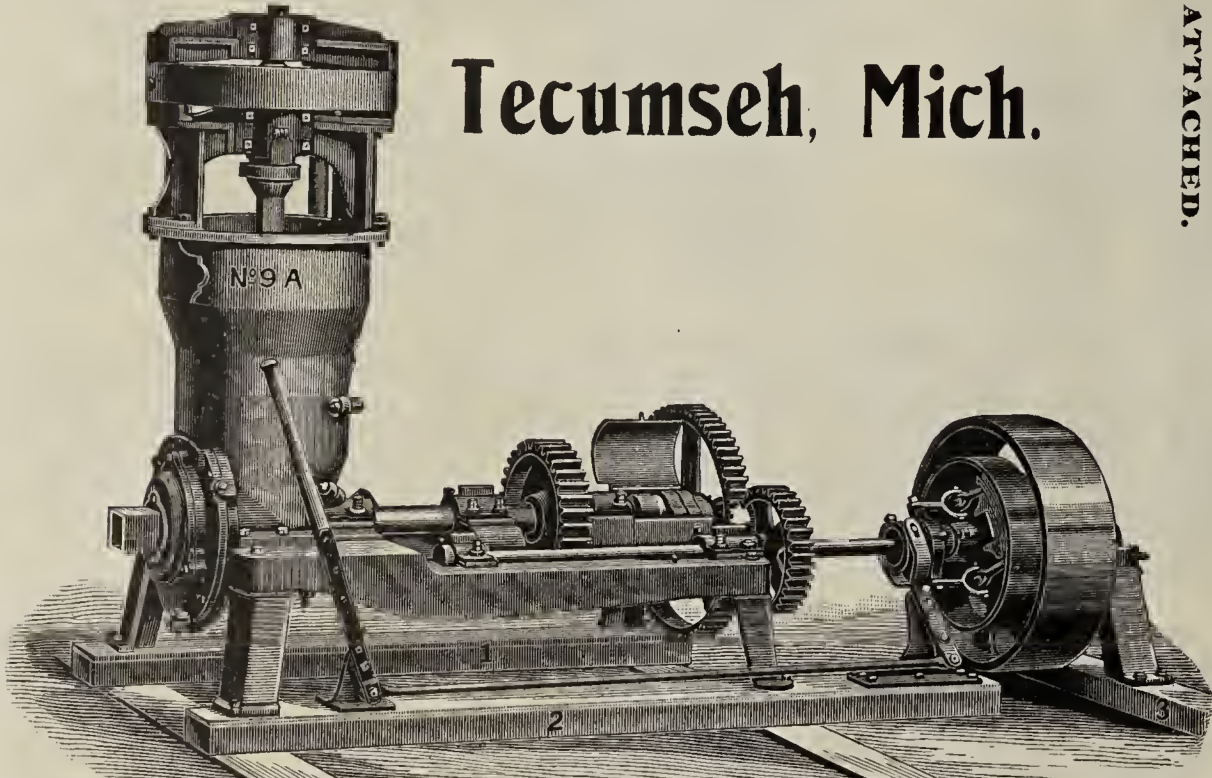


STONE EXTRACTING CLAY CRUSHER.

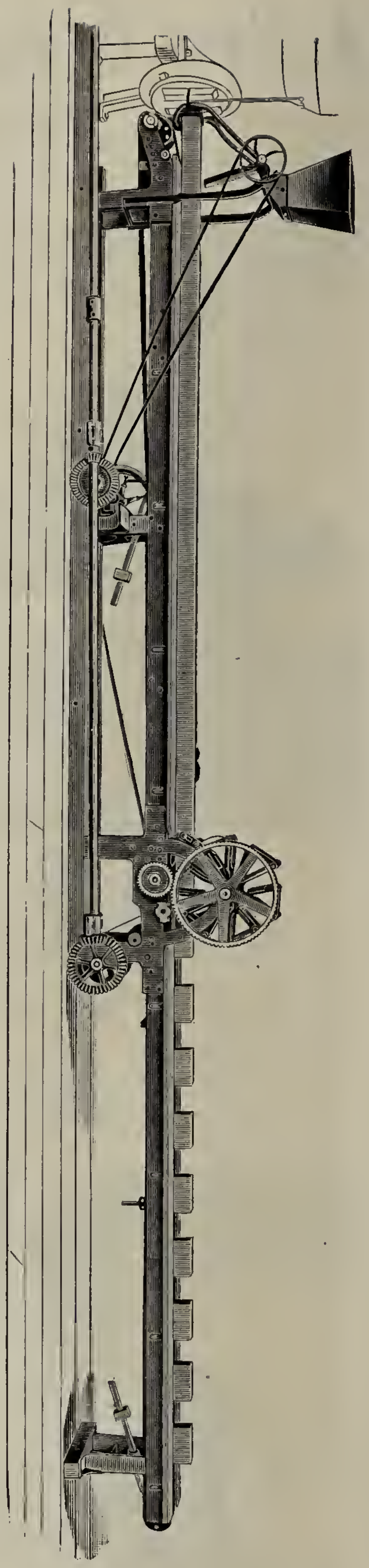
Manufactured by

H. Brewer & Co.,

Tecumseh, Mich.

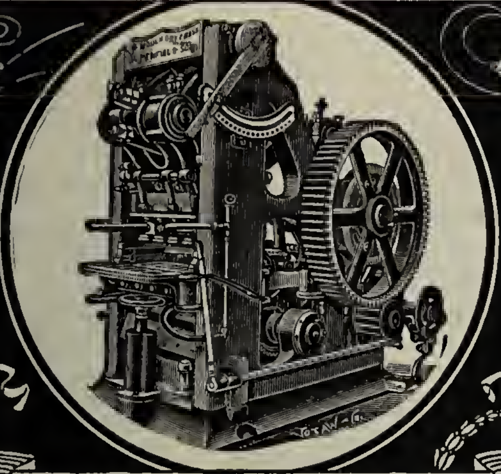


No. 9 "A" BRICK MACHINE.

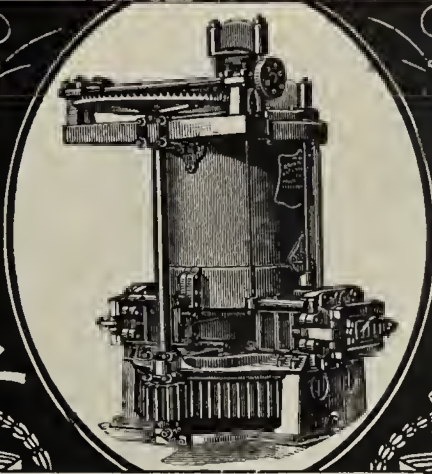


AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

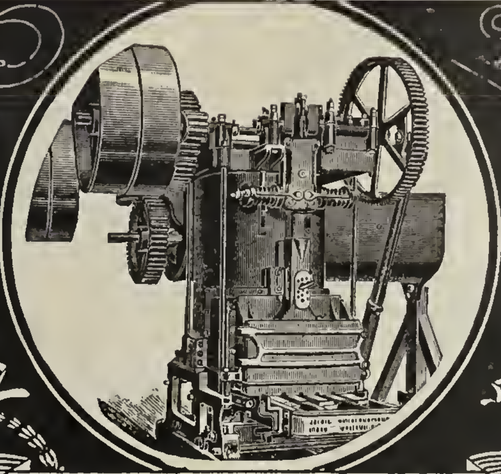
CLAY-WORKING MACHINERY



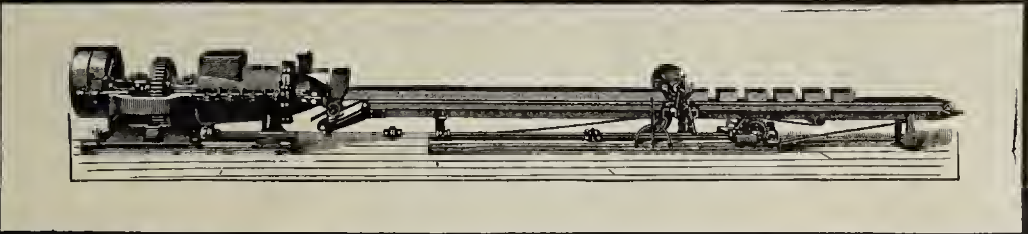
DRY PRESS BRICK MACHINES



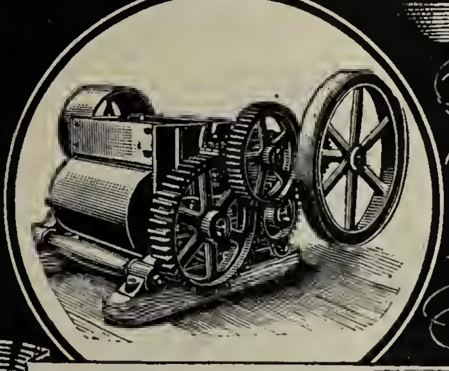
PLUNGER BRICK MACHINES



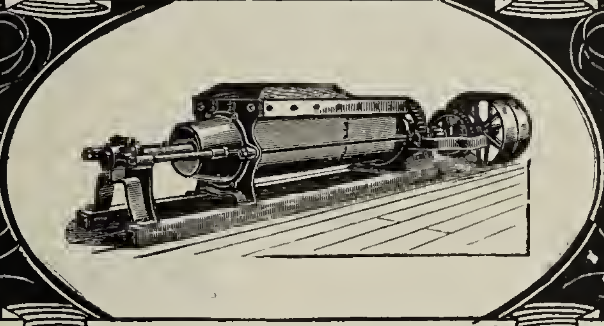
SAND-MOLDING BRICK MACHINES



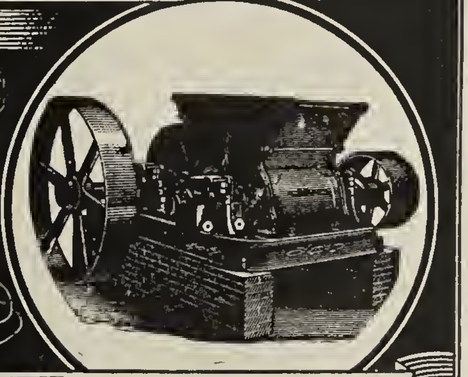
AUGER BRICK MACHINES



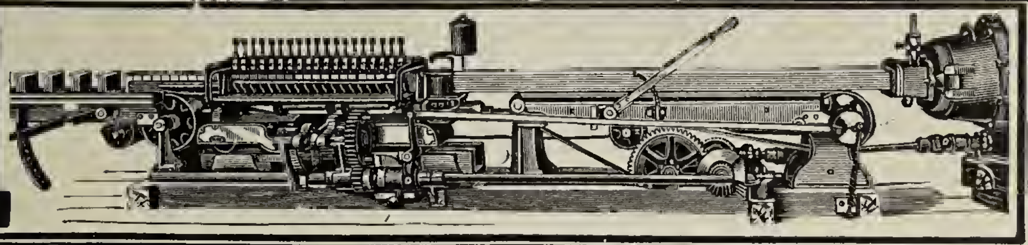
CLAY CRUSHERS



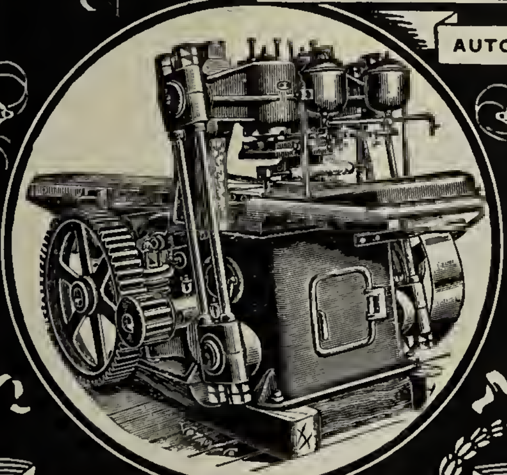
PUG MILLS



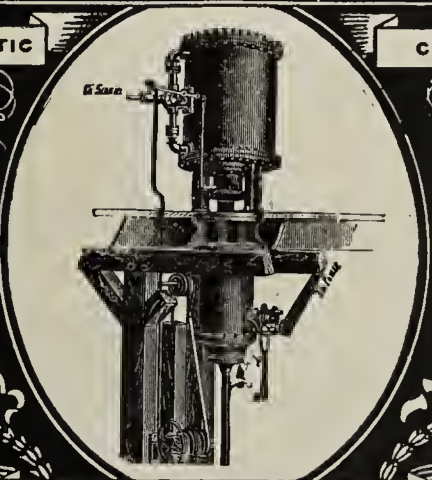
DISINTEGRATORS



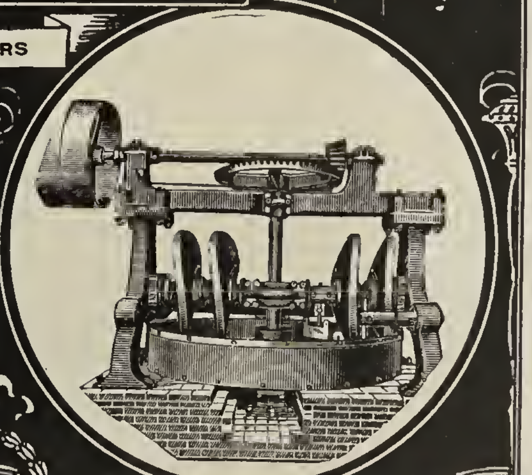
AUTOMATIC CUTTERS



BRICK REPRESSES



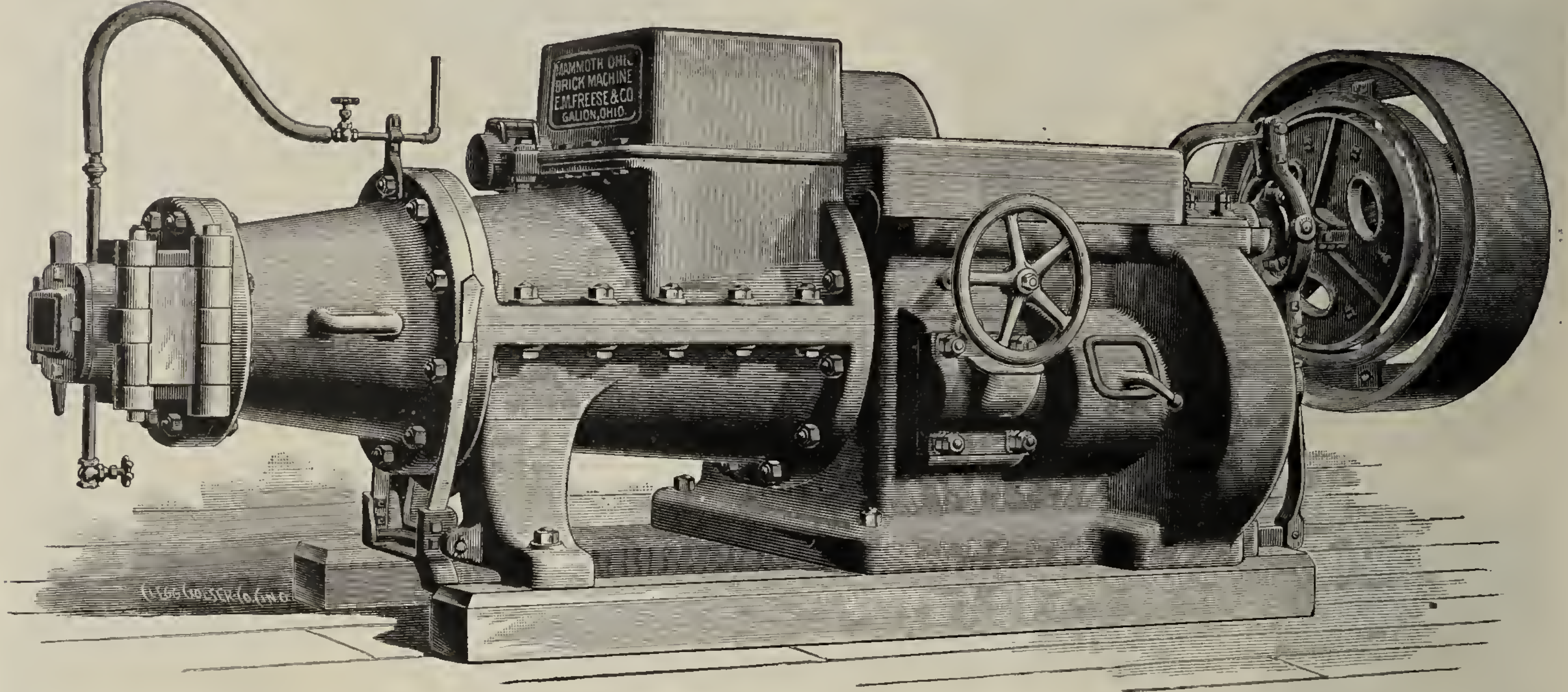
SEWER PIPE PRESSES



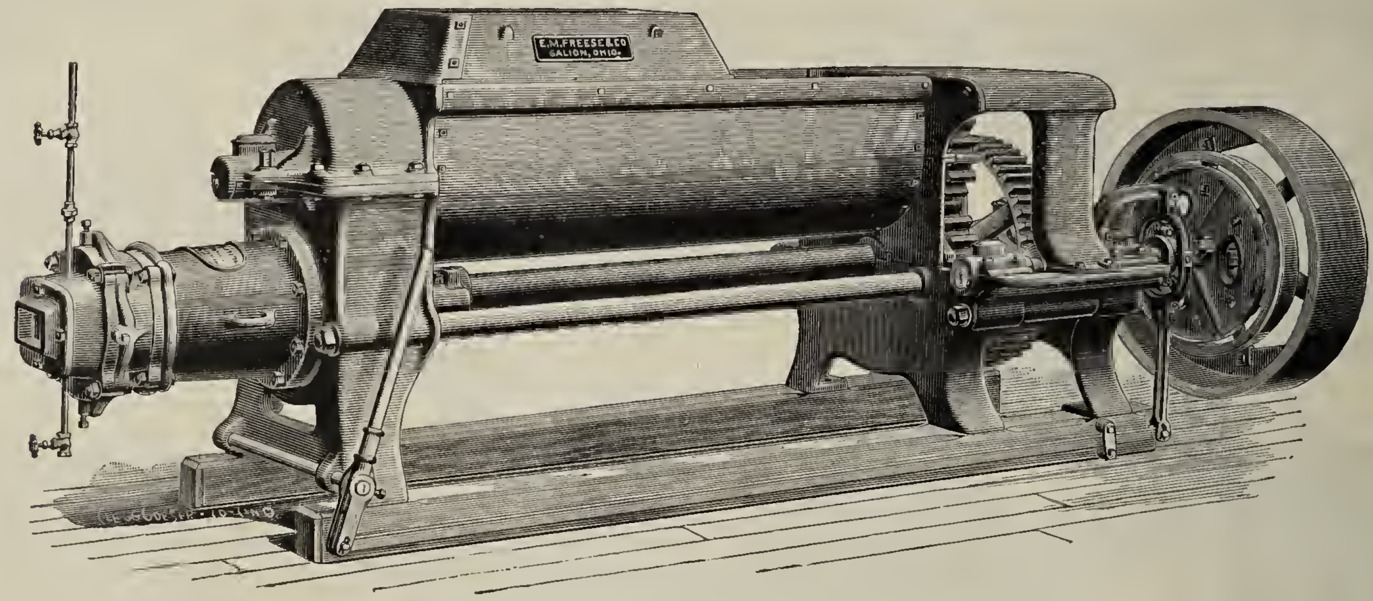
DRY PANS, WET PANS, ETC.

J.W. PENFIELD & SON, WILLOUGHBY, O. U.S.A.

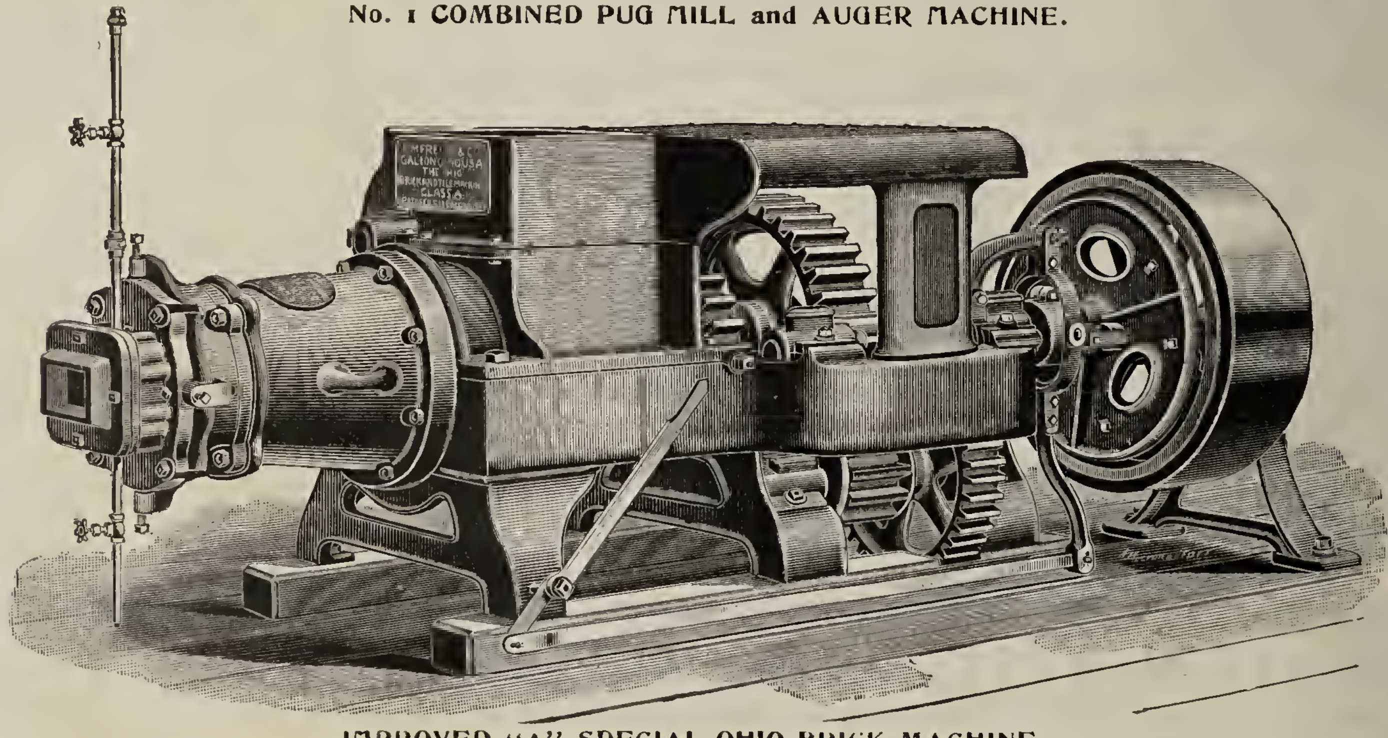
E. M. FREESE & CO., GALION, OHIO.



MAMMOTH BRICK MACHINE.



No. 1 COMBINED PUG MILL and AUGER MACHINE.



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Send for 136 page Catalogue.

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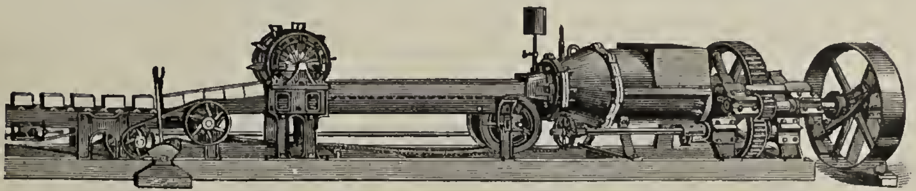
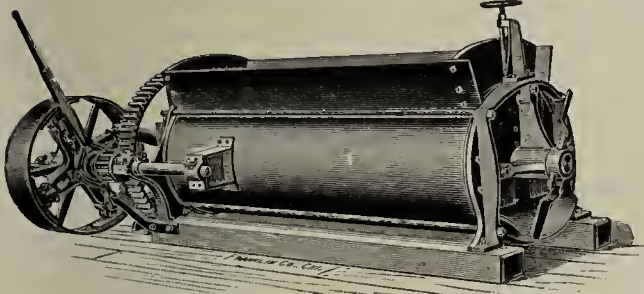
Write for Catalogue.

Before Buying

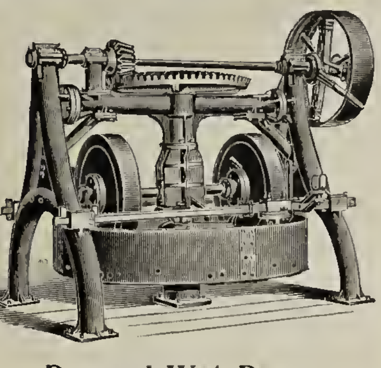
Write for our Prices.



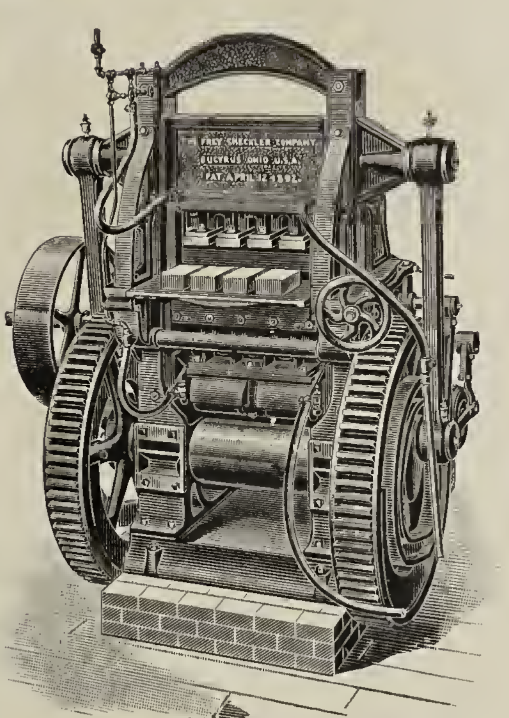
No. 1 Giant Machine and Automatic End Cut Table.



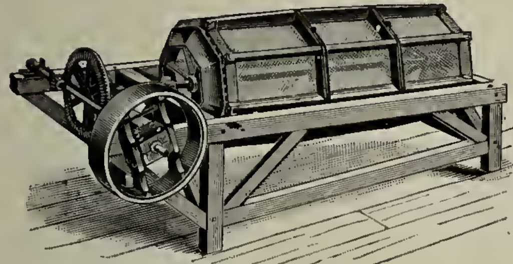
Pug Mills and Granulators.



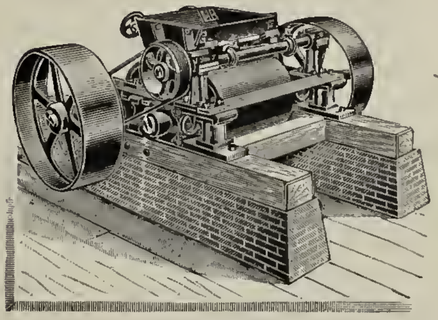
Dry and Wet Pans.


THE FREY-SHECKLER COMPANY
BUCYRUS, OHIO, U.S.A.
PAT. APRIL 12 1892.

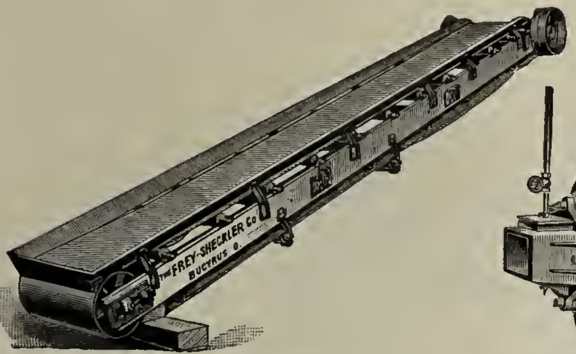
4-Mould Semi-Plastic Brick Press.



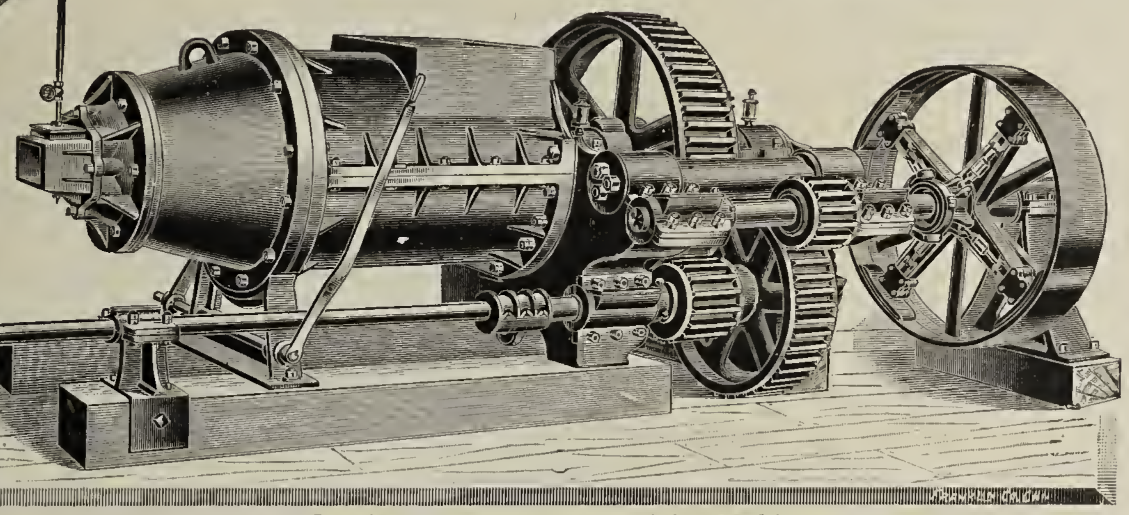
Clay Screens.



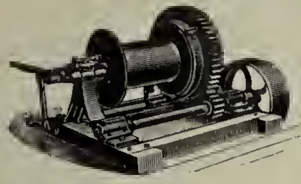
Crushers.



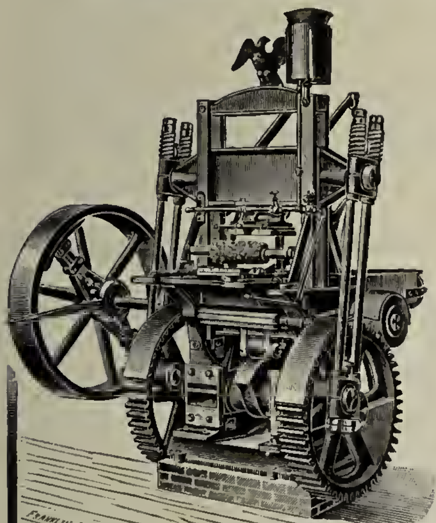
Clay Conveyors.



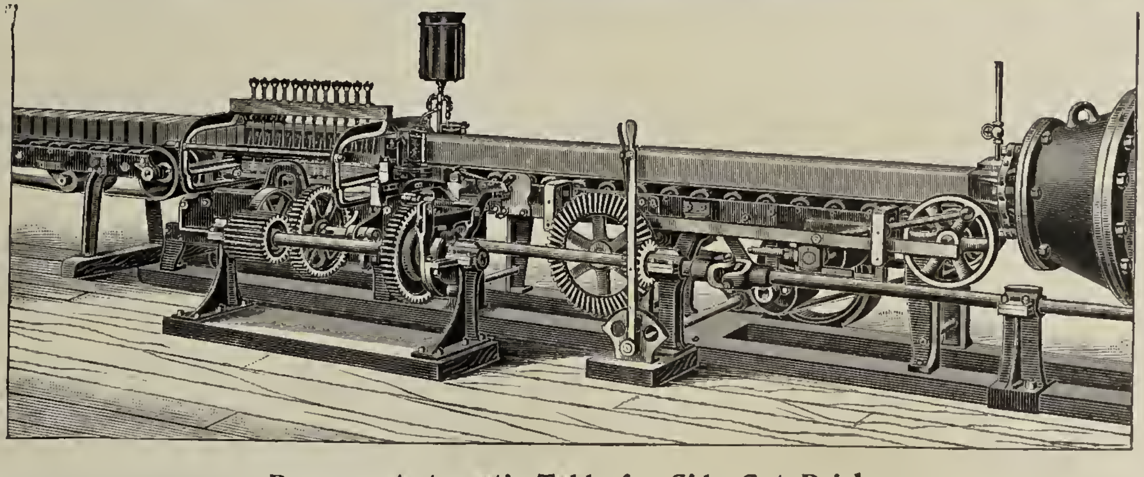
Special Bucyrus Giant Brick Machine.



Winding Drums.



Brick Re-Press.

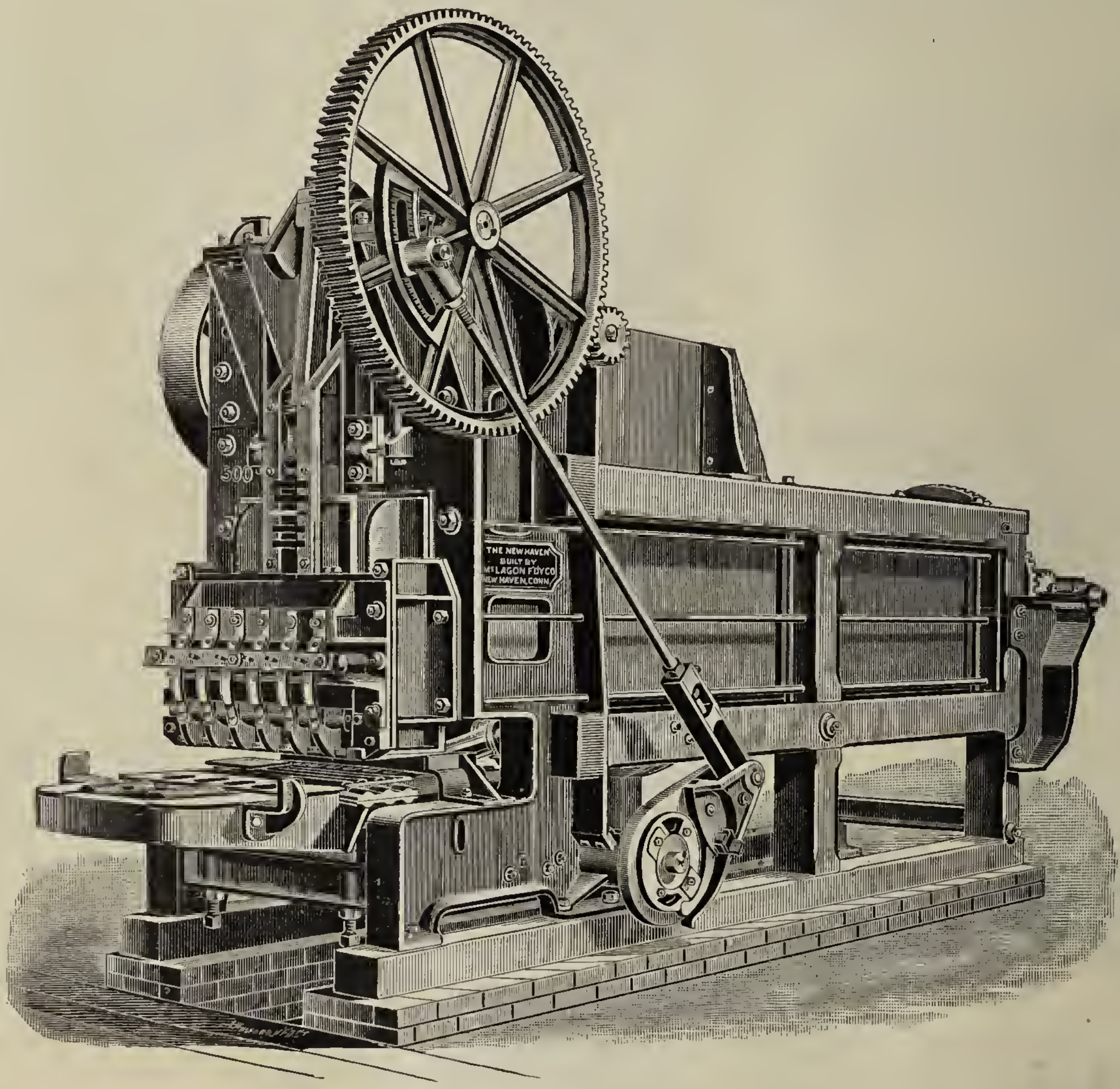


Bucyrus Automatic Table for Side Cut Brick.

The Frey-Sheckler Co., BUCYRUS, OHIO, U. S. A.

More "New Haven" Brick Machines

In use in New England than any other kind. This shows the approval of our Home Trade.



We have sold more **"New Haven" Machinery** this spring than in any previous season both at home and abroad.

For information about our machinery, address

The Eastern Machinery Co.,

NEW HAVEN, CONN.

WONDER MACHINERY,

For Brick and Tile.

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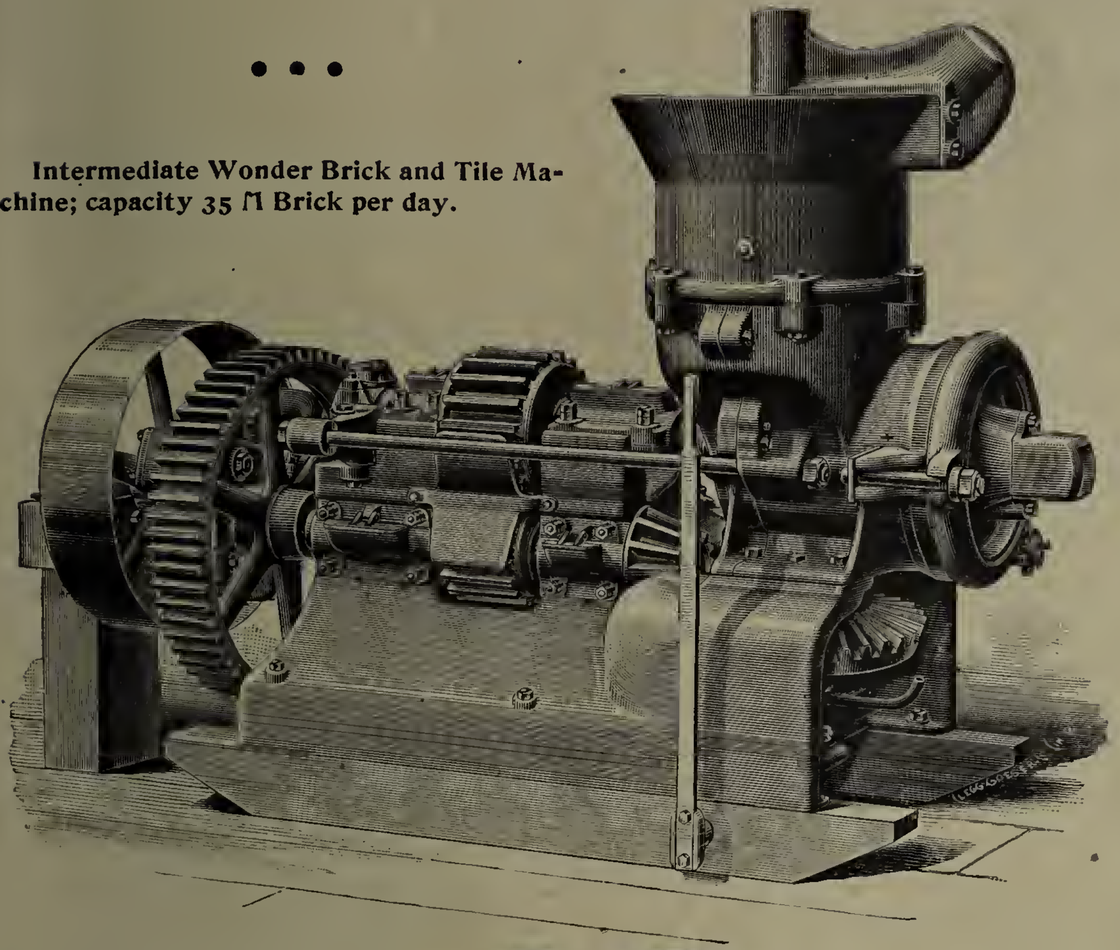
Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



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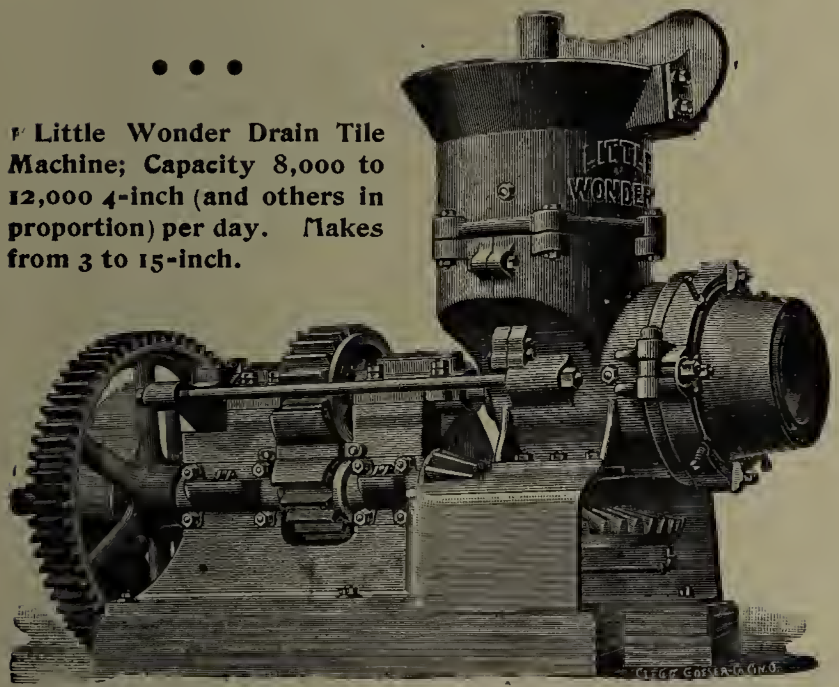
Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.



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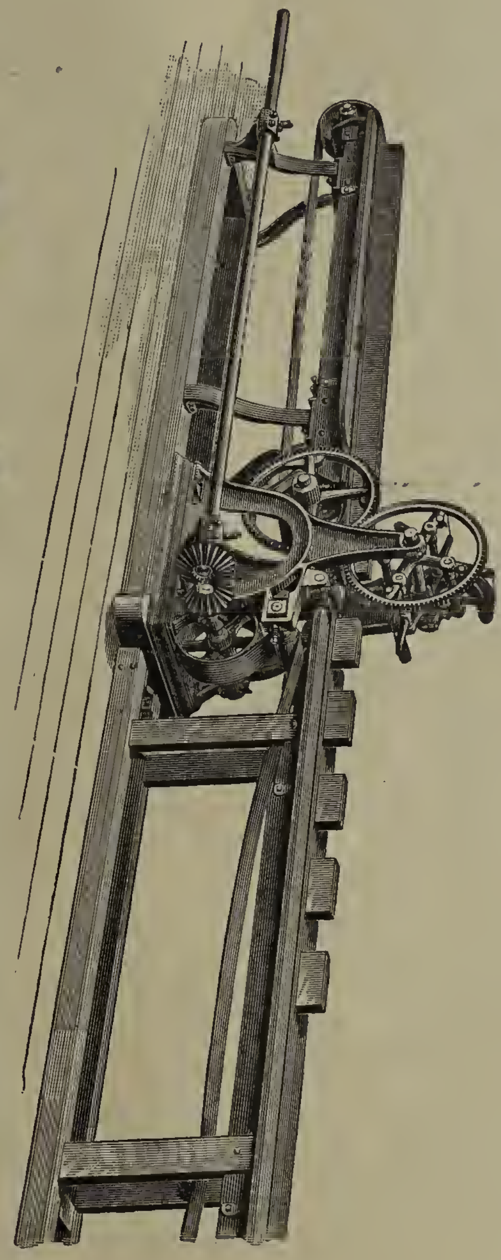
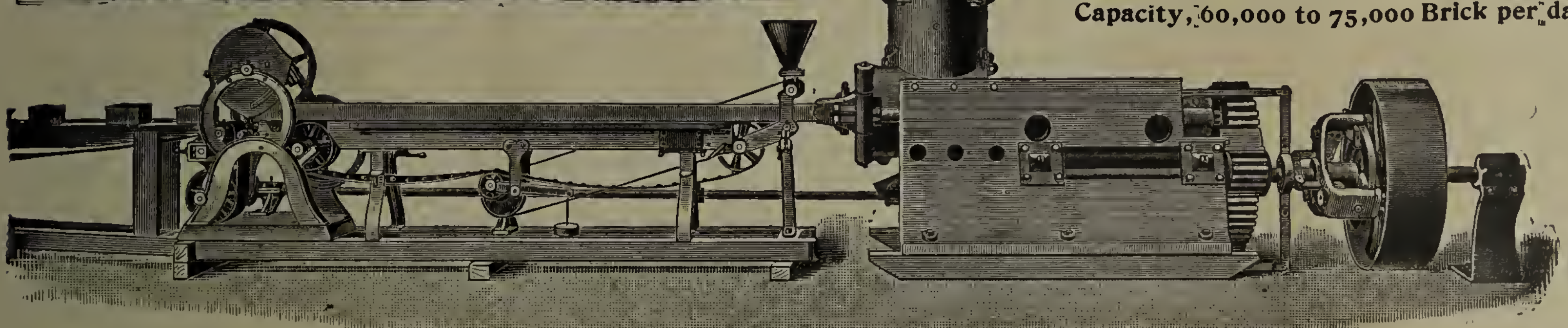


Cunningham's Single Stream Automatic End Cut Brick Cutter.

Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.

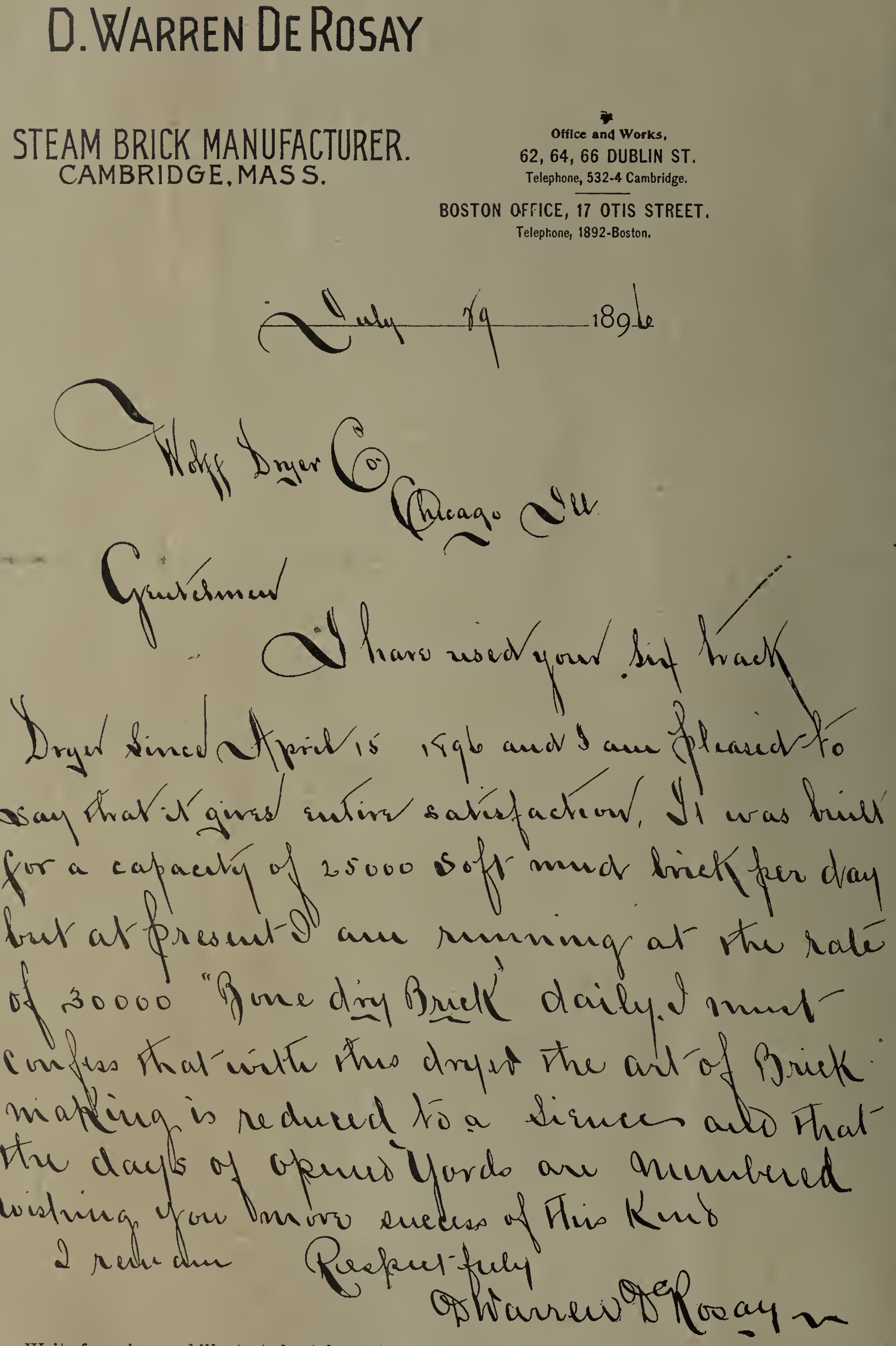


AS MANUFACTURED BY

The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.



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STEAM BRICK MANUFACTURER.
CAMBRIDGE, MASS.

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62, 64, 66 DUBLIN ST.
Telephone, 532-4 Cambridge.

BOSTON OFFICE, 17 OTIS STREET.
Telephone, 1892-Boston.

July 29 1896

Wolff Dryer Co
Chicago Ill

Gentlemen

I have used your Six track Dryer since April 15 1896 and I am pleased to say that it gives entire satisfaction, It was built for a capacity of 25000 Soft mud brick per day but at present I am running at the rate of 30000 "Bone dry Brick" daily. I must confess that with this dryer the art of Brick making is reduced to a science and that the days of open Yards are numbered wishing you more success of this Kind

I remain Respectfuly
D Warren DeRosay

Drying Soft Mud Brick in the **Iron Clad Dryer**

Write for prices and illustrated catalogue to

WOLFF DRYER CO., Chicago, Ills.

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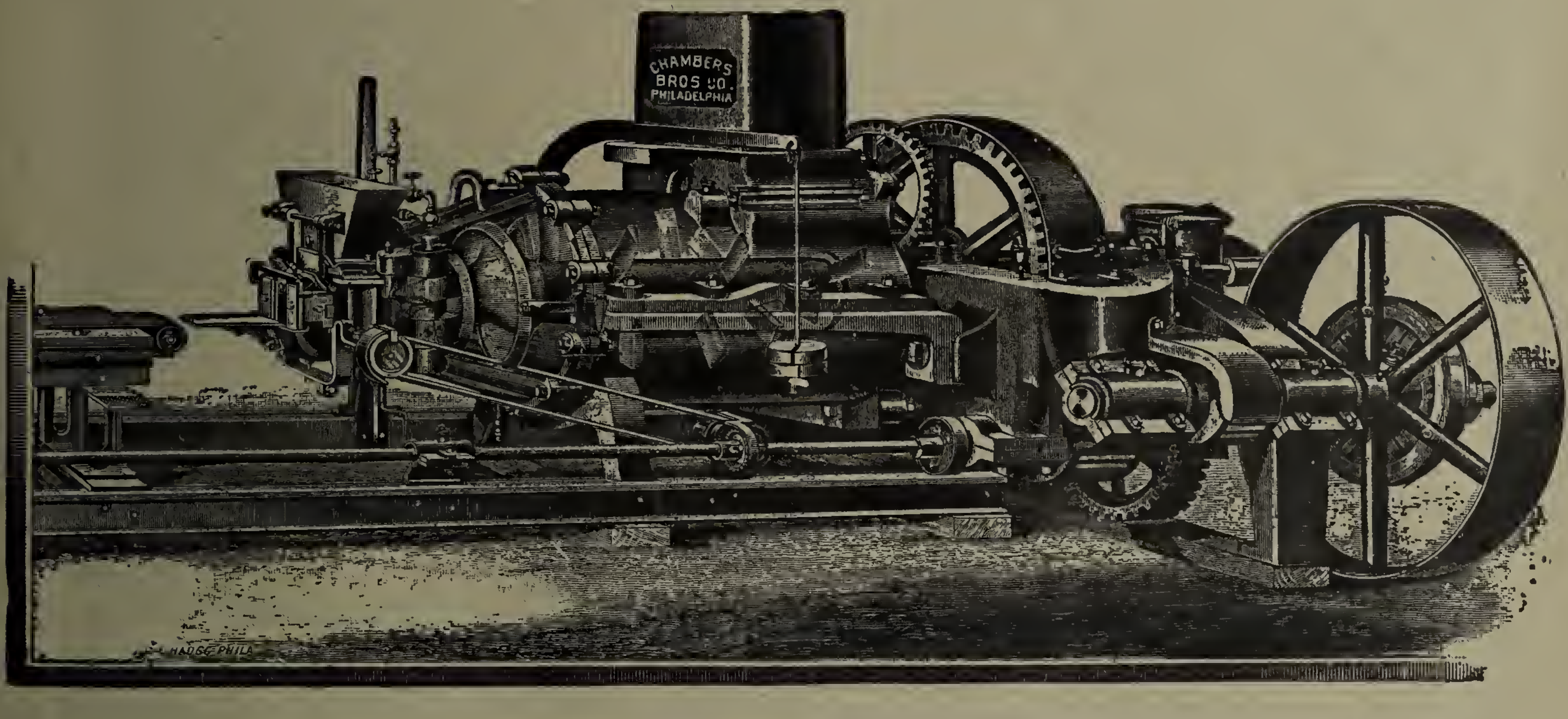
Table of Contents, Page 221.

THE
CLAY WORKER
A JOURNAL DEVOTED TO ALL CLAY WORKING INTERESTS.
INCLUDING BRICK TILE TERRA COTTA SEWER PIPE POTTERY ETC.
T. A. RANDALL & CO. PUBLISHERS.

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXVI, No. 3. INDIANAPOLIS, IND., SEPTEMBER, 1896. $2.00 a Year in Advance.

Brick Making Machinery.



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PHILADELPHIA, PA.

J. E. EASTES, Chicago Agent,
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AN ANTIDOTE FOR HARD TIMES.

The Cummer Dryer

THE CUMMER DRYERS

Will make lots of money for you over any other dryer or system of drying you may employ.

Of course, if you have

The CUMMER DRYER

You are happy even with the low prices and hard times because you are drying your brick so cheaply.

No use talking

The CUMMER DRYER

Is the only dryer on the market. The Royal Brick Co., of Canton, write about it as follows:

Canton, Ohio, June 20th, 1896.

The F. D. Cummer & Son Co., Cleveland.

Dear Sirs:--Replying to yours of the 19th inst., we are more than pleased with the Cummer Dryer.

It saves us 10 car loads of coal per month over the steam dryers we had, and causes no trouble whatever. We make paving blocks, size 9 1-2" x 4" x 4 5-8"; green weight, 13 lbs. 6 oz.; dry, 11 lbs.

We evaporate daily 78,000 pounds of water, and have nice dry blocks.

We have only 10 tracks; had 15 before, and were not able to dry brick as well as we can now dry them.

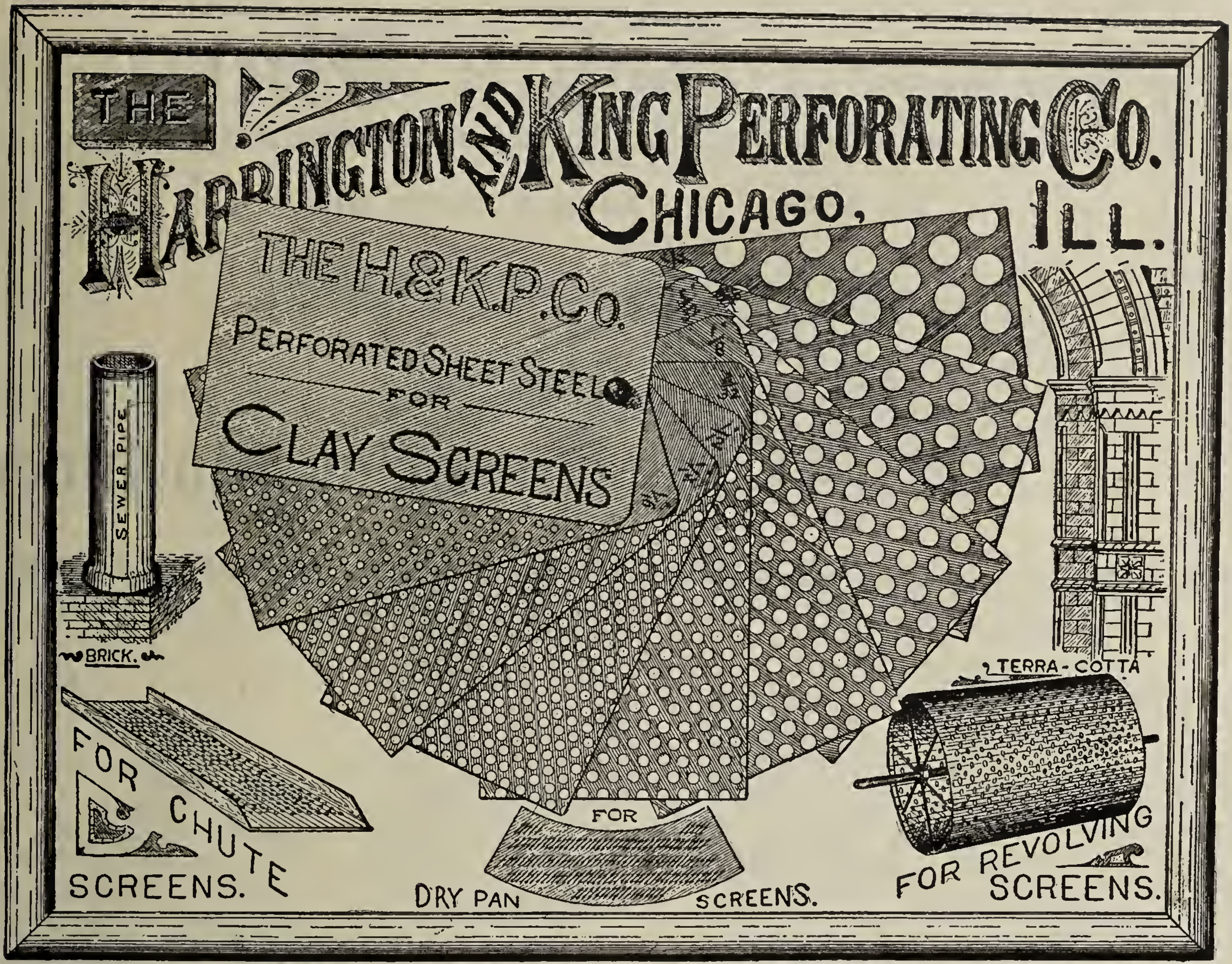
We can conscientiously recommend your dryer, and we will cheerfully give you any further details for which you may ask.

Yours truly,
Otto Giessen, Sec'y and Treas.,
THE ROYAL BRICK COMPANY.

Write for new catalogue.

The F. D. Cummer & Son Co.,

CLEVELAND, OHIO.


THE
HARRINGTON AND KING PERFORATING CO.
CHICAGO, ILL.
THE H.&K.P.Co.
PERFORATED SHEET STEEL FOR CLAY SCREENS
SEWER PIPE
BRICK.
TERRA-COTTA
FOR CHUTE SCREENS.
FOR DRY PAN SCREENS.
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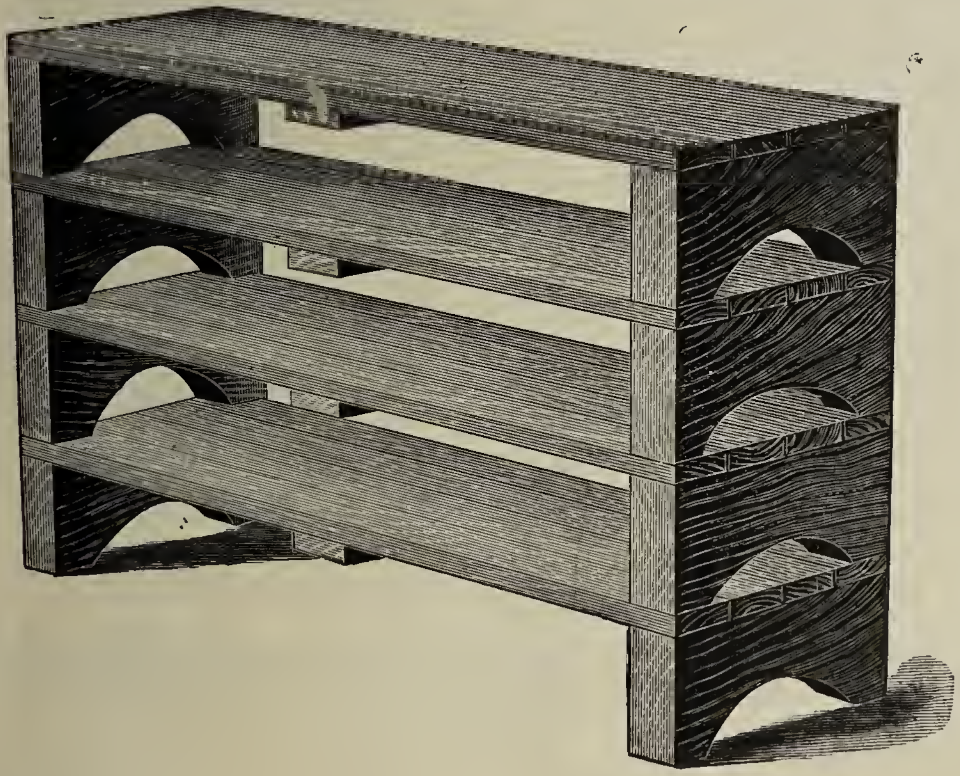

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Wooden Pallets,

WE CAN FURNISH YOU THE BEST.

We make all Styles of

Rack Pallets,
Hacking Pallets,
Pallets for Dryers,
Also *Decks for Dry Cars.*

We can ship them anywhere.

Get good pallets from those who know how to make them. It will pay you in the long run. Send for circulars and prices. Address

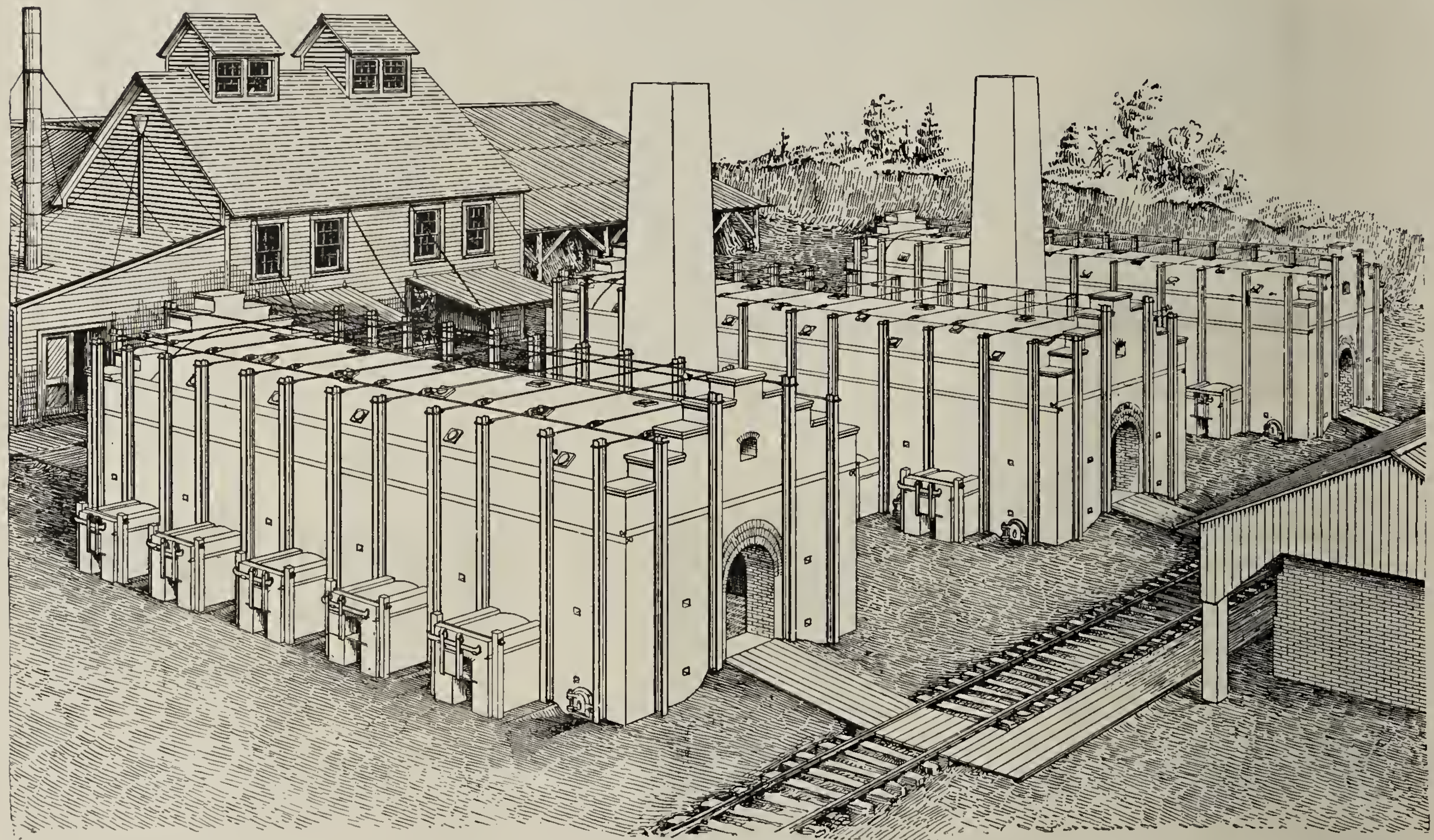
W. B. MERSHON & CO., - Saginaw, East Side, Mich.

A Modern Brick Plant

As Arranged and Equipped by us with

The Boyd Brick Press,
The Flood Kiln and
UP-TO-DATE Clay Preparing Machinery,

WILL MAKE 95 PER CENT. HIGH GRADE BRICK IN REGULAR EVERY DAY WORK.



All the most successful Brick Plants in the United States have been equipped by us.

Brick made on the **Boyd Press** have become the "Standard of Excellence" wherever they are used.

The CHISHOLM, BOYD & WHITE CO.,

OFFICE AND WORKS:
57th and Wallace Streets.

Chicago.

"NEMO ME IMPUNE LACESSIT."

Clay=Working Machinery.

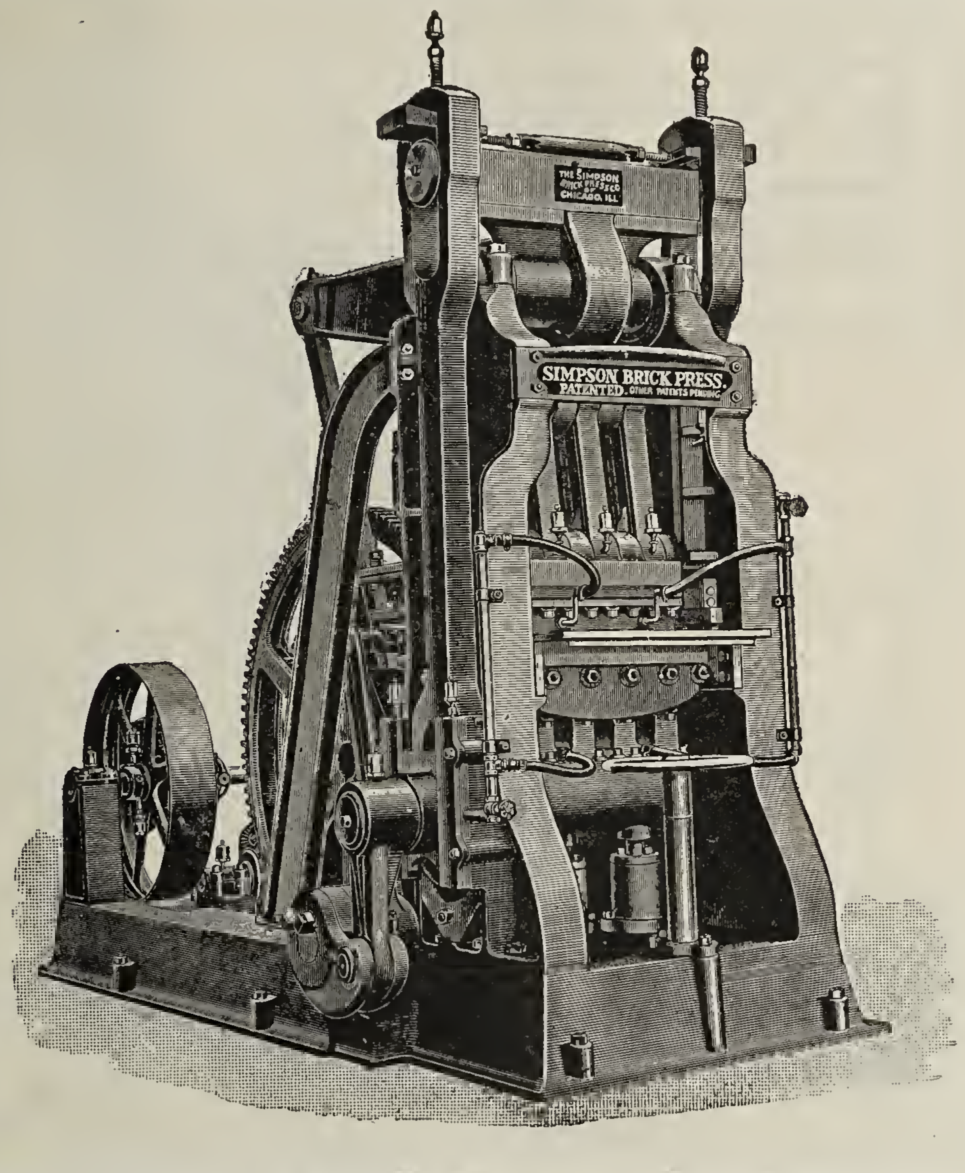
The Simpson Brick Press Co.,

MANUFACTURERS OF THE

Simpson Brick Press,
Automatic Screens,
Clay Steamers,

And a Full Line of Brickyard Equipments. . .

Complete Plants Constructed and Guaranteed. . . .


THE SIMPSON BRICK PRESS CO CHICAGO, ILL.
SIMPSON BRICK PRESS. PATENTED. OTHER PATENTS PENDING.

OUR MACHINERY has long since **passed the experimental stage,** and is considered the standard by competent brickmakers. Write for catalogues.

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Agents for Canada:
WATEROUS ENGINE WORKS CO.,
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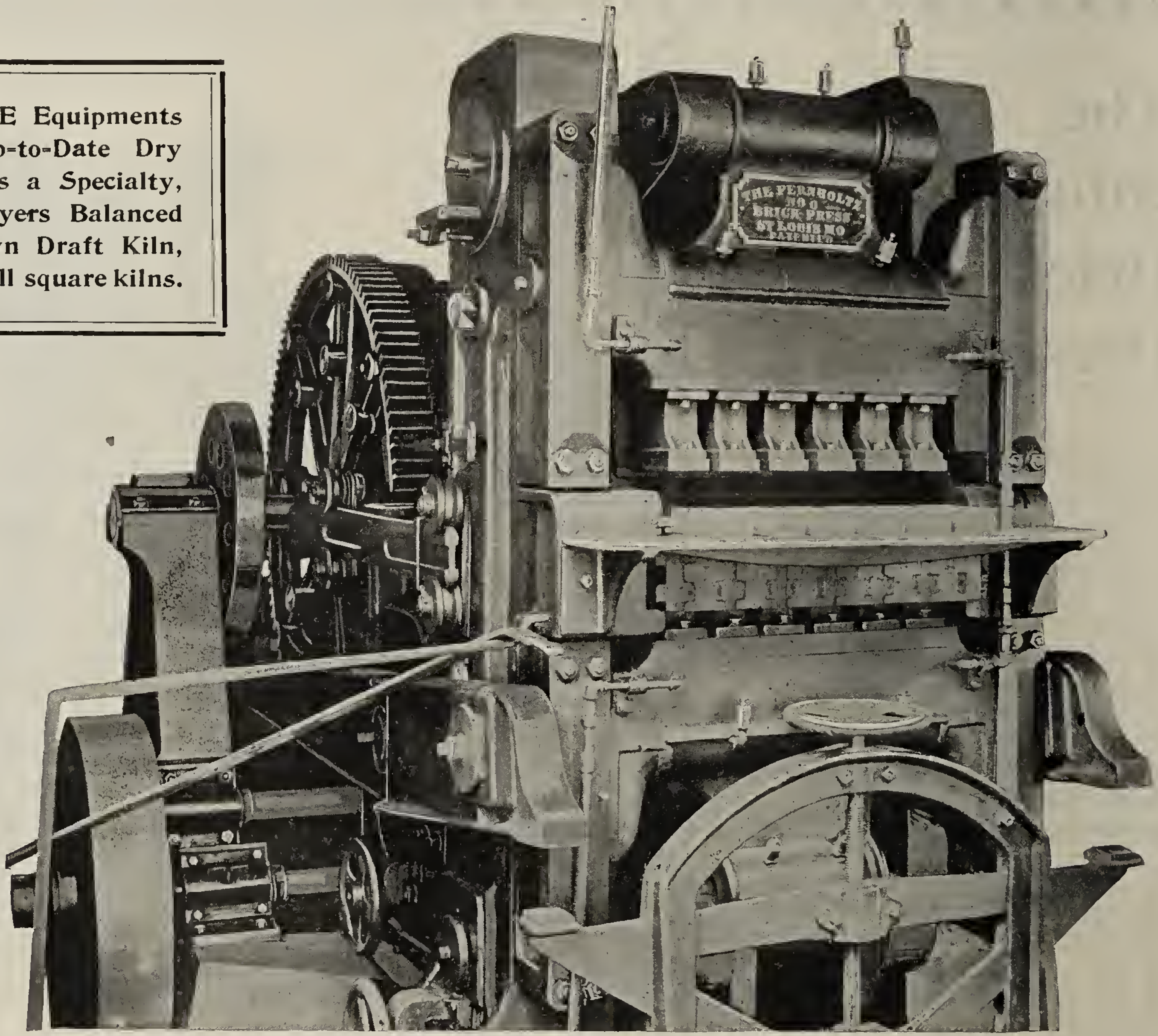
The Fernholtz Improved Brick Press.

THIS press is the result of fifteen years of practical experience as a successful press brick and press brick machine maker, backed by inventive and mechanical talents of a high order. It is unequaled for strength and easy running, requiring only 6 to 7 horse power to operate the largest 6 mold press. All the parts subject to strain are made of the best bessemer steel and every part can be seen and got at easily. The thickness of the brick can be changed or regulated without stopping the press, and every press is fitted with the Fernholtz mould which is generally admitted to be the best mold in use. For fine pressed and ornamental brick this machine is unequalled, the pressure on and movement of the clay in the mold being such as to prevent granulation and insures the most perfect product possible.

We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

The opinion of those using our press and full information on application.

COMPLETE Equipments for Up-to-Date Dry Press Plants a Specialty, including Myers Balanced Up and Down Draft Kiln, The Best of all square kilns.



The Fernholtz Six-Mold Brick Press.

The Fernholtz Brick Press Co.,

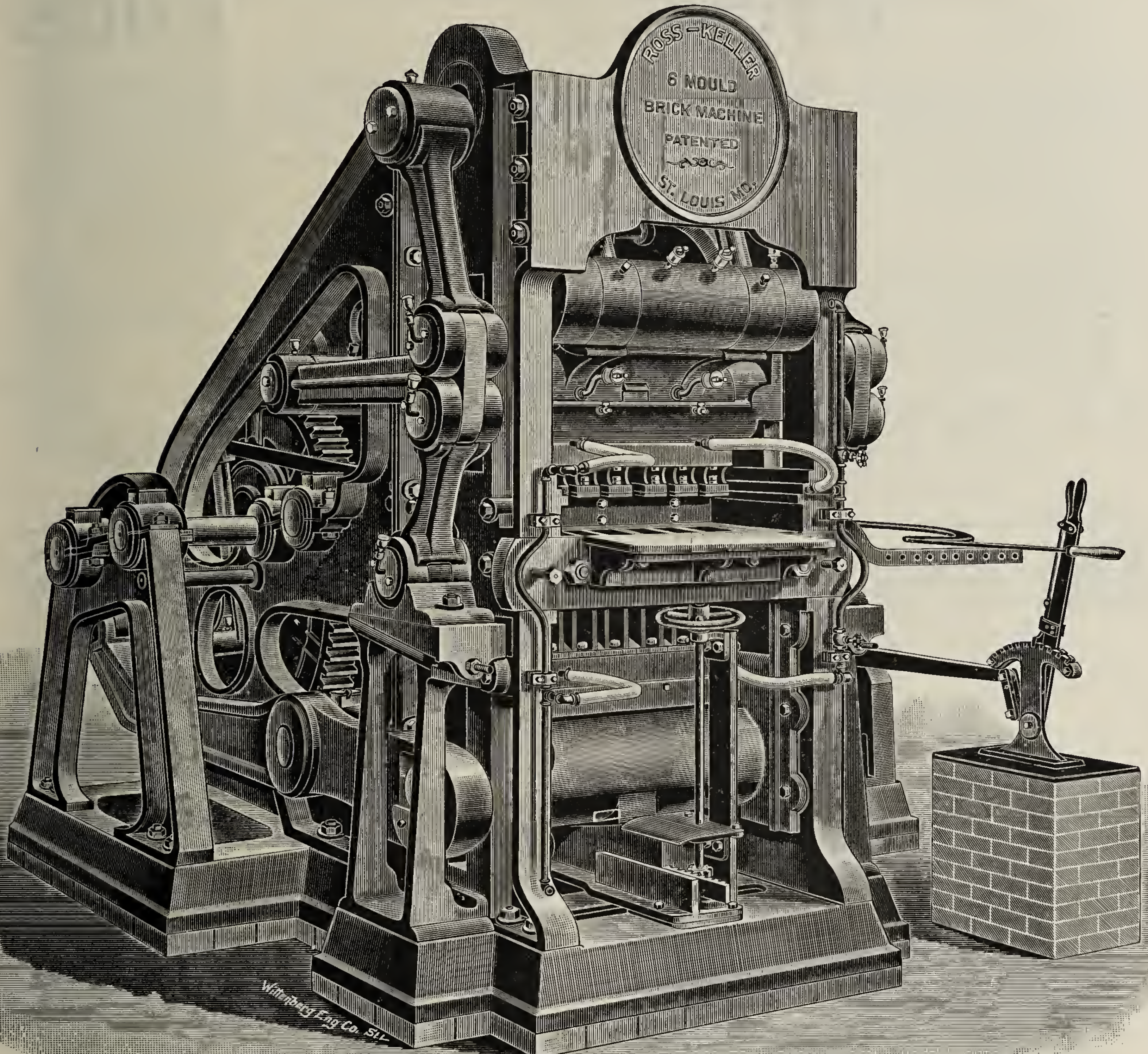
1214 and 1216 Poplar Street, **ST. LOUIS, MO.**

The Latest Improved

Ross-Keller TRIPLE·· PRESSURE Brick Machine.

Manufactured in four and six-mould sizes. Weight of four-mould machine 58,000 pounds; capacity 24,000 brick per day. Weight of six-mould machine 75,000 pounds, capacity 36,000 brick per day.

BRICK SET IN KILN DIRECT FROM MACHINE.



The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Requires but one minute to change the brick from one thickness to another. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

If you want the best come and see us, or write for price and full particulars, address

Ross=Keller Brick Machine Company,

Office 100 Rialto Building, **ST. LOUIS, MO., U. S. A.**

Columbia Brick Press.

All working parts are made of Steel.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

The pressure is absolutely equal on top and bottom of brick.

A brick with granulation cannot be made on this machine.

The liners on mould can be taken out and replaced in five minutes, without removing any other part of the machine.

Any part of the gearing can be removed without taking machine apart.

The mould box can be taken out in a few minutes, without disturbing the other parts of machine.

The "COLUMBIA" presses clay or shale as dry as a hydraulic press, or so damp as to approximate a stiff mud brick, so that the range of products is from building brick to pavers. No other press does such a variety of work.

The "COUMBIA" is the only brick press on the market that meets ALL the needs of a brick plant.

For circulars and prices, address

H. B. HILGEMAN,

General Agent "COLUMBIA Brick Press,
. . . . and "COLUMBIA" Mould,
306 Oriel Building, ST. LOUIS, MO.

Terrazo Cement Tiles.

Complete Plants furnished for making the celebrated **"TERRAZO" Tiles.** Used to the exclusion of all other tiles in all floors, halls, etc., of the following among hundreds of structures in Germany:

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Terrazo Tiles, any color, design or size. For circulars, estimates, etc. Address

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General Agent of THEO. WELGE, for the sale of Dr. BERNHARDI SOHN, G. E. DRAENERT, GERMANY, Machinery and Processes for making TERRAZO CEMENT TILES.

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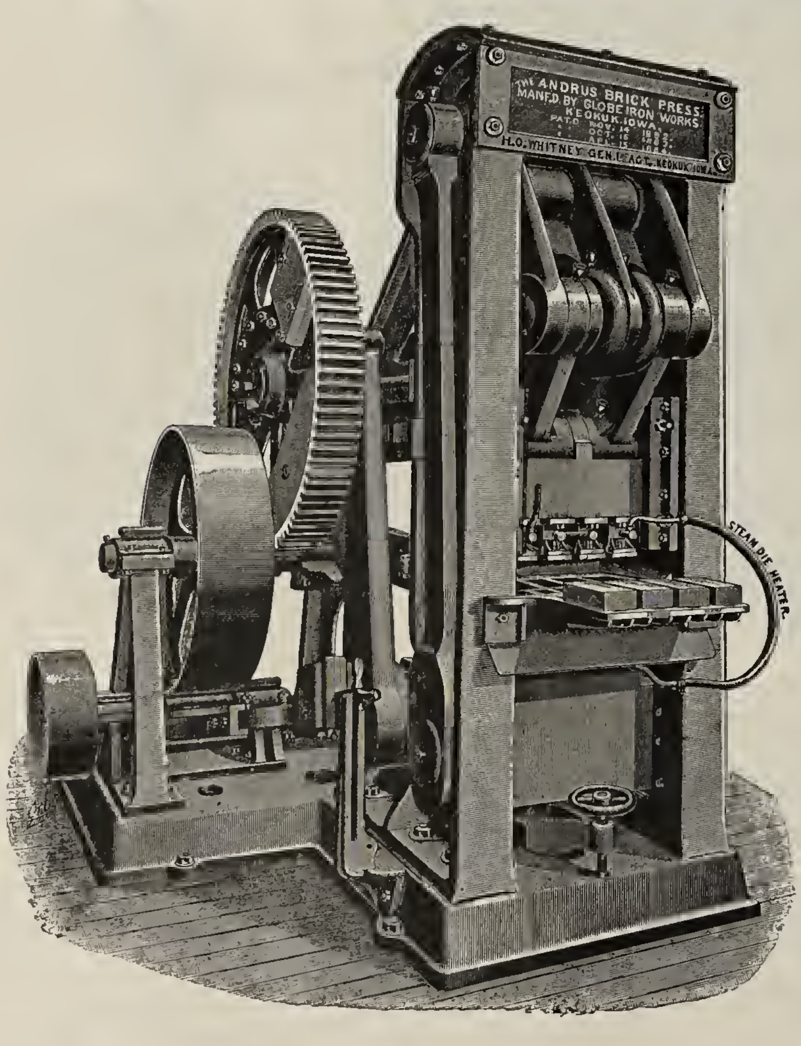
THE ANDRUS DOUBLE PRESSURE BRICK PRESS.


THE ANDRUS BRICK PRESS.
MANF'D BY GLOBE IRON WORKS
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H.O. WHITNEY GEN'L AG'T. KEOKUK IOWA
STEAM DIE HEATER.

We build at our Factory, Keokuk, Iowa, 2, 3 and 4-mold Andrus Presses.

They are the simplest and have the fewest wearing parts, and will accomplish all that the more complicated presses can accomplish, but with less friction and wear. Hence greater economy. . . . .

We guarantee them against breakage for **Five Years.** . . . .

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"LEVIATHAN."

"Upon Earth There is not His Like."

The T. B. Townsend Brick and Contracting Company.

ZANESVILLE, OHIO, July 30th, 1894.

THE MAIN BELTING CO., Chicago, Ill.

GENTLEMEN:—We take pleasure in recommending your Leviathan Belting for use in brick works After we have used every reputable form of Belting we find nothing gives the satisfaction that the Leviathan does, and by the use of the Thompson Belt Grease we double the life of the belting. We are

Yours truly,
THE T. B. TOWNSEND BRICK AND CONTRACTING CO.,
R. C. BURTON, Secretary and Treasurer.

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

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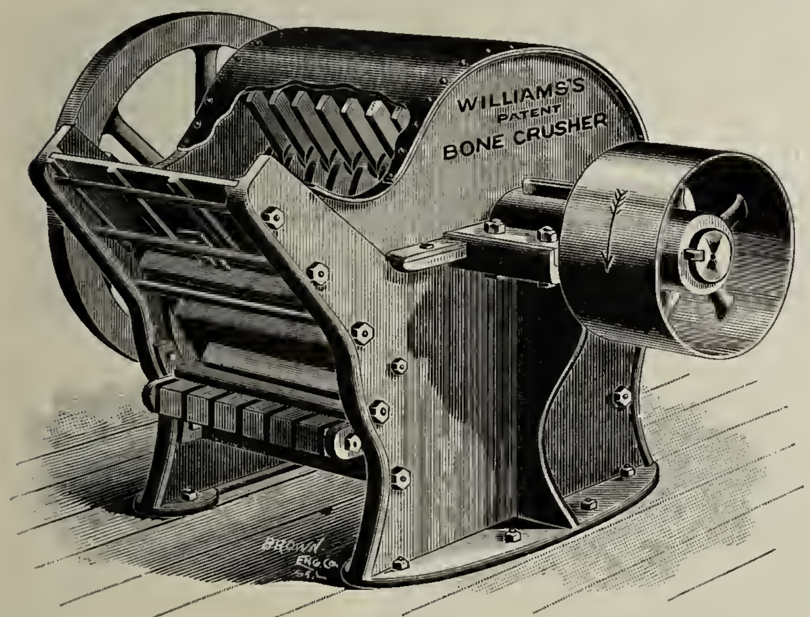
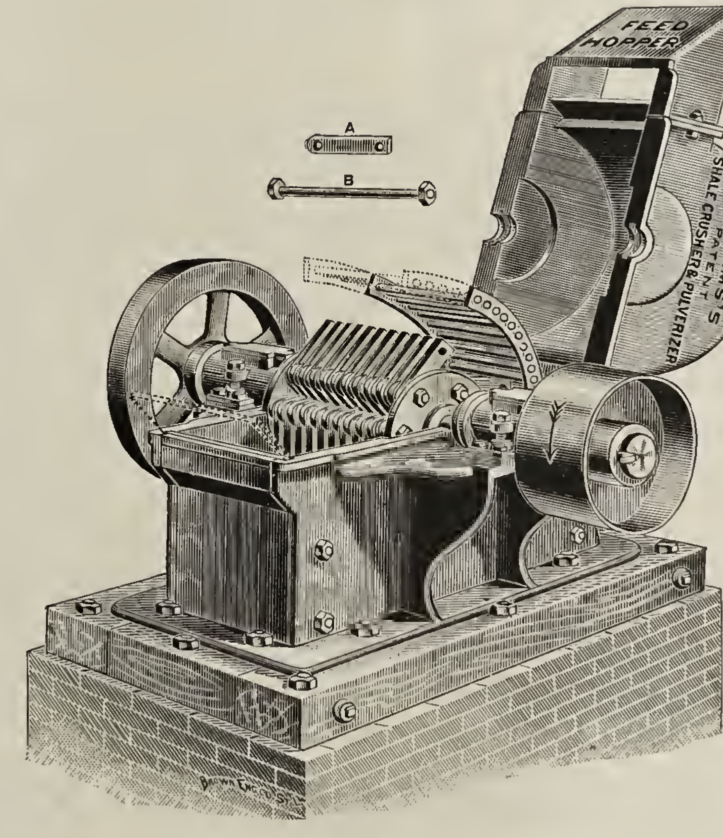
WILLIAMS'S COMBINED SHALE CRUSHER and CLAY PULVERIZER



Williams's Shale Breaker.


FEED HOPPER
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B
WILLIAMS'S PATENT SHALE CRUSHER & PULVERIZER

Williams's Shale and Clay Pulverizer.

THE above machines will handle shale and clay to better advantage with less power and less cost for repairs than any other machine known.
Will guarantee them under any and all circumstances.

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2705 North Broadway, - - St. Louis, Mo.

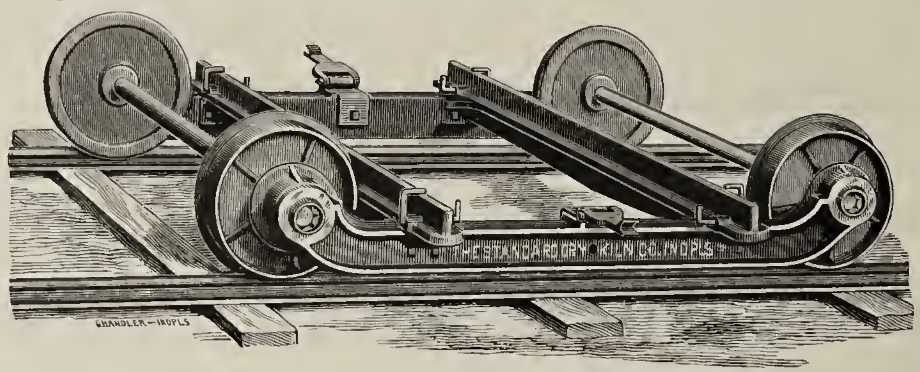
BRICK CARS

And other Drier equipment is our specialty. We are headquarters for everything in this line. Our improved Car has many points to recommend it; it is well proportioned and substantially made; its construction is such that 50 per cent. less bolts are required than in any other make, reducing in this proportion its liability to get loose. It is provided with "chilled" Cage Roller Bearings, which insure greatest ease in running and a minimum amount of wear.

Our **Double Deck** Car is deserving of special mention; the standards and upper and lower cross pieces are in one piece, which obviates all liability to racking, and does away with numerous bolts and objectionable angle braces.

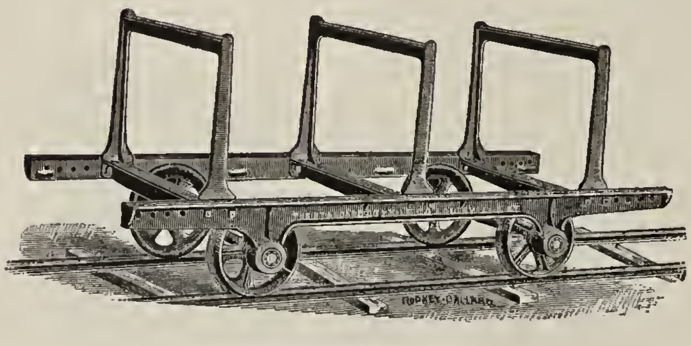
THINK OF IT! A 6 post Double Deck Car put together with only 12 bolts.

If you are overhauling your Drying Plant and require equipment of any kind—Cars—Turn Tables—Transfers—Rail—Pump or Tank—write us for Catalogue and figures. We have reduced our prices to "hard time" basis.

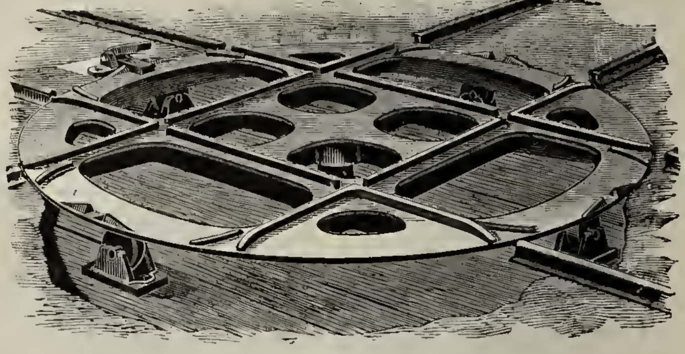

THE STANDARD DRY KILN CO. INDPLS
CHANDLER—INDPLS

Chilled Cage

Roller Bearing



DOUBLE DECK CAR.



TURN TABLE.

You'll Make no Mistake

In your choice if you select our Equipment for either an old or new Drying Plant; and if in need of the latter, don't fail to investigate the merits of

The Standard
Improved Brick Drier

It has stood the test of time and has been found to wear well. It's no experiment, but a recorded success, as our patrons cheerfully testify.

Send for Catalogue, endorsements and "hard time" prices.

The Standard Dry Kiln Co., 186 South Meridian St.,
INDIANAPOLIS, IND.

THE CLAY-WORKER

The Official Organ of the National Brick Manufacturers' Association of the United States of America.

Vol. XXVI. INDIANAPOLIS, IND., SEPTEMBER, 1896. No. 3.

Written for the CLAY-WORKER.

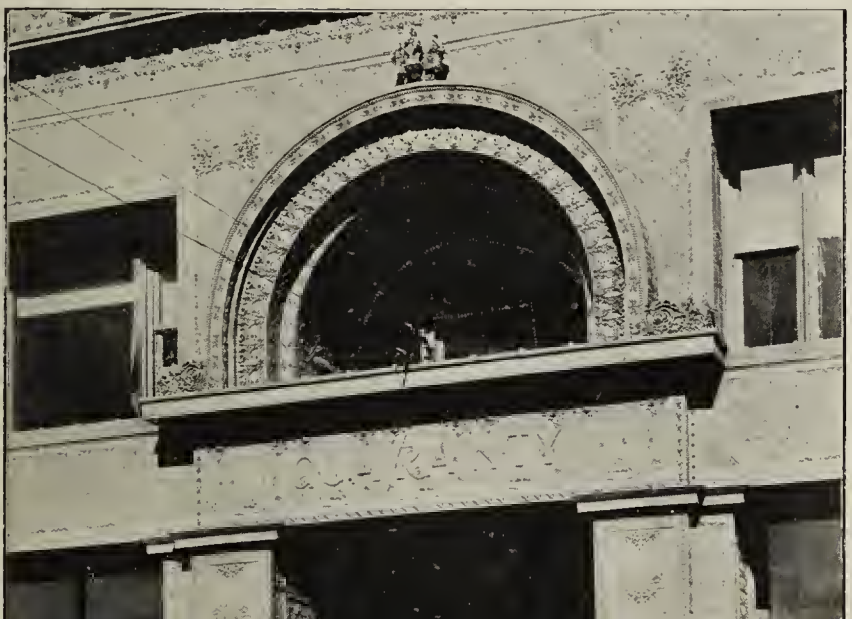
THE UTILITY OF TERRA COTTA IN ARCHITECTURE.

"CLAY IS CERTAINLY as sensitive a material as could well have come to the hand of the architect, and we should rejoice that the trend of modern building operations has brought it, in the form of terra cotta, into a use so natural and so general as that which now prevails.

"The artistic possibilities of this fine material are limitless, and appeal at once to the imagination and technical skill of the architect and the modeler for an adequate and poetical expression. Certainly there is no phase of sentiment, from the grandiose and powerful to the delicate and ethereal, that may not find in the skillful and sympathetic use of terra cotta a wholly satisfying medium.

"Add to the possibilities of form the developments that are bound to come about in glazing and colorings, and the outlook is certainly attractive."

So writes Mr. Louis H. Sullivan, the well-known architect, of Chicago, an eminent authority in all matters pertaining to architecture. The Guaranty Building of Buffalo, of which we give a number of illustrations, was designed by Adler & Sullivan, of Chicago. Mr. Louis H. Sullivan is acknowledged to be the artist of that firm of architects. Since the dissolution of their partnership Mr. Sullivan has retained the original offices and has full charge of all work, so that to him is due the credit for this noted structure.



Main Entrance the Guaranty Building, Buffalo, N. Y.
Adler and Sullivan, Architects.

Ours is not an artistic people. An artistic piece of work like the Guaranty Building in Buffalo does not come as the public expression or from the demand of the citizens of that community. It is the personal expression of an individual—its architect. A structure of this kind must have an influence on the community. The community did not have an influence on the building. Is this not always so? may be asked. Certainly this condition is not typical of the history of art and architecture. The people of ancient Greece had an ideal. The artists worked to it. The Roman architecture was monumental, grand. It reflected the spirit of its time. It was official. It emanated from the government. It was an architecture growing out of organization. Gothic architecture, that of the thirteenth century especially, grew from the people. Their highest and most universal expression was in building. They expressed the great religious emotion of that time through their architecture. They thus announced religious fervor and individual freedom. Their architecture expresses more of life, more of deep feeling than that of any time before or since. It is the supremely great, and great because it expresses great ideas, great feeling, new thought and emotion in the world's history. It came from the mass of the people. Most building work of our time is, to say the least, very inartistic. Modern civilization does not run in that channel. We have not progressed along such lines. The artist stands as one apart from the rest of the world.

This building which we picture stands distinct and apart from the general and even pretentious architecture of America. There are other tall buildings in Buffalo, many more in New York and the other cities of the country, but none possessing as great artistic value as this. One may naturally ask, In what does the greatness of this building consist? Certainly not in its size, for there are others much larger. Certainly not from the standpoint of the picturesque or any interest of outline. As we see it, it is practically a cube. Primarily it is a perfectly natural development of a commercial structure. Below we find the best possible arrangement for stores and banks. We find a perfectly natural expression of their function in the structural forms. Above there are a number of stories; it makes no difference how many, for we do not have to count the number of stories in this building in order to admire it. These upper stories are treated in the simplest and most natural manner possible. The piers which separate the windows and carry the structural material on the inside are merely piers. The horizontal separations of the different stories are absolutely national. They are merely separations. At the top we have an attic and cornice, so that, taking it all in all, we have a building containing the simplest possible structural outlines, so arranged as to express the uses of the building. The hand, guided by the heart and mind of a great artist, touches this mass, and we have great art. The entire surface of this structure is profusely decorated, but even without a square inch of decoration this building is easily the greatest piece of commercial architecture in America. There is a nobility and simplicity in it which reaches both heart and mind.

As it is, however, this building is absolutely covered with a wealth of ornament, the beauty of which our pictures can only faintly suggest. It is the greatest work of a master in architectural decoration. Withal, this decoration is original. It is not a hackneyed reproduction of old forms, but is the natural effort of one who has new thought and new joys to bring into the world. It is a great thing to be able to say of any man that he has actually produced what will be a new source of pleasure to the generations to come. Here, however, we actually have it. First, a general composition which is new in its simplicity and nobility; then a covering of beautiful ornament, showing a quality of mind and heart not before known in our generation.

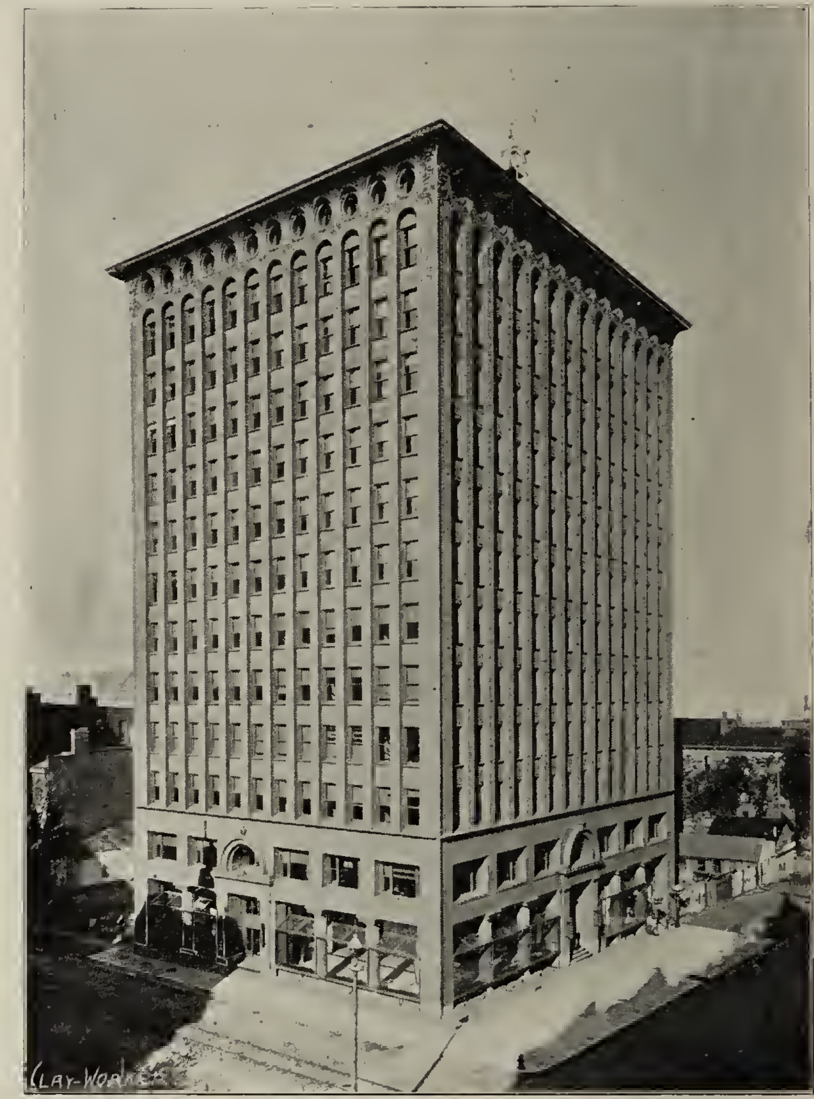
The frame of this building is of steel. The covering is of terra cotta. It is a pleasure to see the artistic possibilities of burned clay so wonderfully shown as they have been here. In a structural sense it is treated in a natural manner. It is handled as terra cotta, not as stone or other building material. It is used to surround the frame of the building. An artistic expression has been given to this envelope. A mass of clay does not represent much when considered in a commercial sense, but under the directing force of a great artist it takes a high place as a part of the world's property. It will not do for the clayworker to disregard the artistic and the higher expressions in architecture. Primarily it is the artistic handling which gives clay its value. Again, there is no material which is more dependent upon artistic handling for material worth than terra cotta. A boastful or coarse business man may say that he is willing to make anything providing he gets his pay for it. If all men were like him he would not get his pay. A mass of clay, when worked into a thousand of brick, represents very little of value. Passing under the hand of the artist, it represents very great value. The difference may be measured by the artistic work.

Mr. Sullivan has made extensive use of terra cotta in his other works, notably in the Schiller Theater, which, before the Guaranty Building was constructed, was proclaimed, both by American and foreign critics, to be the most successful high building in the world. The Stock Exchange in Chicago, the Wainwright and Union Trust Company Buildings, in St. Louis, are examples of terra cotta construction.

In a recent article by Mr. Sullivan on "The Tall Office Building, Artistically Considered," there is a paragraph which clearly expresses his idea as to the manner of designing the tall office building. "Beginning with the first story, we give it a main entrance that attracts the eye to its location, and the remainder of the story we treat in a more or less liberal, expansive, sumptuous way, a way based exactly on the practical necessities, but expressed with the sentiment of largeness and freedom. The second story we treat in a similar way, but usually with milder pretension. Above this, throughout the indefinite number of typical office tiers, we take our cue from the individual cell, which requires a window, with its separating pier, its sill and lintel, and we, without more ado, make them look all alike because they are all alike. This brings us to the attic, which, having no division into office cells and no special requirement for lighting, gives to us the power to show by means of its broad expanse of wall and its dominating weight and character that which is the fact, namely, that the series of office tiers has come definitely to an end."

All clayworkers are naturally interested in the commercial outcome of their undertaking, and, because of the higher material value which comes to material and labor through artistic handling, it is a natural part of the work of this journal to lay great stress upon the general principles and ideals which have resulted in the production of this building.

LOUIS H. GIBSON.



The Guaranty Building, Buffalo.

OBITUARY.

John Walker, formerly of Aurora, Ind., died Aug. 19, 1896, at Keyport, N. J. The deceased was in good health up to the time of his death, when he was suddenly stricken with apoplexy. He was born at Hartford, O., Aug. 18, 1826.

He was actively engaged in the brick business for thirty years. The writer knew him very well while he was located at Aurora, Ind. It was once said that "John Walker, of Aurora, made the best brick sold in the Cincinnati market."

Mr. Walker also served as postmaster at Aurora for twenty years, and was, at one time, well to do. He was always liberal to charitable and benevolent causes.

He was buried with Masonic honors, of which order he was a member in good standing. A wife, two sons and several grandchildren mourn his loss. He was always a kind, loving, patient husband and father. He was the soul of honor, and his word was his bond.

W. A. E.

Written for the CLAY-WORKER.

BRICK BUILDINGS BEST.

BY R. B. MORRISON.

THE ADVANTAGES of brick as a building material over wood is a subject that has not received the attention from brick manufacturers that its importance demands. In fact, there has been no united or systematic effort on the part of our National Association to bring this matter before the "home builders" of our country in a shape that would impress upon them the economy of building their houses of durable fire-proof material rather than use material that is temporary and inflammable in its nature.

While the first cost of a house constructed of wood is less than one constructed of brick, probably within ten years the wooden structure may have cost as much or even more than the brick structure. A brick house, properly constructed, is just as free from moisture as one built of wood. The former is less affected by heat and cold than the latter. The writer will not attempt in this article to go into details to prove that a dwelling of brick is more durable, nearer fire-proof, just as conducive to health, and, in the end, cheaper than one built of wood, as that is not the object we are aiming at, but rather to bring before brickmakers the importance of taking care of their interests, especially those that will increase the demand for their product.

I am many times impressed with this subject when our customers propose plans for dwellings to be built of brick, then, after figuring the cost of same, decide they cannot afford to build with brick except foundations and chimneys. This, I have no doubt, is the experience of every brickmaker. Many do not even figure on brick for their houses; they take it for granted that brick is out of the question, and think only of building a house of wood, a temporary affair, built only for the present generation.

It is true we have journals published devoted to the interests of brickmaking and brick building, but they do not reach the consumer. Our people need education along these lines. They need to learn that appearance or show is not all there is to consider in a home, but, rather, safety, durability and comfort. The question is, How can we best accomplish this? It would seem that we ought to reach them through the architects. Do architects take sufficient interest in these matters? I never knew of one who especially advocated the use of brick rather than wood. While we ought to bring all the influence we can to bear upon them, still this will not suffice. In a great many cases of houses of moderate proportions the plans are drawn by some local builder and the architect has nothing to do with it. I have no doubt if we could have articles on this subject written in an interesting and attractive manner and published in some of our magazines, not as an advertisement, but as a subject of general interest to everybody who has a home or expects to have one or wants one, they would be widely copied in the newspapers of the country, and in this way reach the people.

There is no way that we can help our business more than by widening our fields in this manner. He that causes a house to be built of brick instead of wood is a benefactor to all brickmakers, if not to his race. Has our National Association done anything on this line? Has it caused a brick to be used where none were used before? If not, it is not doing its whole duty.

In our programme for our next Convention let us have a paper on the advantages of brick as a building material over all other material, and another paper and discussion on how we can best get these facts before the people who are building houses. If the dwelling houses were built of brick instead of wood it would increase the demand for brick at least 100 per cent.

One objection that is frequently brought up against using brick in dwellings is: They cannot be made so attractive in color and finish as can a house built of wood. This was true a few years ago, but now, when you can get bricks of every hue to suit the fancy, as well as every conceivable shape and design, and trimmings of stone and terra cotta, results can be obtained to suit the most fastidious in this line, and brickmakers should put forth every effort to produce brick well finished, perfect in shape, uniform in color and strong and durable.

Another objection against brick for dwellings is that they absorb moisture, hence brick houses are not so healthy as a house built of wood. Of course, all these objections can be met, and it can be demonstrated that a house of brick, properly planned and constructed, is as dry as one built of wood. Brickmakers must keep up with the procession, and this is one way to help to accomplish it. We must use all honorable means to increase demand for our product and keep pace with our competitors in other lines of building material.

Side Entrance of The Guaranty Building.

NOW IS THE TIME TO INVEST.

Here and there we find reports that indicate that business is not altogether dried up. It is stated that much activity still exists in the great center of the iron industry, Pittsburg, Pa. The Leader of that city says the architects are all busy working on prospective plans, and the continued placing of loans makes the outlook ahead for fall and winter building very good. In another article on the real estate outlook the same paper reports in their issue of Aug. 9: "Sales of realty were larger in number and more important in character last week than the week before. And the inquiry for property was far better last week than it has been at any time during the past two months. Dealers all week reported large demand for both residence and business property." Such things show that enterprising business men are willing to discount the future and have faith in the stability of American institutions. The old motto, in such times as these, is worth remembering: "He who watches the clouds will neither reap nor sow." The opportunity to make money by taking advantage of the present low prices and inaction should stimulate moneyed men to improve their real estate. The moment better times are inaugurated contracts will not be placed as low as at present, materials will cost more, and when the political horizon has cleared the opportunity to erect good buildings at present very low prices will have gone.—Architecture and Building.

Written for the CLAY-WORKER.

THE GENERAL MANAGER.

II.—The Works.

BY F. W. BUTTERWORTH.

THE FIRST ESSENTIAL to the successful operation of any plant for the manufacture of clay products is to get it in the right place. Our Manager, in this connection, will need to call in all his ingenuity, experience, foresight and good judgment.

There are so many things that have a bearing upon the choice of location—the clay, the market, the character of the ware, transportation facilities, labor and procuring the same, price and amount of property available, water and fuel supply, etc.—that it is useless to lay down any fixed rules. Each site in every general locality has been chosen for some supposed advantage, and should be determined upon only after careful inquiry, thorough deliberation and exhaustive experiment.

The same is true as to the selection of machinery, kilns and appurtenances—the deepest knowledge and most mature experience not always sufficing to prevent many costly blunders. The man who can go into an entirely new and undeveloped field, and from his knowledge, experience and what experiments he may be able to make, erect a plant, place in position the machinery requisite to dig, prepare and mold the clay to the best advantage, dry it if necessary, and burn it successfully, without a failure or two on the start, is worthy of great commendation, and it is certainly advisable, despite the demurs of stockholders, to judiciously spend quite an amount of money in experiment and the making of "assurance doubly sure" before proceeding to the erection of the plant.

In this article, however, we will suppose the choice of location and machinery judiciously made, and take up the actual running of the plant and the Manager's position and duties as directly concerned with the works.

The costs of manufacture vary so greatly with the clays and fuels used that it is difficult to approximate a subdivision in percentage with any accuracy. The following subdivision is made with the order of their importance in view:

Labor.

Fuel.

Wear and tear of works and machinery, and depreciation of the value of land because of removal of clay.

Advertising and cost of sales.

General expenses—insurance, interest, etc.

Materials, oils, etc.

The largest portion of the cost of manufacture being labor, let us first turn our attention to that:

As the General Manager becomes overburdened with the stress of work that demands his own individual attention, he looks for the most convenient portion of his duties to shift. The running of the works, if properly systematized, is a thing of monotony and daily repetition of detail, and can most easily be thrown upon a man or men of but little education, but extensive experience, with nothing but this one particular duty to attend to.

The choosing of the Superintendent is a delicate and important matter. He should be a man of experience in the particular process in use at this one plant, with the capacity for handling men successfully and agreeably, and with executive ability to carry out promptly and to the letter the orders of his superior. The Manager exacts from him implicit obedience, and should control him absolutely, that the methods of one may be exactly as the methods of the other—holding him responsible for the actions of his bosses and men, blaming when blame is due, and giving him credit for success when deserved.

The various processes of manufacture are usually at considerable distance from each other, precluding the possibility of one man watching everything at one time, and hence we see the importance of a thorough subdivision of labor into gangs, with a reliable working boss or foreman, who is held to as great an extent as possible responsible for the actions of his entire gang, and who earns by manual labor his daily wage, reducing in this way the cost of direct superintendence to the minimum.

A Bit of Decorative Detail—Guaranty Building.

It is surely a necessity in a plant of any size to have a foreman over the machine department who shall have charge of the preparing, molding and motive machinery, and where there is much detail about the sorting and loading, it will probably save money and annoyance to have a moderate-priced man to do nothing but look after that end; but most of the other processes can be worked successfully with the cost of superintendence trifling.

The Superintendent gives his orders to these bosses, and sees that they are carried out, exercising a general supervision over everything, from the clay as taken from the bank to the ware when loaded ready for delivery.

The control of men, in our opinion, should be given directly to the Superintendent, who alone should do the hiring and discharging, although a complaint from any of the foremen should receive attention invariably, because that is their only means for controlling the men directly under them.

Each individual has different methods of handling men, but if he will watch carefully the following points he will not often be troubled with strikes:

Let him always, in his dealings with his employes, keep his own self-respect, and he cannot fail to command theirs—and this applies socially as well as in a business way.

Familiarity with them has never yet been known to breed aught else but contempt, yet a kind word now and then, or a "How's the wife, Henry," besides making Henry's day more cheerful, will earn several dollars for the company. Always call a man by his own name; nick-names increase familiarity.

Stimulation to greater efforts by honest, good-tempered rivalry produces the best results, but be sure and keep it good-tempered, for our processes are so knit together that all must work harmoniously together. One cannot be too careful in dispensing favors of promotion or increased wages.

Encourage honest pride in their product, and have them think more of that than the wages they earn, but make them sure of deserved reward.

Strict impartiality in every way is an absolute necessity; a lot of men working in a factory can best be compared to a class of boys in school, and each of us knows how it hurt and galled when there were pets—especially when we were not the pets.

The only redress, punishment or means of discipline an employer has is to discharge the hand; consequently, that should be used sparingly, judiciously, and only after careful thought pro and con. Many a man has been discharged for some trifling cause because the foreman's breakfast was badly cooked.

There is undoubtedly a sort of hypnotism used in dealing with men—the influence of one mind over another. Starting from the Manager, who controls his Superintendent and office force almost without the need of words, and quite as he does the fingers of his hands, on to the Superintendent, who governs his foremen or bosses, and in turn to the men under them, we see the influence of the stronger over the weaker, guiding, checking and urging, not so much by the word of mouth as by this strange mesmeric influence.

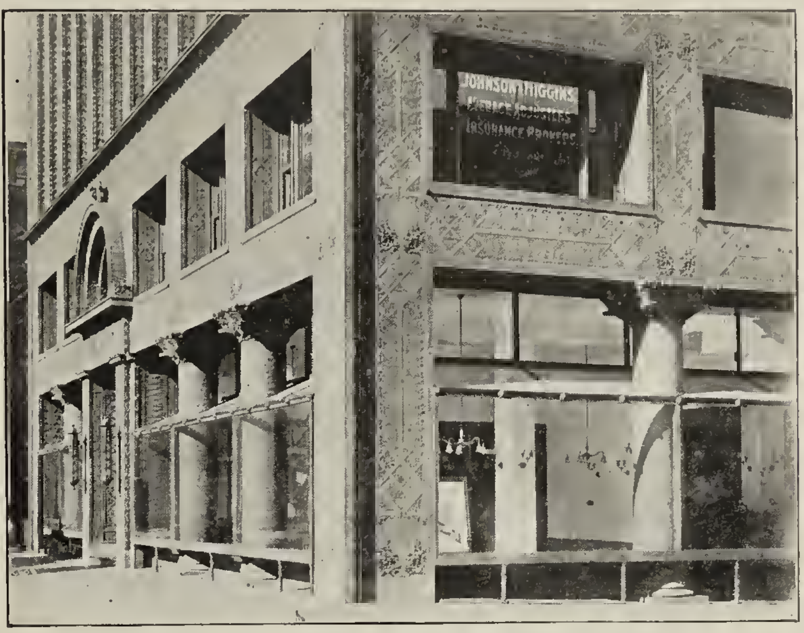
As to the manner of payment of labor, the most satisfactory way to employer and employed alike is undoubtedly "by the piece." Each man is then paid in proportion to the amount of work done, the employer can tell more positively as to the cost of his product, and in the long run there is money put into both pockets.

The fuel bill varies so much with location and the kind of ware produced, and has been so very thoroughly written up, that in a general article of this kind there is left but little room for remarks.

The keeping up of machinery and tools cannot be too carefully watched. It is never wise to allow your men a chance to excuse poor work by justly blaming the tools furnished. Repairs soon run into money, however; but the breakage of one particular portion of machinery should set the General Manager to thinking up some means of strengthening it.

The cost of selling and the general expenses of the business will be treated separately, and the materials used in our industry are usually so few and their cost so little that they are scarcely deserving of remark.

The General Manager can, by cultivating habits of careful observation, exercise, usually, a sufficient general supervision by making two rapid daily trips through the works. By practice he can tell at a glance any defect in machinery, slovenly workmanship, or improper manipulation of kilns. His skill and the known effect of certain causes should enable him to correct mistakes before the ware is finished, and thus save the loss resulting from working backward from effect to cause. For his motto let him take the following and post it in his desk where he cannot help but see it every hour of the day:



A Corner of the Guaranty Building.

Produce the best, then lie awake nights until you manufacture cheaper than anybody else.

Written for the CLAY-WORKER.

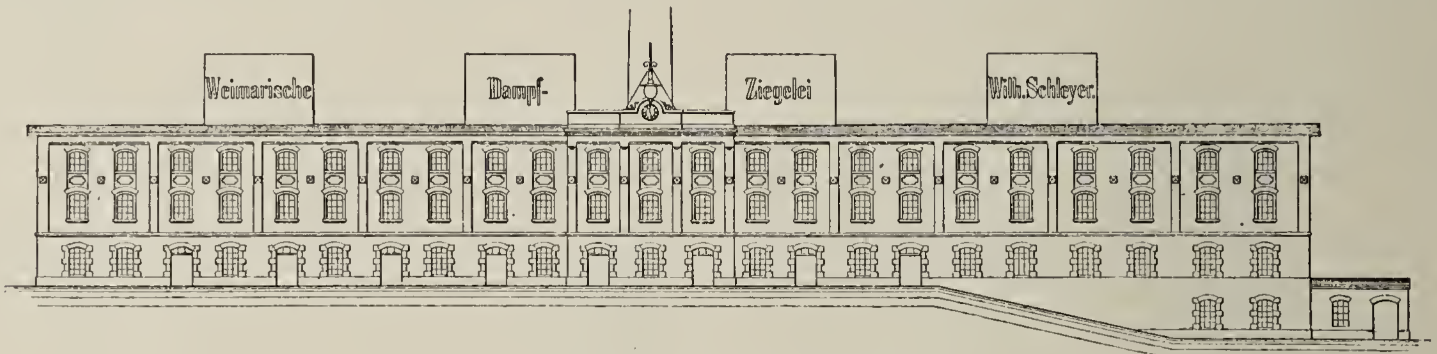
IN DEUTSCHLAND. No. 7.

The Clay-Worker Correspondent Traveling Through Thuringia and the Middle German States.

THROUGH THE CHARMING valleys of Thuringia, so full of historical interest, our rambling journey took us to the towns of Apolda, Weimar, Erfurt, Gotha, Eisenach, every one of these places being a gem in the chain of beautiful old cities spread over this fair portion of Germany. Although teeming with the remnants of bygone ages, Thuringia is wide awake in regard to modern industries. Often by the side of moss-covered old piles belonging to the remote past one sees the tall stacks of glass works, potteries and metal-working establishments whose products are known all over the globe; in fact, the label, "Made in Thuringia," has a most favorable ring in the markets of all lands, standing for good, honest Teutonic skill and energy.

Of brick and roofing tile works we saw a number. At Apolda we had the pleasure of visiting a neat and compact common brick plant, the Lindner Brick Works, which might be considered a model of a common brickyard. The plant is arranged all in one building, which is built at the foot of a hill some seventy-five feet high, the kiln floor being about ten feet above the street level. The bank is thirty feet high and the clay is conveyed to the factory in cars running by gravity. Much difficulty is encountered in converting the material into brick, as it is composed of shale, red clay and sandstone, which must be mixed in proper proportions. Arriving at the factory, this mixture passes through a pair of strong corrugated crushers and a pair of smooth rollers, and is then conveyed to the soaking pit by means of buckets suspended from a pair of double-flanged wheels running on a single track. The soaking pit is constructed on stone arches supported by iron pillars, immediately above the press room. To the brick machine there is attached another smooth roller crusher. Owing to the small area at the disposal of the builder, the continuous kiln has only twelve chambers, furnishing daily ten to twelve thousand vitrified building brick, 10x4.8x2.6 inches. In this kiln the water-smoke is drawn off on top of the arch, in distinction from other types, where the vapors pass off through flues arranged at the bottom of the kiln. The output seemed to be of a remarkably uniform degree of hardness. At times lime is burnt successfully along with the brick. Apolda can boast of a church built entirely of brick and terra cotta. This church is built in the exquisite Gothic style, which the German architects understand so well how to use. The windows are considered masterpieces of architectural detail. In the inside of the edifice glazed brick are used with a delightfully pleasing effect, and the pulpit is a splendid piece of terra cotta work.

Weimar, the noble little city, with whose name the names of Goethe and Schiller are inseparably connected, was our stopping place for a day, and the time was spent very agreeably, owing to the kindness of Mr. Otto Bock, a brickyard engineer, who has made himself a name by his work in constructing kilns and plants on modern principles. Weimar has among its brickyards, also, an interesting plant which deserves mention, the Weimar Steam Brickyard, owned by a Mr. Schleyer. We are indebted to Mr. Bock, the builder, for the cut of these works. It is seen at a glance that this concern is as unlike an American brickyard as it is possible to be, and it must be confessed that the difference lies in favor of the German plant, at least in regard to appearances. The building is 220 feet long and sixty feet wide, three and four stories high, with a corrugated iron roof, supported by iron beams. The whole offers a harmonious view, which is very pleasing to one accustomed to American brickyard construction. At this place a material is used similar to that at Apolda, shale, clay and sandstone, mined in quarry fashion with pick and bar. The bank is situated some three hundred feet from the works, and the clay is conveyed to the building by means of cars drawn by a continuous chain system. An addition at one end of the factory, 16x14 feet, contains the crushers, a strong one with corrugated rollers and one with smooth rollers. From the crushers the clay is conveyed to the second floor by means of a belt elevator. There the soaking pit is located, occupying the entire width of the building, having a length of fifty-six feet, a width of twenty-one feet and a height of nineteen feet. The elevator dumps the crushed clay into suspended buckets running on a single elevated track. These distribute the clay over the floor, the track forming a loop. The material is dumped in successive layers to a height of twelve feet, each layer being sprinkled with cold water in summer and hot in winter. The soaking pit is divided into two parts, each holding enough clay for 50,000 brick. While the one is being filled the other one is drawn upon. The soaked clay is taken from the pit by means of a bucket system similar to the one distributing the material, the track being constructed just high enough above the floor to enable the buckets to run, it being, of course, covered up when the pit is filled. Gradually, as the clay is used up, the track is made clear until the pit is emptied. The soaked material is taken to a platform built above a pair of crushers. There any clay not soft enough can be wet with a hose before going into the crusher. Directly below the crusher is situated the auger machine, having a capacity of 25,000 brick per day. From the machine the brick are taken to the drying floors above the continuous kiln, which have rack room for 200,000 brick. The drying floors are divided into two parts by aisles running through the middle parallel to the building. Three-wheeled trucks are used for hauling all the brick, green and burned. From the drying floors the loaded trucks are taken to the kiln level by means of platform elevators. Three large ventilating stacks take off the vapors of the drying ware, and one is arranged above the soak pit. The power is furnished by a fifty-horse-power engine, which, besides driving the crushers, brick machines and elevators, also runs a dynamo producing electricity for lighting purposes. A fire stack, 130 feet high, produces draft for the kiln and the boiler. The kiln has sixteen chambers, each holding 12,000 brick, making a daily output of sixteen to eighteen thousand. This kiln is also provided with the upper draft arrangement. At this yard vitrified brick are burned, with a consumption of 250 pounds of coal per thousand. Provisions have been made for reducing the danger of fire to the minimum. All the woodwork on the inside of the works has a coat of water-glass paint, and on each story hose connected with a water line is always kept ready for use.



The Schleyer Brick Works, Weimar.

Besides common and front brick, roofing tiles and shape brick are made, and the entire capacity is equal to five million pieces per year.

—The Continuous Kiln in General.—

By this time we no longer manifested such interest in continuous kilns as characterized our conduct at the beginning of our German expedition. We expected to find them as a matter of course, and commenced to talk quite technically on subjects like up or down watersmoking, smoke flues, dampers, etc. It must be admitted that the Germans have well-nigh attained perfection in handling them, and we venture the assertion that the continuous kiln will before very long be the one generally used in the German brick industry. The writer has seen these kilns on yards having such small capacities that it seemed improbable that a kiln requiring a comparatively large capital to build, as this one does, could be regarded a wise investment, and yet proprietors of yards making four or five thousand brick per day are well satisfied with their continuous kilns.

It has been estimated by a German writer that there are over four thousand continuous kilns in Germany, of which number the inventor, Mr. Hoffmann, has built some two thousand. This ever-increasing popularity is, of course, first of all, due to the enormous saving in fuel, the saving effected ranging from 60 to 75 per cent. of the fuel used in periodic kilns. A writer has estimated that if all the brick, roofing tiles, drain tiles, lime and cement in Germany were burned in continuous kilns, at least $37,000,000 would be saved annually. So much as to the economic value of this kiln.

It is commonly known that the "ring-oven" is an endless arched tunnel, either round, square or elliptical, fired from holes through the crown or roof arches. The process of burning proceeds as follows: The air, entering through the door of an empty division, passes into one being emptied, and from here progresses to parts filled with cooling ware, absorbing heat and becoming hotter and hotter, until it reaches the place where combustion takes place, where the temperature is at its highest. Owing to the peculiar mode of firing, the coal being sprinkled between the brick, the highly heated air is permitted to come into intimate contact with the fuel and perfect combustion can take place. The combustion gases pass along into watersmoked and watersmoking compartments, parting with a great deal of their heat, and at last, reaching a paper partition, they escape through a flue controlled by a damper into a main flue communicating with a tall stack. Thus, as the ware is being burned, the fire moves on continually. Hence, three claims are made for the Hoffmann kiln, viz.:

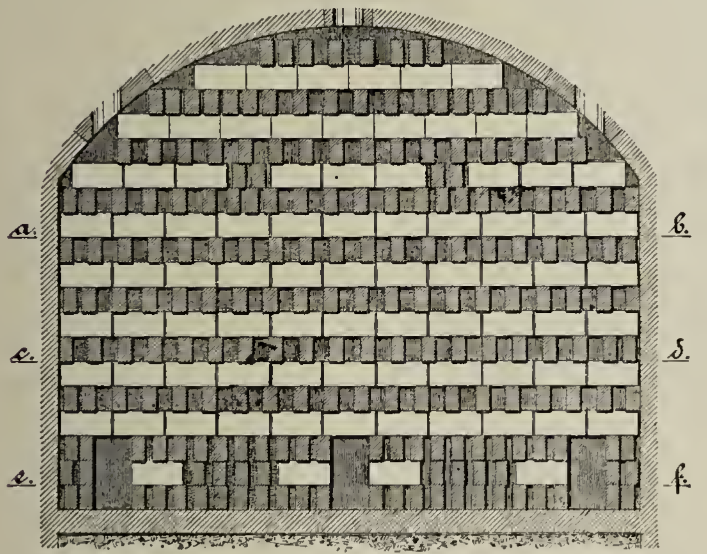
First—The fuel is distributed at the places where the greatest heat is required, and as soon as the ware next to a row of fire holes is burned, no more heat need be wasted at that point to burn ware at some more distant place, as is the case with fixed furnaces.

Second—The air for combustion is heated without extra cost for fuel, not as in the grate furnaces, at the expense of the fresh fuel. At the same time, this air performs the office of cooling the burned ware.

Third—The heat of the combustion gases is used for watersmoking the compartments at the furthest end and for heating the chambers next to the fired one up to red heat.

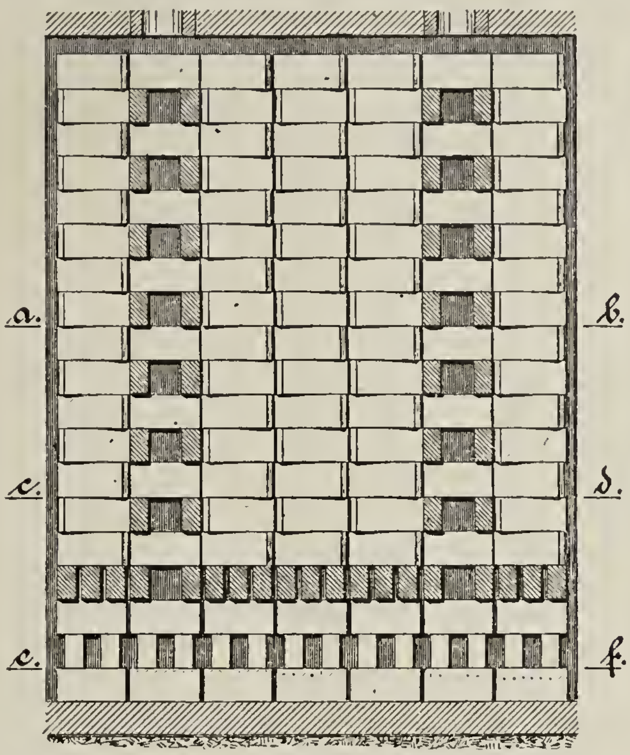
In starting the kiln a temporary furnace must, of course, be constructed in a head wall put up across the tunnel, and a fire kept up until the ware under the adjoining fire holes has been raised to a red heat, when the regular top holes are used.

The setting must be done more carefully than in ordinary kilns. At the bottom flues are set with green brick, parallel to the kiln walls, narrower at the middle than at the sides of the kiln, as the fire always has a tendency to advance quicker at the center. Under each row of fire holes a fire stand of loosely set green brick is constructed, and care is taken to let the brick project somewhat all the way down, so that the coal thrown in does not fall to the bottom directly, but is scattered and kept suspended until burned up. The distance which the brick must be set apart depends on the size of the coal used. It is of importance to have the flues plumb in order to enable the burner to watch the progress of the fire at the bottom. Between the fire flues the brick are set in the usual way; skintling seems to be practiced a good deal. At the bottom the brick are set wide, and very close at the top. The distance between the fire holes is always calculated to contain a number of rows of brick without leaving any extra space; about three rows are usually allowed. The setting is done some six chambers ahead of the fire, and, after every three chambers set, a paper partition is put up, tight in kilns with downward draft and loose in such with upward draft, for reasons to be considered later on. A special grade of paper is used for this purpose, the best quality costing about three-quarters of a cent per square yard.



Brick Setting in Continuous Kiln. Cross section of Kiln Showing Fire Stand.

The burning of continuous kilns did not seem to the writer to require such extraordinary skill as some appear to believe. In fact, we have been told that often a man who has never seen a continuous kiln before, but who has an ordinary share of common senses, is better able to burn in a more satisfactory manner than one who has his head filled up with all kinds of ideas concerning the ideal working of a kiln. The authority for this statement is a man who ought to know.



Brick Setting in Continuous Kiln. Side View of Fire Stands.

Supposing a continuous kiln had just been fired up by means of the temporary grates spoken of. The watersmoking, of course, proceeds very slowly, like in any other kiln, and the stronger the draft the better. As soon as the first six fire rows are raised to a good red heat the firing is commenced from the top, small shovels being used, of the size of an ordinary stove shovel. The first paper partition must be burned out with a lump of waste, soaked with coal oil, fastened on to a long rod. It is essential that the fire should progress at the bottom first. According to the length of the kiln, eight to twelve rows of fire holes are fired at one time. When firing is started at a new row the last one at the rear is left out. A good way of firing is to fire the rows alternately, so that one row is in good heat when the other one is being fired. The caps of the fire holes are designed so as to be perfectly tight; the usual pattern is a cast-iron bell set into a socket filled with sand. It is of great importance that the firing should be done very regularly. For this reason watchman's clocks are used extensively. Care is also taken to have uniform draft at all times, and draft gauges are frequently employed to guide the burner. The finishing point is determined by Seger cones and shrinkage measurements. For burning the better class of clay goods the Haedrich fire walls (see April Clay-Worker) render efficient service.

The writer has endeavored to outline the general methods of operating a continuous kiln, but it must be remembered that there are several kiln systems, each of which requires a somewhat modified treatment, which we must consider under their respective heads. However, the general principles enunciated hold good for all types of continuous kilns.

NOT SO BAD AS REPORTED.

A letter from some one who signs "Buckeye," in your August issue, was shown me to-day. He is either grossly ignorant of his subject or is one of the many enemies of the Royal Clay Manufacturing Company, among the sewer-pipe manufacturers, who are anxious to do the Royal all the injury they can by misrepresentation. On a very low basis of figuring, there is over $50,000 worth of marketable goods, instead of $4,000, as he represents. The lower floor is somewhat damaged by the steam pipes, but nothing in comparison with what "Buckeye" claims. The works and mines are in condition that they could be put in operation at a day's notice. It is not the general impression in Uhrichsville that the Royal will never be a factor in the sewer-pipe business. This impression is only in the minds of a few of her enemies, with whom "the wish is father to the thought." JUSTICE.

Written for the CLAY-WORKER.

SUGGESTIONS ABOUT KILNS.

—Cracks in Kilns.—

PERHAPS FEW OF US realize the importance of having the walls of our kilns as nearly tight as possible. This applies as well to up-draft as to down-draft kilns. In any case, for good results, the draft should be strong and vigorous. An indifferent draft is as hard to manage as an overloaded horse. The pull lags at the most critical moment. Height of stack and generous capacity of flues are certain to give plenty of draught unless there are damp or wet underground flues. No stack for a down-draft kiln should be less than sixty feet high from level of grate bars. Seventy-five feet is better. The amount of air which passes through the cracks of a kiln with a vigorous draft is large in any event, and may be enough to prevent a good burn. Water glass (or silicate of soda) mixed with fine ground fire brick, and forced well into the cracks, will stay put, and there is hardly anything else that will. Even a fusible clay is likely to crack off and make a crack larger. The cracks should be stopped without fail every time a kiln is discharged, because the heating and cooling of the kiln walls is sure to make new cracks at every burning, and every crack costs coal. Water glass is cheap by the barrel, costing about one and a quarter cents a pound, and a barrel of it is very useful about a brick plant. If it gets stiff, hot water will dissolve and dilute it. It is made by melting together about one part of soda ash and three parts of quartz sand, and the melted lumps are dissolved by superheated steam. The cracks on the outside of a kiln should also be stopped. This mortar of water glass and fine ground brick will stick and harden on iron or brick, or almost anything not greasy or oily, and grows harder with heat. It will stop cracks in boiler walls or boiler fronts, in door tiles or iron doors, and new uses will present themselves if it is handy to get. It will stand fire well if mixed with quartz sand, fine quartz or burned fire clay.

Probably many who do not use the tops of their square kilns for dry floors would do so if the bracing rods were not in the way, as these rods generally run over the tops of the kilns. It seems unwise to waste so much fine drying room when a superior bracing may be constructed around the kilns. Take four round iron rods, about one and a quarter inches in diameter, bent to eight-inch radius curve round the four corners of the kiln, or set of kilns, reaching to four turnbuckles, one on each side, near the center of each of the four sides, the whole bent to the form of an oval. Let the turnbuckles be braced out to about fifteen inches from the kiln by cast-iron braces. Each brace consists of a flat plate and a projecting arm, with a rod groove in the end of the arm, which should be about two by one and a half inches at the end, gradually increasing towards the plate end, which is set to bear against the plates or buckstaves on the kiln walls. These arm braces should be about fifteen inches long at the sides of the turnbuckles, the next ones twelve, nine and six inches in succession, the last near the corner plates, which should have a rod groove running around the corner, the curve to be eight inches radius. Angle irons should run vertically on the corners under the corner plates. Three sets of these rods will be ample for a kiln, or set of kilns, having arches twelve to fourteen feet wide, constructed about fifteen inches above the half circle, or slightly Gothic. Wrought plates of three-eighth-inch iron, eight inches wide, may be used to run horizontally under the bracing arms, and these plates can be held in place by spikes running into the joints between the brick. These rods may also hold arm braces from the upright buckstaves. The strain on the rods so placed will be distributed along them and there will be elasticity through the whole bracing.

This method of bracing has stood the test of years without yielding. Many have abandoned square kilns because the bracing was defective and the arches unsafe. If necessary, the lower rods may be carried up over the doors without danger.

When the weather begins to be warm in the spring kilns should be set a little more open than in the winter, gradually increasing the openings a little as summer heat comes.

However good the draft, it is less in hot weather than cold. The setting and burning of kilns seem to be the most critical parts of brick manufacture.

Regularity of plan, perpendicular and horizontal flues between the bricks, so that peep holes may be made clear through the kilns from side to side, are most desirable. Plenty of peep holes enable a burner to see just what he is accomplishing, and trial pieces can be used freely. The only way to learn more about burning while the kilns are under fire is by peep holes and trial pieces, and we all have very much yet to learn about the effect of fire on clays. Stoppers, four inches by two, with three-quarter-inch holes through them, flaring larger inwards, and the stoppers projecting three inches from the kiln, tapering to the holes, so that at the end of the holes they are one and a quarter inches round, with mica eye pieces at the extreme ends, will be durable, and the mica will not get clouded, as it does not get too hot.

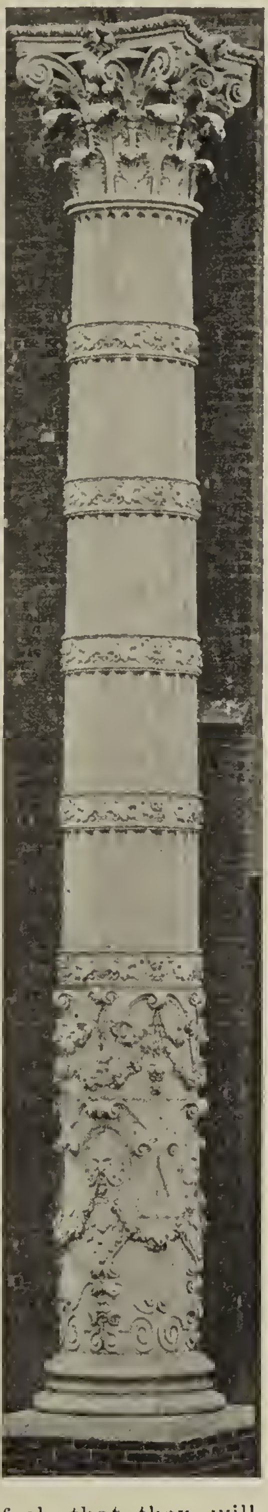
The entrance doors of kilns frequently give trouble from the bulging of the walls. This may be largely prevented by the use of tie blocks, four by five by twenty inches long, set a few courses apart, and the walls made six or eight inches broader each way at the bottom, and battered up about two feet. Side and end walls should always be battered the same way, starting at about eight inches at the bottom.

Some down-draft kilns, which would otherwise do good work, are prevented by small outlet holes or flues in the bottom. Their total areas of opening may be enough, but they are too much subdivided, and cause sluggish draft from friction on the surfaces of the flues. Two flue holes, four inches by two inches, have each eight inches area of opening, a total of sixteen inches with each twelve inches of surface; total, twenty-four inches. One flue hole, four inches by four inches, has as much area of opening, sixteen inches, with sixteen inches of friction surface, the two smaller ones having 50 per cent. more than the larger one. It is best to have large openings, and to have the kiln so set as to convey the gases freely through the bottom courses. Large openings are more readily kept clean and free. The sides of the flues should be scraped after each discharge of kiln so as to reduce friction of draft and keep full area of opening. These matters seem trivial, but they are surely important. The natural draft of a kiln is a very delicate force. A small piece of tissue paper will stop a small flue. A light, airy fringe of soot will deaden it, even to uselessness. A careless, uneven setting of brick will check this draft. Wide flues in setting in one part of a kiln and narrow in another will draw the most fire where there is least friction. The shrinkage will begin first through those passages and increase the tendency of the fire towards that part of the kiln enough to make an uneven burn. The whole operation of burning a kiln is a delicate management of a delicate force, and successful manufacture depends upon kilns intelligently constructed, set with intelligent forethought and burned with industrious care. GEO. C. HICKS.

A TERRA COTTA COLUMN.

THE BEAUTIFUL COLUMN here illustrated is one of eight similar ones used in the City Hall of Elmira, N. Y. It is two feet and six inches in diameter, twenty-five feet in height, and is made of sixty-four pieces. The color is gray, as is all of the terra cotta in the building, which was made by the New York Architectural Terra Cotta Company, and the bricks were specially made from the same clay. The building itself is exposed on all sides, and, when completed, promises to be one of the most interesting pieces of municipal architecture.

This work illustrates not only the decorative possibilities of terra cotta, which no one ever questioned, but the improvement in the structural use of this material. A few years ago a terra cotta column of this magnitude would not have been thought of in this country.—The Brick Builder.



MAKING SMOOTH TILE.

It is desirable to have drain tile made smooth, both inside and out. It will require some effort and painstaking, but it will pay in the end. Drain tile that are smooth on the inside are less liable to gather obstructions flowing through the drain. Roots of crops often find their way down into the tile. After the crop is gathered they break off and are carried out in the water if not caught on some projection in the tile. Obstructions of this character are liable to gather silt, and, in one way and another, lessen the capacity of the drains.

The drain that is smooth on the inside has a greater capacity than a drain of the same size which is rough on the inside.

In handling tile, in our experience, we very much prefer to take hold of a tile that is smooth on the outside. They are not so rough to the hands, and we can turn them to fit with less trouble. The ends of the tile should be evenly cut off, and, so far as is possible without too much expense, made smooth. Much of this care necessary to make smooth, well-formed tile depends on the handling from the mill to the drying room. An employe may so handle as not to mar them in any way, and, if painstaking, he will smooth down the rough places in the handling. A little effort to smooth here and there, on the tile, any rough projections which he may see will, in the main, very greatly improve their appearance, and make them much more desirable to purchasers. We like to see well-made, smooth tile. We think, or feel, that they will give satisfaction—better satisfaction.

CLAY MINERS IN POLITICS.

The Denial Club, of Portsmouth, O., was born too late to get a place in the Popocratic platform, but if it can persuade candidate Bryan to incorporate its project in his campaign orations the effect will be the same. The members of this club are interested in shale mines, and they believe, therefore, that the only way to save the country is by the free coinage of brick. They assert that paving brick is as indestructible as silver if properly taken care of, and that "brick certificates" could be issued and made legal tender as well as "silver certificates." Although they are somewhat late in coming into the field, they rely for success on the fact that most of the free silver arguments would apply as well to paving brick, and only a slight modification would be required to make the literature serve both interests. Their case is undeniably strong, and, since miners are the sole beneficiaries of the Popocratic campaign, they see no reason why there should be any discrimination against shale miners. The "gold brick" has fallen into such disrepute they declare that as a Popocratic slogan "silver—brick" would sweep the country.—Chicago Tribune.

Written for the CLAY-WORKER.

FUEL BILLS UP TO DATE.—No. 2.

BY D. W. STOOKEY.

—Practical Application.—

IT NOW REMAINS for the inventor to produce an apparatus that will satisfy the three apparently simple conditions announced by the scientists as being essential to the perfect, and therefore economical, combustion of fuel.

The proprietors of all manufacturing establishments operate the plants for the difference between the total income and the total expense. This shows that economy in production is of vital importance. We are seeking furnaces and methods of burning fuels that will give the most economical results or the highest efficiency possible from the fuel used. While intensity of heat is necessary in practice, it cannot profitably be utilized at too great a sacrifice of quantity of fuel. The furnace that is wanted is the one that will produce the required degree of heat with the least consumption of fuel.

In this paper we have nothing to do with the utilization or economical application of heat after it has been produced from the fuel, but simply the development of the highest possible amount of heat from the fuel consumed. Knowing the three conditions that have been named by scientists as being absolutely essential, and understanding that these are the only ones that need be considered, inventors have produced many devices that to their minds supplied the long-felt want. In the face of these hopeful inventors and to the detriment of their devices and interests, the want is felt yet. The problems that seemed so simple are yet unsolved.

The difficulty in making practical applications of these three apparently easy rules is attested by the acknowledged inefficiency of boiler furnaces as indicated by the quotation given above, by the known inefficiency of furnaces in general, as shown by the small amount of heat utilized as compared to the total amount that it is possible to obtain from fuels, by the fact that all large cities have ordinances and officers whose object is to abate the "smoke nuisance," and by the fact that nearly three thousand patents have been taken out for smoke-preventing devices. Such thoughts and facts as these will surely justify frequent treatment of this subject in the Clay-Worker, and the manufacturer who fails to give it his careful and intelligent attention neglects his best interests.

All these difficulties and discussions arise from unsatisfactory and wasteful attempts to satisfy the three conditions above named, that in and of themselves seem so very simple.

—A Sufficient Supply of Air.—

The first, a sufficient supply of air, seems easily satisfied. The books and scientific papers are full of tables giving the exact amount of air, both in weight and volume, necessary to the combustion of one pound of fuel of various kinds. In attempting to supply the needed air perforated grates have been introduced. Air has been admitted through the door and near the bridge wall above the grates. To feed the air, drafts both induced and forced, have been applied. Induced draft may be caused by chimneys or by suction fans at the base of the uptake. Forced draft is caused by a pressure of air in front of the furnace greater than that of the atmosphere.

With solid fuel it is necessary that air pass through the fuel so that each atom of carbon can unite with one atom of oxygen and be lifted by the draft, as a gas, from the grate. It would be better if enough air could be supplied through the fire to completely burn the solid carbon, but the layer of fuel with the ashes and cinder on the grate or bottom of the furnace so obstruct it that often enough air is not admitted in this way.

Attempts have been made to supply this deficiency of air, as well as that needed to burn the gases that are generated above the grate, by admitting air above the fire through the door and through openings at the back end of the grate, near or in the bridge wall. Objections to this method may be urged upon the ground that the air is not sufficiently heated when it comes in contact with the hot gaseous fuel, and will tend to cool it and thus check the burning. Another serious objection is that the air comes into the furnace in streams and flows towards the chimney without being thoroughly mixed with those gases with which it is intended to unite. Another objection to admitting air at the back end of the grates is that it does not have time nor opportunity to become thoroughly heated and mixed with the combustible gases before they pass beyond the furnace, where burning should take place. Air that enters through the grates passes through the fire and becomes heated before coming in contact with the hot gases that are ready to unite with hot air, and be completely burned, and thus give out all their heat before leaving the furnace or combustion chamber.

Here is seen the need of good grates, kept clean and uniformly covered, not too thick, with a hot bed of burning fuel. If the grate surface is large enough and the fires kept clean and evenly spread over the grate at a moderate thickness, enough air will be admitted, with good draft, through the grates to burn all the fuel, and it will come in contact with the gases in the furnace highly heated and evenly distributed. With these conditions little air should be admitted through the doors, and all cracks in the furnace walls should be kept tightly closed.

In practice, as has been determined by experiment, about twice the theoretical amount of air is required to secure perfect combustion. In a summary of a series of experiments made in England, published in Bourne's "Steam, Air and Gas Engines," it is stated that "In all experiments the highest result was always obtained when all the air was introduced through the fire bars.

"A moderately thick and hot fire, with rapid draft, uniformly gave the best results."

In this connection comes the thought that complete combustion of the fuel may be obtained and yet the efficiency of the furnace be very low or a great amount of the heat wasted. We showed above that if the supply of air is too small the furnace may become a fuel gas producer that sends the greater part of the fuel up the chimney in gaseous form.

Now we wish to warn against admitting too much air. The surplus can only be injurious. It takes heat from the furnace and carries it up the chimney, and by so doing both cools the furnace and wastes the heat. Arrange the grates to admit all the air needed, and then studiously exclude all other air from the furnace.

—A Thorough Mixture of the Fuel and Air.—

Chemical action takes place between the minutest particles and at the smallest distances. If the oxygen of the air is to unite with the carbon and hydrogen of the fuel as they fly through the furnace it is evident that they must be intimately mingled. Good results cannot be had from large columns or streams of air and gas side by side in the current. The fuel and air must be finely divided and intimately mingled if they are to combine atom to atom in chemical union.

In reality the only practical way to intimately mix the air and fuel is by an efficient system of grates for solid fuels and a complete spraying or atomizing apparatus for burning oil or gas. All those devices or schemes for admitting air above the grates or near the back end of the furnace are nothing more nor less than protests against the imperfections of the grate system, and are conceived in a spirit of compromise. They are based on the idea of choosing the least of two evils. Instead of tolerating an inefficient grate, and then going ahead and attempting to correct the evil that the imperfect grate produces by introducing another imperfect and inefficient device, it would be better to return to the origin of the first evil and try to correct it. Good grates, intelligently and faithfully attended, will go very far towards thoroughly mixing the air and fuel.

Combustion chambers have been introduced back of the bridge wall for the purpose of prolonging the time that the air and gases may have to mingle and unite in burning. Theoretically the idea is good, but in practice they often fail because the inventor so arranges his combustion chamber that the temperature falls below that required for rapid combustion. In giving time for the mixture of the air and gases he loses sight of the third condition, and carries the gases beyond the high temperature of the furnace.

—A High Temperature.—

It is a universally accepted law of chemistry that chemical action is much more vigorous at high temperatures. Combustion, or the chemical combining of the oxygen of the air and fuel, comes under this law. The air and fuel gases in the furnace are moving rapidly towards the chimney, and within a few seconds are beyond their range of usefulness. They must unite quickly or be lost. They must unite and give out their heat before reaching the objects to be heated or they will be of no use. They can only unite quickly by being intimately mingled and highly heated. A high temperature is an absolute essential to the economical combustion of fuels. From considerations of economy any fire should be intensely hot. There are times when only a small amount of heat is wanted, but this small amount should be produced by a small hot fire. When more heat is required the size of the fire should be increased. A slow, dull, smoldering, smoking fire is a very expensive one.

Any condition that tends to lower the temperature of the furnace will prevent the rapid combustion of the gases. Cold air should not be admitted above the grates either by opening the furnace door or by cracks, holes or openings, either intentional or accidental. If intentional, they are a mistake. If accidental, they should be patched and closed. When it becomes necessary to open the furnace doors they should be closed again as quickly as possible.

Large quantities of fresh, cold fuel placed within the furnace at one time tend to lower the temperature by consuming the amount of heat required to raise the temperature of the fuel to that of the furnace. A more regular and efficient condition could be obtained by firing lightly and often. The practice of spreading fresh fuel all over the fire is decidedly objectionable. It not only checks the fire for a time by cooling the whole surface, but it brings the cold fuel in contact with the gases just leaving the fire. These gases, as has previously been shown, require at this time a high temperature in order that they may be burned before leaving the furnace. This layer of fresh cold fuel chills them and permits them to escape from the furnace to the cooler regions beyond without being burned and without giving up the heat that it was possible to derive from them had the conditions been favorable.

A bright, hot fire should be kept on the back part of the grates to heat and assist in burning gases that are escaping from the fuel and passing rapidly towards the chimney. This may best be obtained by placing the fresh fuel on the front of the grates and allowing it to lie there until the principal gases have passed off and the solid carbon has become red or white hot. It may then be pushed towards the back of the grate and fresh fuel put in its place.

—In Conclusion.—

The statements made in this paper have, in the main, been based upon theoretical conditions. In practice it will be admitted that changes must sometimes be made that are at variance with theory or science, but it probably can be said without fear of successful contradiction that all those instances in which practice does not follow theory are found to be very expensive. Taking the instance already cited, in which it has been found that better results can be obtained—in practice—by admitting more air to the furnace than would be required to burn all the fuel, we can readily see that this is only done to partially make amends for the imperfect practical methods employed in mixing the air and gases.

The surplus air becomes heated and carries just that much heat away without being of any benefit, but it is better to lose some heat in this way than to lose more by permitting the gases to go from the furnace unburned.

Practical methods can only be successful and economical while they stay as near as possible to theoretical conditions. Fuels can only be successfully and profitably employed in the industries when they are used in accordance with the natural laws which pertain to combustion. That method which obtains the best and most economical results in practice from the use of fuel, whether for developing power, evaporating moisture from green clay wares or burning the goods in the kiln, is the one that follows most closely the conditions found written in nature's laws, and is also the one that is wanted and that will be chosen by the intelligent manufacturer. The manufacturer who intelligently follows the laws of nature, as discovered and formulated by science, will obtain the best results, will produce his products by the best and most economical methods, and will be rewarded by the largest margin of profits.

VITRIFIED STREET PAVING BRICK.*

THE IMPROVEMENT of streets is a matter of great importance and is receiving a great deal of attention, as experience has convinced every one of the great benefit to the value of property, and also to the health and comfort of all classes. What is wanted is a pavement at not too great an expenditure for construction and maintenance, that will afford ease of traction, freedom from noise and dust, foothold for horses, and facility of repair when torn up to get at the network of pipes, wires, etc., which seems to be unavoidable in our modern cities.

—Foundations.—

A suitable foundation for a brick pavement that will answer all requirements, where the question of cost is considered, depends upon the nearness of the town to the quarries and the distance from the centers of the brick industry. When the traffic is extra heavy, a concrete foundation of six inches has been found to be the most successful, as it is also the most expensive. On all residence streets and business streets of moderate heavy traffic, the two-course brick has proven the best adapted to meet all requirements, the lower course of brick being a second grade of pavers laid flat upon a four-inch bed of sand, costing about $2 less per thousand than the No. 1, or surface, brick. This also enables the pavement to be opened up for repairs to water mains, gas pipes, etc., and replaced without damaging the foundation.

The macadam or broken stone foundation, which has been used quite extensively in the past, has not proven successful, as the sand, in the course of time, works its way down in the broken stone, leaving the surface uneven. Where the subsoil is of gravel or sand, under moderate traffic, no foundation is necessary. In Winona, Minn., several miles of brick were laid on the subsoil of sand only, and is to-day, after four year's wear, in good condition. In cities where the traffic is heavy a concrete foundation is best; in other cases, except where the subsoil is sandy, where no extra foundation is necessary, the second quality paving brick answers all of the qualifications demanded.

—Smoothness of Paving Brick.—

A brick pavement, well laid upon a suitable foundation, wherever the brick used are thoroughly vitrified, continues smooth during the life of the pavement. Climate has no effect upon a brick pavement; the brick, being thoroughly vitrified, absorb no moisture, and cannot, therefore, be affected by heat or cold. Bonfires and large conflagrations have no effect whatever, nor do we find any evidence of the cracking of the pavement, as may be said of other kinds of paving, either from the heat or from the cold.

—Ease and Cheapness of Repairs.—

As to this the brick pavement easily ranks first, because it is more durable and needs less repairs, and because any ordinary workman can make the repairs. In taking up for water pipes, etc., the above facts are very important.

—Healthfulness.—

Good vitrified brick are impervious to water; the space between the bricks is small, and when well filled with sand or tar will turn water. There are no interspaces to retain filth and breed disease. Dr. Jas. E. Reeve, late President of the American Public Health Association, says: "From a sanitary point of view, brick pavements are absolutely faultless, and no other material used can compare with them for cleanliness."

PROF. H. A. WHEELER, E. M., Author "Vitrified Paving Brick," St. Louis, Mo.

—Cleanliness.—

Brick streets can be washed and sprinkled at will without injury. Capt. Chas. F. Powell, the government officer in charge of the streets of Washington, says that vitrified brick is now being used for paving all gutters, even though the roadway is paved with different material, as the water has no effect upon a thoroughly vitrified brick.

—Safety and Ease for Horses.—

In this respect it is far ahead of any other kind of pavement. It affords a foothold for horses, enabling them to move a load that could not be started on any of the other pavements. Brick are not more slippery when wet than when dry.

L. W. Rundlett, City Engineer of St. Paul, says as to this: "I was told that brick make a slippery pavement, but find this is not true. I drove a horse at top speed on a wet pavement, and have watched teams hauling heavy loads to determine this, and am satisfied with the results."

—Durability.—

Works of the Watertown, N. Y. Pressed Brick Co. Rear View.

Under this head we will examine the experience of others. The Chicago, Burlington & Quincy Railroad Company, at their Chicago freight yards, experimented with all kinds of pavements, finally using brick as the best, and found that after a tonnage of 12,500 tons had passed over it daily for four years, but one brick had been broken.

From Baltimore, Md., I quote a letter from Capt. Jones Talbot, who has charge of Chase's wharf, where heavy traffic is continually carried on. He says: "In 1892 3,500 yards of vitrified brick pavements were laid on the wharf. As heavy loads as are hauled in Baltimore pass over it, and it as yet shows no bad effects." In Baltimore there has been general satisfaction with brick pavements.

From the Chicago Inter Ocean, March 1, 1896: "It may be said that the short streets paved with brick, running from Madison to Washington on La Salle street, have had a harder test than any street running parallel with it, as its smoothness makes it easier for heavy loads to be drawn, and teamsters will go a block out of their way to take that advantage, yet the pavement shows little wear. These facts are worthy of notice, and in the future contracts for pavement should be selected that will show these results." Then follows a long list of opinions obtained by their reporters from the property owners along the street, all expressing their satisfaction with the street.

A. W. Cooke, Chief Engineer Department of Public Works, Chicago, in a letter written Nov. 3, 1893, says, in regard to a portion of Lake avenue, laid with brick three years before: "I have examined the pavement recently, and find that it has withstood the heavy traffic excellently. I do not hesitate to say that if the foundation is properly prepared and care taken in the selection of the brick, I see no reason why it should not take the place of granite blocks on our streets where traffic is the heaviest, as the latter has proven expensive and the noise unbearable to the residents along the improvement. In my opinion the time is not far distant when property owners will demand brick pavements, as it is rapidly growing in favor."

Niles Merriweather, Chief Engineer of Memphis, Tenn., says: "We have no pavement that, for appearance, solidity and ease of traction, is equal to brick."

C. N. Seabright, Mayor of Wheeling, W. Va., says: "We think there is no better or cheaper pavement made."

—Summing Up, Therefore,—

We say a brick pavement is a clean pavement—can be washed and sprinkled, and washed without injury.

A brick pavement is a smooth pavement—not slippery—yet affords a good foothold for horses.

A brick pavement is healthful.

A brick pavement is very easily repaired by ordinary workmen.

A brick pavement is a durable pavement.

—Merits of Different Pavings.—

The comparative merits of different paving materials for Chicago have been classified by Engineer D. W. Mead, as follows:

	Asphalt.	Brick.	Cedar Block.	Cobble Stone.	Granite Block.	Macadam.
First cost	5	4	2	1	6	3
Cost of maintenance	4	1	5	3	2	6
Facility of repair	6	2	5	4	3	1
Durability under traffic	4	1	5	3	2	6
Freedom from noise	3	4	2	6	5	1
Free'l'm from dust	1	2	4	5	3	6
Freedom from decay	5	1	6	3	2	4
Freedom from absorption	1	2	6	4	3	5
Fo'thold for horses	6	4	5	1	2	3
Ease of traction	1	2	3	6	5	4
	36	23	43	36	33	39

*Brochure issued by the Purington Paving Brick Co., Galesburg, Ill.

Perhaps the most gigantic project of the age is that to build a ship canal from Lake Ontario, down the St. Lawrence, through Lake Champlain, and down the Hudson to the Atlantic, which shall be twenty-six feet deep and three hundred feet wide. Already $200,000 has been expended in surveys and preliminary work. The company expects to finish it in less than ten years.

Written for the CLAY-WORKER.

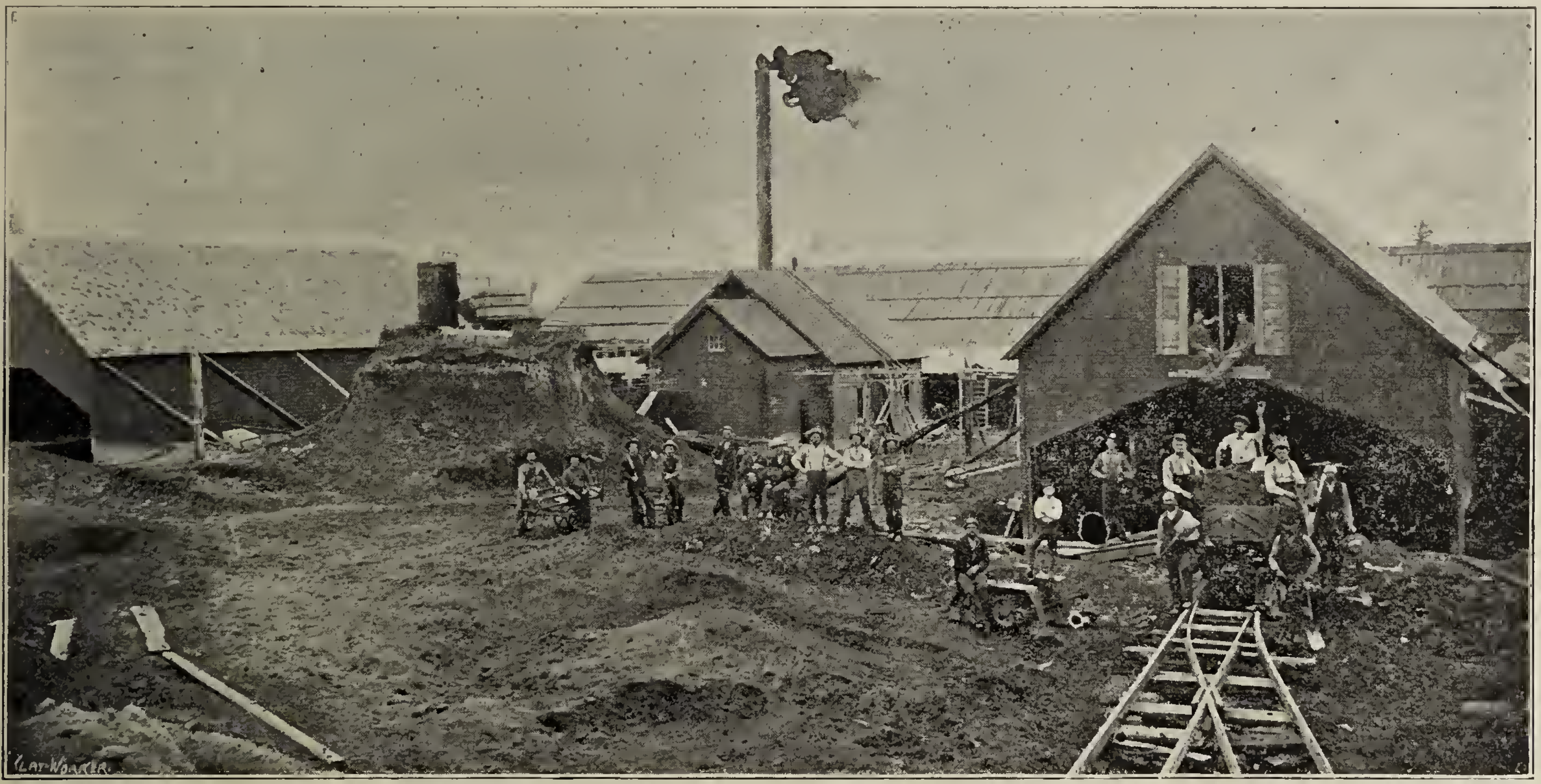
THE DEVELOPMENT OF THE AMERICAN BRICK.

New York.

NO STATE in the Union has carried forward with more vigor than New York the development of the brick industry. The demand for good brick is so great that it has created a production that is not equaled, at least in quantity, nor surpassed in quality, by any other State. Besides what are used in the local markets, many millions are annually shipped on coasting vessels from the port of New York, as well as by the railroads, canals and great lakes.

Brick were imported at a very early date by the Dutch at New Amsterdam, but as the pioneers pushed their way northward along the Hudson they found a country rich in clay, from which they made a rough brick to build chimneys and fireplaces. What these early settlers began, with their crude and primitive methods, has been carried forward by succeeding generations, until to-day there are hundreds of brickyards, modern in every detail of equipment, turning out annually hundreds of millions of excellent brick. Haverstraw is noted the country over for the production of brick.

Leaving the lower Hudson, we will ascend the river to Glens Falls, where Crowfoot, Pepper & Fargo started a yard in 1849. Brick were made by the hand process in this yard till 1866, when new and improved machinery was introduced.



Works of the Watertown (N. Y.) Pressed Brick Co. Front View.

At about this period there was a great demand in Glens Falls for building material, and especially brick, as the entire business portion of the town was wiped out by fire in 1864. The burned district was, however, soon rebuilt, and, in most instances, of brick.

Mr. D. P. De Long is at present the proprietor of this yard, and has, by strict attention to business and a studied effort to please the trade, been able to dispose of his entire output right at home, within a radius of a few miles. The capacity of the yard is about three million brick per annum, made by water power.

Brick were made in Watertown, N. Y., nearly fifty years ago, and the first yard was started by Massey & Henderson, and one later by a Mr. Whiting.

The yard shown in the illustration was started in 1888 by Woodruff & Lewis, who continued in business for about a year and a half, when they were forced to discontinue manufacture, as they lacked proper machinery for working the clay and had no capital with which to purchase more. The clay is a stiff, hard kind, very difficult to work, and has to be crushed, but makes good brick when properly prepared. In January, 1890, a stock company was formed, with a capital stock of $25,000, known as the Watertown Pressed Brick Company. The company immediately put in a rack and pallet system, two Martin brick machines, crushers, sanders, etc., which makes it at present one of the most complete yards in the State. They turn out four million brick per year, and sell all they can make. Mr. Hugh Mellon, Treasurer of the company, said in an interview: "The outlook for this season is not good; times are dull; money close. Silver is not very free around here."

In the town of Half Moon, near the village of Mechanicsville, Saratoga county, is situated one of the finest brickyards in New York State. It is the yard of the Mechanicsville Brick Company, and brick have been made on the premises for nearly fifty years. In 1887 the present company was organized and commenced work with an open yard, using Nile's washing and tempering pits, with a capacity of two and one-half millions per annum. This plant continued to turn out enough brick to supply the local market for a few years, but in 1891 it was decided to increase the capacity to five million brick and to add to the plant several pieces of new and improved machinery. Accordingly, they bought machinery, introduced the pallet system and doubled their output. This plant seemed to the owners large enough to supply the demand for several years to come, but it seemed as if their sales increased in spite of them, until last year it was found they would again have to "build on." A new Standard Dry Kiln Company's five-tunnel dryer was erected, also an improved Potts horizontal brick machine, with disintegrator and granulator. At this time the open yard was abandoned. This yard, with all modern improvements and every facility that skill and capital can procure, with a capacity of ten million brick per annum, is without doubt one of the finest plants in the State of New York. The President of the company, Mr. Geo. B. Perry, says: "We have been aiming at a high standard in common brick, and do not hesitate to assert that we make the best common brick produced in this State."

Brick were made near Buffalo in 1842 by L. Kirkover and also by Wm. C. and Alex. Brush. Brush Bros. have continued in business as a firm ever since, and have succeeded in placing their name and their product at the top of the list. They make, in connection with Mr. Geo. H. Schmidt, at Jewettville, N. Y., pressed and ornamental brick from shale, and sell most of their product in Buffalo, some thirteen miles away.

About sixty or seventy million bricks are made in and about Buffalo by some ten different firms, and of this number Brush Bros. have made as high as twenty-five million, but their average annual output is between thirteen and fourteen millions.

Some ten years ago the brickmakers of Buffalo formed an association to regulate prices and protect themselves from cheap competition. This combination worked well until the hard times began to be felt, when one manufacturer dropped out and competition commenced. New yards were started and prices dropped so that the association was forced to disorganize last February. The weak spot in this organization seems to have been the lack of a good-sized bond, which should have been deposited by every member of the association, which would have been forfeited when a member dropped out. If this had been done in this case, the manufacturer who dropped out would have had a substantial inducement to remain.

In 1894 Brush Bros. put in a dryer and all necessary machinery to make brick in the winter, which they have done the past two seasons. Warren H. Brush, when asked what the prospects for trade in his vicinity were, said: "The prospects of trade are very good this year in this country, notwithstanding the fact that the manufacturers are all separate and will do some great cutting in prices."

Brick were made at Horseheads, N. Y., in 1846, by Benjamin Westlake. The yard has continued to make brick ever since, and is at present conducted by Mr. R. G. Eisenhart, the genial Manager of the Horseheads Brick Company. R. N. BUELL.

AN OLD SUPERSTITION.

IT IS AN OLD human weakness to believe that something may be had for nothing. The first man that toiled must have dreamed, when resting time came, of a world in which the good things of life would come without work. Ease and plenty without effort is the universal ideal. Man was striving for it long before the years began to be numbered, and he is still at it. And he will keep at it so long as he is built after the present pattern. When money came into use you may be sure that there was a free coinage party formed the same day. And then the trouble began. So long as man desired real wealth there was a chance that he might go to work to accumulate it. He could readily understand that there would be no free coinage of cattle or corn or clothing. But with the advent of money his reason became more or less unsettled. Money stood for all the good things of earth to him, and he artlessly reasoned that if only a plentiful and easily acquired substance were chosen to serve as money, all luxuries would be within his easy reach. This heresy has had various forms of expression through all ages.

—The Get-Rich-Quick Idea.—

The alchemists were among the early silverites. They sought to transmute the baser metals into gold. The silverites of this day are considerably less ingenious. For the most part, they comprehend that if gold were as plentiful as the sands of the sea its value as a money metal would be greatly impaired. And so alchemy has been abandoned for other schemes of relief from the oppressive laws of nature. One of the most practical of these languishes under the ban of the law, and yet, in intent, it is not necessarily criminal.

A very fair dollar can be made of lead, and some excellent banknotes have been turned out by anonymous financiers. Unfortunately, if the thing became general this amateur money would so depreciate in value as to demoralize the whole business world. The scheme lacks that system and authority which enable one of our present dollars of legitimate parentage to make its way in the world without question. Another scheme for easy wealth is more fascinating, but much less practical. It consists in journeying to a great city to buy money that has been printed from "genuine government plates." This promises such large returns that many estimable believers in free silver have investigated it with lively enthusiasm. And they are hardly to be blamed. The fluent and engaging stranger who opens correspondence with them gives his frank assurance that the treasury notes which he is ready to sell them are quite as good as any issued by the government, and he very plausibly suggests that no one will lose anything by their circulation. So potent is the ancient dream of plenty that the silverite gets together what cash he can and goes to meet his benefactor. It does not seem strange to him that this affable person should be willing to give him five thousand dollars of good money for one-tenth of that sum in no better money. And his dream is only temporarily interrupted when he finds that what he really gets is known as "green goods"—something of no value except to the original owner—and that he himself is referred to by the knowing ones as a "come-on." No; the dream endures. And perhaps the next year he snaps greedily at a gold brick that is offered him for one-quarter of its worth. And he will continue to dream, even after he has learned that the gold bricks put upon the market by itinerant capitalists are not worth their weight in gold.

—A Specie of Counterfeiting.—

It must be said of the free silver dream that it combines the virtues of each of the above plans for quick opulence. It does not make gold, as the alchemists tried to do, but it takes a baser metal and makes it as "good as gold." It does not promise so large a profit as the green goods purveyor or he of the bargain sale of gold bricks, but it promises two dollars for one, which is far from contemptible. And, finally, it puts the government at once into the business of counterfeiting, and makes that process legal, for, if it is counterfeiting to pass 5 cents' worth of lead for a dollar, what is it to pass 50 cents' worth of silver for a dollar?

—Really a Question of Enlightenment.—

It is not to be expected that man is going to relinquish this world-old dream as the result of one campaign of education. And yet, as the alchemy of old led to the science of chemistry, so we look for this futile experimenting with cheap money to lead to an enlightened and scientific system of finance. In the meantime, it must be remembered that the rank and file of the silverites are honestly striving for the best as they see it. Let the adherents of sound money understand that they are not combating dishonesty, but an ancient superstition of great potency, and that their best weapon is rational argument. To cry "Anarchist" at a farmer who is straining under a burden he cannot see is only to suggest to him that there must be something good in anarchy, after all. The fight now is between enlightenment and superstition.

PUCK.

MAY HE NEVER GROW OLD.

Publishers Clay-Worker:

Inclosed you will find $2 in payment for the Clay-Worker another year. Have been a subscriber so long that I have forgotten when I commenced to take it, but I guess I will stay with you so long as I make brick. JAS. HORNER.

Written for the CLAY-WORKER.

T'OTHER SIDE OF THE POND.

Charles Lederer, Makes a Social Call on Europe—He Finds Himself in a Chronic State of Embarrassment.

IT WAS NOT my intention to let this article, which was written and illustrated abroad, nor the one that will follow, see the light of day, but I am actuated to make them public after a perusal of the articles written by the Clay-Worker's able and gifted regular European correspondent. My standpoint may not find favor, but I shall not take to the woods if they don't. I shall face the mob.

It is as difficult for me to collect my thoughts way over here in Hamburg, Germany, from where I am writing, as it is for my procrastinating creditors in the States to collect the bills they forgot to send to me before I sailed. What joy they will feel on my return! They will probably form a joy trust. Well, I forgive them.

What a monkey a man makes of himself when he deliberately sails away from the only civilized country on earth and gets tangled up with the hungry, robbing hordes that inhabit the countries over here. Still, I am too proud to return before my time is up. It won't do to let people think I'm not having the fun my friends say they envy me for. "Oh, how I'd like to make that trip," I've heard friends exclaim. "Oh, how I'd like to see the old United States again," say I. And nothing but pride keeps me here. The only decent part of it was the ocean trip. It is quite two months since I sailed from New York, but it seems a small lifetime.

There are a few very fair things to see over here, nice old things, with histories and photographs (at a shilling each in England and a mark apiece here in Deutschland) attached. It would be pleasant enough seeing the sights and walking along the streets, that are certainly cleaner than our cleanest, and driving along roads that are finer than our finest boulevards, but all that doesn't compensate for the ways of the people. These people who start in to rob you—commit petty larceny under the excuse that it is the custom of the country—ought to be in jail. And their mean little ways, especially in England, after they have succeeded in fleecing you! It makes me want to go back to London with a big club just to think of it. I stopped in London at one of the supposedly best and certainly one of the dearest places in London. They charged the usual one shilling and sixpence extra for "service," which is supposed to cover light and attendance. I had a room as big as a young barn. It was about eleven feet high, and near each end of the ceiling was a measly light not much larger than a peanut, and so high up that if you wanted to read you'd have to climb upon a stepladder to decipher long primer type. That's only a sample; but here in Hamburg it's worse yet. There are also two little electric lights in this room, a spacious, gorgeously decorated room, in the swellest hotel, and overlooking the water park (in the heart of the city), called Binnenalster.

She had cut me dead a few Moments Before.

But here we can't even use the two little lights. By an ingenious arrangement, when you turn on one light the other goes out. They are in different parts of the room, but you can't burn both at once. These are trifles, but when there are several hundred such trifles life may be a burden, even if surrounded by the grandeur of the shadows of the magnificent past—I found that in a guide book to-day.

Both the German and the English Policemen tried to direct me to a Brick Plant.

I felt comfortable on shipboard, even when the ship was pitching and tumbling so that a young lady, who had cut me dead but a few moments before, flew into my arms with a vigor not born of affection, while my cabin mate, a young man from Montana, who had induced her to do the cutting, was vainly beating the air with his heels. I can't feel comfortable here. Like in England, everybody is looking for a tip. That is to say, everybody except a few Grafs and Barons and Vons. They would like to be tipped, too, but their family escutcheons keep them from it. Sometimes they get very poor and go to the States and become waiters. They accept tips then.

Brick Sidewalks are frequent in Germany. Also they reflect well.

I haven't seen a brick plant yet. I saw one at Epping, near the celebrated Epping forest. The proprietor was away, and a big unsociable dog was the only one at home. I asked a London bobby where there was a brick plant in London, and he politely showed me the direction to go and how many turns to make, but when I reached the place he had directed me to I found that it was the Botanical Gardens. Here in Hamburg I asked a policeman, who looked like Bismarck in his youth, and wore a uniform like a major general in Milwaukee, to tell me where a brick garden was to be found, and he directed me to a sausage factory. So I have been, as yet, unable to make the interesting investigations into the brick industry of Europe that I intended to.

There are plenty of brick here, though, and they are largely used for pavements. The brick are very smooth and set

A Prim and Precise Lady from Andover, Mass.

closely together. When it rains the pavements is almost as reflective as a mirror or the writer of a war history in a New York monthly magazine. And even these mirror-like pavements are objectionable—at least a lady I met, a long-time spinster from Andover, Mass., objected to them. This Andover, Mass., lady, however, didn't approve of much of anything. She was chaperoning her niece to Berlin, where she was going to study chiropody, or music, or something. The spinster lady said she didn't like these sidewalks because they showed four ankles, in rainy weather, instead of two where the sidewalks didn't reflect. I told her I was going to invent a sidewalk mirror that would bunch all four in one, and she hasn't recognized me since.

CHARLES LEDERER.

Written for the CLAY-WORKER.

IMPORTANCE OF GOOD BRICK AND GOOD PRICES.

BY J. W. CRARY, SR.

AS I UNDERSTAND the purpose and true office and interest of the Clay-Worker, it is to teach and disseminate every valuable knowledge pertaining to the clay craft. The chief of all is brick and terra cotta. Whatever tends to the right and proper use of brick and terra cotta and to their cheap and perfect manufacture is within the province of the legitimate use and object of the Clay-Worker. First in order is to teach and insist upon perfect work. Whatever tends to improve the quality of brick and terra cotta and their economic uses enhances the market demand and price. The best is always the cheapest in the long run. When architects, builders and owners of buildings find that at least 20 per cent. can be saved by building a wall of first-class hard brick, besides saving ground room, they will demand the high grade brick and pay the high grade price. If 100,000 good hard brick will do a job better, when properly used, than 125,000 mixed with an inferior grade, it is evident that the builder will not use the low grade, but will rather add the cost of the low grade to the price of the high grade. By so doing he not only saves the trouble of handling the inferior brick, but also the cost of laying them and the room they would take in the increased thickness of wall. To make the case plain, we will suppose that a building specifies for walls eighteen inches thick, the outside of the walls to be of "good hard brick," the inside filled in with "good salmon." Now, it must be clear to any good builder that if these walls should be built of first-class hard brick, well laid in mortar made of good lime and sand, and enough hydraulic cement to make it "set" quick and hard, a thirteen-inch wall would be stronger than an eighteen-inch wall built of inferior brick in the common way. Besides this saving in labor and material, four inches of ground room would be saved to increase the size of the building.

—Bad Brick Causes Bad, Botch Work.—

If we take the common "party wall" work, the walls are required to be unnecessarily thick for the reason that they are supposed to be fire-proof as well as strong. After the "line courses" are laid, the inside is "filled in" in a careless, rapid style. The mortar is spread in a perfunctory way, the brick are salmon and bats, not properly "bedded;" the joints are not "flushed," and only carelessly "dashed" and seldom "grouted," and the whole interior of the wall is dependent for its standing on the two exterior, or "line," courses. All this botch work is encouraged by low grade and low priced brick. It does no good to anybody, and only makes a market for botch brickmakers' work.

It may be insisted that salmon brick can be used in good work, and that it would be an unnecessary waste and loss to entirely reject them. A good brickmaker will not have more than 5 per cent. of salmon brick. These can be properly used in inside chimneys, smoke flues, etc., also in boiler and other furnace work, but for all substantial, perfect brick work hard brick are cheapest, and should be preferred by all interested in good building.

—Walls for Dwelling Houses Should Be of Hard Brick.—

It is the common practice to use salmon brick in all inside work of walls for dwelling houses. Then these walls are "furred" and "lathed" so that the plastering will keep dry. Now, this is a great blunder for a wise builder to make. A nine-inch wall, built of good hard brick, in the proper way, without "furring," is better than a thirteen-inch wall built in the common way with it. If the brick are hard and strong, and laid well in the best kind of mortar, the inside course can be set on edge, three courses on edge, then a "header" to bind. This leaves a hollow space between the outer and inner part of the wall, which is a complete non-conductor of heat, cold or water from the outside part of the wall. Not only that; the expense and nuisance of "furring" and lathing is avoided, and the plastering is put on the brick, and, while adding strength to the wall, it is as dry as if put on "laths."

—Good Brick Building Is the Best and Cheapest.—

The restless enterprise of our people is always scheming to compete in anything that will show a margin of pay. The stone men, the iron men and the lumber men are all and each against brick, and for paving the asphaltum men are deadly hostile to brick. They put forth all sorts of absurdities and use all sorts of means to belittle brick and "bebiggle" "pitch." They employ the juvenile wisdom of the pretentious C. E.'s to invent foggy theories about the insolent, naughty brick pavements, that destroy the placid, virtuous equanimity of their great minds. That terrible "rumbling" is now the chief sin of brick pavements. This sin was not thought of until all other objections had been dispelled and quietly vanished by the very thorough and satisfactory tests of brick pavement for streets, when done honestly in the best manner. Asphaltum don't "rumble," but if sticking and stinking in hot weather and sliding and tripping up horses in cold weather, then hard to repair at any time, be the lovely virtues of asphaltum, paving brickmakers will have to "cease their troubling and take a rest."

—Demand Depends More Upon Quality than Quantity.—

If there were no good brick to be had to any extent in the markets for building, stone, iron, cement and wood would soon take the place of brick, but as good brick are unquestionably the very best and cheapest building material in the known world, it is simply a question of quality until any brickmaker can produce the best; then, when all brickmakers are true experts, and put no brick on the market but the best quality, quantity and demand will equalize, but the prices will not fluctuate.

—Prices of Brick Should Be Fixed and Steady.—

All, or nearly all, products of human labor are more or less perishable except brick. It does not pay to keep anything for a market that is liable to deteriorate in value. If a brickmaker should have brick "in stock," his only question is, Can I afford to carry this stock? There is not one cent of risk if the stock of brick is first-class. Nothing can damage them but a severe, destructive earthquake. A stock of first-class brick is the very best savings bank a man can have. You can trust a stock of good, first-class brick for any amount it will count to the consumer, but you must always keep your eye on a bank.

The only way to keep the price of brick at a paying scale is to stop the overproduction when the market begins to decline. Overproducing and low prices meet half way, but they scarcely ever stimulate demand. If brick are sold at cost or less, speculators, not consumers, take the low offerings. This "ties up" brickmakers. They cannot operate until the speculator has "unloaded." When people get ready to build they don't wait for a decline in the price of building material or even labor; they build because they have a surplus of cash, and either want to use the building or else keep it for rent. Demand will always create supply, but supply will not always create demand. This fact will especially apply to brick, and brick is one of the best indicators of the progress and profits of the business of a country. When times are prosperous, money is "easy," and, to prevent being idle, seeks investment in holding and improving real estate. It is the only legitimate outlet for surplus capital.

—Less Brick and More Profit.—

The greedy brickmaker is absorbed in the thought of increasing his quantity of brick rather than the quality or price. So, looking at the supply side only, he doubles his output, to find that he has made less clear money when he has made six million than when he made only three million brick. This bad policy will apply to nearly all lines of business of our country, but especially to the greedy, half-way brickmakers. Overproduction is always worse than underproduction. It creates a fictitious demand for everything, which must naturally produce an abnormal condition, not only in business affairs, but in the moral and social system.

A SUCCESSFUL ORGANIZATION OF GERMAN FRONT BRICK MANUFACTURERS.

The brick business in Germany has been, and in some parts is yet, in a very discouraging condition, prices being so low that the profits of the business are reduced to the minimum and are hardly sufficient to keep the factories running. It is refreshing to note an exception. A number of manufacturers in the Rhine districts have organized to form an association whose object is to maintain living prices. They have succeeded in doing so, and a paper recently read by Mr. Janssen before a meeting of the Association of German Brick, Clay Ware, Lime and Cement Manufacturers states the origin, objects and constitution of the organization. We believe it will be of interest to the readers of the Clay-Worker to make an extract from this paper. In the introduction Mr. Janssen gave expression to the hope that his exposition might convince the convention of the absolute necessity of a more intimate union. He then proceeded to demonstrate the cause, object, founding, continuation and the present condition of the organization, in the main as follows:

In order to prevent a misconception as to the objects of the organization he wished to state that it had never been the intention of the members to create a trust simply for advancing prices to the disadvantage of the consumers, but that the object was to guard against ruin, which threatened to ensue if unrestricted competition was continued. Mighty as has been the advance of the front-brick industry in the seventies and eighties, for the last decade an unhealthy competition and a constant underbidding in contracts has existed, which eventually must lead to ruin, and actually has ruined many. In Western Germany the question of existence was at stake. That this was the case is proved by the failures of a number of works and by the enormous differences in prices which could be found in bids for advertised contracts, the lower of which permitted no profits.

This was the cause of the organization evolved from the question, "What is to be done to insure to well-made products a corresponding price, and how to prevent the low prices which are possible only with poor products?" Hence the object is: Mutual regulation of the selling and disposal of the products, prevention of mutual, unhealthy competition, and the attaining of reasonable selling prices. The products, fine front brick, to be of the usual size, not including molded brick, terra cotta and glazed ware.

As a matter of course, the common sale is restricted to the agreed territory, which includes the Rhine province, Westphalia and part of Hessia-Nassau.

The regulation of the sale is accomplished by disposing of the total products through one office. This was the main point at issue in the transactions preceding the establishment of the Association. The difficulties which put themselves in the way were innumerable, and the completion of the organization took two years. Conflicting interests, which fought each other, and many prejudices had to be conquered. After tireless and continuous work seven of the most prominent establishments in the Rhine district united to form the "West German selling office for front brick." But two other important works have so far not seen fit to join. In the charter meeting on April 6, 1894, the constitution was adopted.

The selling office can now look back on a two years' existence, and it can be truly said that its activity has been beneficial for the associated works. Already in 1894, which was not a whole year, a favorable result was obtained. In 1895 this favorable result was rendered much more gratifying, although the two large works still remained on the outside, and had to be met in competition. Before organizing the price of quarter brick was 25 marks ($6) per thousand, while now the average price is 30 marks ($7.25); for half brick it used to be 40 marks ($9.40), and it is now 50 marks ($12).

The rules under which the business of the organization is conducted have yet to be considered.

The first article deals with the obligations of the members in regard to the selling of front brick, and transfers the sole right of selling to the office of the Association, which also conducts the entire correspondence with the consumers, closes contracts, collects money and does all other business.

Of the other regulations the most important only are mentioned. The contracting with the buyer is effected, as has been mentioned before, through the common office, but the consent of the factory which is to fill the contract is, of course, required before closing the contract. Bills of shipment must be sent to the office by the factory after each shipment, or every month, for inspection, and from there are sent along to the buyer.

Another paragraph states the general conditions of payment, which are cash within a month after last shipment, with a discount of 1½ per cent., or in notes of three months. An exception is made only in the dealings with the government.

One of the most important provisions is that respecting the portion of the total orders which falls to the lot of each separate concern. In this respect the greatest possible care is taken to keep to each factory its original custom and to consider the just wishes of the customers. But in order to prevent an unjustified refusal of a concern to fill an order, it is decided that the Executive Committee only can determine whether the grounds on which the refusal is based are justified. If this is not the case, the order is credited to the share of the refusing concern, and it thus loses the equivalent of that contract. The shares are determined in the general meeting, and they can only be changed by a unanimous resolution of a general meeting, and never before expiration of the first six months of the business year.

In the general meetings the associated concerns are entitled to vote according to the number of ballots credited to each, determined on the basis of one vote for every 250,000 brick, but the maximum of each is not allowed to exceed ten.

Other paragraphs treat of the duties of the Executive Committee, the general meetings, manner of balloting, line of action against competing concerns, management, etc.

The funds of the Association consist of levies and fines. The levies are determined by a percentage tax upon the net amounts of the front brick sold. The brick used for construction purposes on the factories are, of course, not levied. The funds are used for the cost of management, the commissions of agents, for the covering of bad debts, and other purposes determined in the general meetings. Every concern has to deposit 10,000 marks ($2,400) as a security of good faith.

As to the length of the agreement, it was decided to make it five years.

If, in time, a concern changes hands, be it by purchase, lease or trade, the seller is required to transfer the privileges and duties of the agreement to his legal successor. A member failing or closing the works ceases to be a member.

Two years' experience has made some alterations in the agreement necessary. Thus, the business of the common office is not to be transacted according to the sole directions of the Executive Committee, but also according to those of the general meetings and the constitution.

The business department is required to visit, at least once a year, every concern, and to assure itself that all the requirements are being fulfilled.

The statutes concerning fines for violating the rules in regard to the selling of front brick, as well as for selling below the price set by the common office, are made more rigid. Special provisions are made against concerns which endeavor to screen their selling price by allowing commissions, discounts or other similar proceedings. More exact statutes have been provided for fining concerns refusing to fill orders or to give information to the business director.

Lastly, some slight alterations have been made in regard to the composition of a committee of arbitration.

These are the most important points of the agreement, and, as has been said before, the undertaking has proved successful. The results would have been far better had the Association not been obliged to contend with the competition of two concerns, and all endeavors to induce them to join have been in vain so far. However, when they are convinced that by competing with the Association they do not gain anything and do not injure the organization, they will probably join.

Mr. Janssen closed, advising the convention to stop fighting each other and to organize, and to persevere until an organization is effected, for in unity is strength.

A NEW SYSTEM OF DRYING POTTERY.

A FRENCH ENGINEER, M. Olschewsky, has perfected a new system for drying pottery in closed chambers not provided with ventilation, which is described by the Moniteur de la Ceramique substantially as follows:

It has been the practice to dry pottery exclusively in chambers in which the air is renewed by means of ventilators. This practice is the cause of uneven drying, since the pieces first coming in contact with the air are dried more quickly than the others, and also of the loss of the unconsumed heat contained in the air when removed from the drying chamber by the ventilators.

This new system is designed to avoid both disadvantages and to facilitate drying in chambers that are constructed without ventilators, and which have no communication with the outside except through the doors.

The drying chamber, therefore, is provided with a receptacle, made of metallic grill work, on which is placed a certain quantity of chloride of calcium or other solid substance which readily absorbs moisture in the form of vapor. The drying chamber is tightly closed and heated by means of heat conduits laid on the floor or hung from the side walls. In drying the ware there is at once formed in the dry room a great quantity of moisture, which, instead of condensing and running down the side walls, is absorbed by the chloride of calcium. The latter, in absorbing water, gives off its latent heat, thus constituting in itself an additional source of heat to accelerate the drying of the pottery. The chloride that is liquified descends, and is accumulated in a gutter and escapes from the drying chamber, where it is afterwards itself dried and used over again in the drying chamber receptacle therefor, which is provided with loose covers, permitting easy recharging.

The pieces of pottery to be dried are placed as usual for drying by the old method—on movable shelves supported by brackets or otherwise.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 47.

—Burning Brick.—

I THINK, IF WE ALLOW the elements to stand over for a paper or two and devote the time and space to the chemistry of burning clay, there will be no objections raised. Strictly speaking, we do not actually burn bricks or other clay products. We dry, bake and sometimes fuse them, but we must always remember that they had already been burnt when they came to our hands, and we only received the burnt products of some silicon, aluminum, etc., the burning of which silicon, aluminium, etc., occurred unnumbered ages ago. These elements, when burnt, were, of course, oxides, for, chemically speaking, oxidizing and burning are synonymous terms. These oxides, along with others, were subsequently fused by some intense heat, and this fusion with other oxides, etc., furnished, after cooling, what geologists call igneous rocks; these, in turn, were forced up through the stratified crust of the earth in various places; thus exposed to atmospheric and other influences, they, in turn, began to crumble and decay, and as they crumbled the rain washed away the mold and dust and deposited it in what we now call our clay beds. Now, the clayworker takes this mixed deposit, and, after molding it to the desired form, endeavors, with the aid of heat, to restore some of its primitive hardness, and finds he can accomplish all that is desired with a temperature much below that required for complete fusion again. One cannot fail to observe that a good hard burnt brick has many of the properties of the original rock. And what means have been used to give to soft, plastic clay that hardness, etc.? It has all been accomplished by simply oxidizing some other elements, of which carbon is the chief.

Oxidation is always heat producing. Oxidation cannot take place without producing heat. We may not, in some cases, be able to detect it with our dull, imperfect sense of touch, but reason has invented aids for the senses, and by these aids we know that those iron bars rusting outside the shop and that piece of machinery rusting in the shop are all giving out heat, are literally being burnt. This latter is known as slow oxidation, or slow burning. In view of the ordinary idea of burning, it would appear very inconsistent, if not foolish, to state that freezing cold iron is burning, and actually giving out heat. This can easily be demonstrated with the aids mentioned above. If we master the chemical idea of burning, the obscurity and irrationality of the above statement will entirely disappear and open up clear and consistent.

It may be urged—as it often is—that "the practical burner has no use for such fine-spun theories." I would reply, the practical burner is the one above all others that ought to know all about burning, and to endeavor to put into practical use all he knows.

Well, now, to come down to practical clay burning. It is a lamentable fact that many burners are not acquainted with the first principles of burning. I do not here refer to chemical knowledge, but to the common-sense notions about it. When I see men with twenty-five to thirty years' and more experience firing heavily on an already overgorged grate; when I see men crowd stick after stick on to unburned wood, until the arches are so full that they cannot accommodate a six-inch flame—I say, when I see all this done to force or hurry the heat, what other conclusion can I draw? I will repeat here that I know some good firemen with little or no book knowledge, and I know poor firemen with book learning. Of course, a great deal depends on the conscientiousness of the men, and I do not hesitate to say that the conscientious ignoramus is preferable to the scholarly lazyback, but the intelligent man of principle is preferable to either.

Merely knowing that every atom of carbon in the fuel requires two atoms of oxygen to thoroughly oxidize or burn it does not constitute a good fireman or burner; he must also know the conditions that will favor such a combination, and strive to maintain them. If he be a close and careful observer he will not fail to discover that heating air expands it, and further observation and thinking over the matter will reveal to him the fact that but for this expansion we could never have natural draft.

Scientists have carefully examined this expansion of air and other gases, and find that their rate is nearly uniform for equal degrees of heat, and is about 1-590 for each degree Fahr. increase of heat or temperature, or, to make it plainer, one cubic foot of air heated 590 degrees Fahr. will be expanded to two cubic feet. This expansion of the air is often overlooked, but invariably with proportionally poor results. If your furnace temperature is 2,000 degrees Fahr., you can easily perceive that the incoming air will be expanded by such heat to more than four times its original bulk. Common sense would, therefore, insist that there ought to be a clear space above the fuel with a sectional area at least four times that of the inlet to the grate. I refer here to the ordinary doorway to the ash pit of the furnace or arch.

Do not throttle your draft and smother your flame to increase heat in the arches. It is a common, but inexcusable, mistake. If dampering is necessary, let it be done at that point where the heat leaves the ware, if possible in a practical sense, and this leads me to the promise in my last of a few words on the nature of flames and their utility in the brick kiln. As I told you before, Siemens taught iron and steelworkers the nature and uses of oxidizing, neutral and reducing flames, also how to produce them; of course, the production and control of the several qualities of flame are much easier with gaseous fuel than with solids, but the same principles govern both. An oxidizing flame, then, is one produced by perfect or complete combustion, the products being generally carbonic acid and water, the latter in the form of steam or vapor. Both these products are oxidizing, and are more so if an excess of air has been used in burning the fuel, because this would add free oxygen to the flue gases. The oxidizing flame cannot serve any useful purpose in the kiln after watersmoking, nor can it be considered harmful unless excess of air is used, in which case waste of fuel would occur, because such excess of air would absorb sufficient heat to raise it to the temperature of the burning gases. In watersmoking, however, an excess of air is beneficial, inasmuch as it prevents the arches from becoming unduly hot before the upper portion is dry, and supplies a larger volume of heated gases to absorb the moisture as it passes through the kiln. For oxidizing purposes it plays little or no part with the ware in the kiln.

—The Reducing Flame.—

This can and does play an important part in the kiln. Much has been said and much disputed about the percentage of good hard bricks turned out of the kiln. Many consider the statement of 95 per cent. hard burned as unworthy of consideration, mere idle boasting. Why? Because the antiquated notions of buring they still cling to will only give them 70 or 80 per cent. How, then, will they accept the proposition to make an everyday practice of burning 100 per cent. hard just as easy and certain as they now get their 70 or 80 per cent.? I suppose they will meet it by deciding that the writer is visionary and knows not whereof he writes. This is a free and easy way of meeting it, but, of course, does not settle the matter. The reducing flame is the opposite of the oxidizing flame and produced by opposite means, viz.: an insufficiency of air to promote complete combustion, which results in the production of preponderating quantities of carbonic oxide and free hydrogen, both of which are possessed of strong reducing qualities; that is, they will, with the aid of sufficient heat, convert iron ores and some other metallic ores into metal, or will reduce them to lower oxides. This is of the utmost importance in the burning of red building brick, especially red front brick, where color plays so valuable a part, for you must remember that color is not due to the clay, but to the small admixture of iron and other impurities found in it, iron giving all the shades of red, from the lightest salmon to the semi-fused blacks, according to the amount of reduction that has taken place in the iron ores contained in the clay. I have elsewhere in these articles alluded to this coloring quality of iron in the clay, and so have other able writers, but when you get into conversation with managers and other brickyard experts you find them bent on discovering some magic mixture or compound that will insure the desired shade, and thoroughly ignoring the knowledge and means of arriving at such magical results, never dreaming that by skillful management of the fires they have perfect control of the coloring, as well as burning the bricks. Heat alone will reduce a peroxide of iron to a lower oxide, but when excessive heat is undesirable the reduction may be made at a lower temperature with carbonic oxide or hydrogen, or a mixture of the two. I may here state that the more the iron is reduced the deeper is the color of the bricks. Having stated plainly how reducing flames are produced and their effect on the coloring matter in the clay, I must leave it now in the hands of the manager and burner to burn for color.

In a former article in this journal I stated that it is easily possible to reverse the conditions of a kiln with regard to its heat; that is, to scorch the top courses, while the arches are only a good salmon. Of course, this is not so easy with the open-topped kiln as with a close-topped one; nevertheless, with a little scheming and loose setting on top of the open-top kiln, it may be done. I do not contend for the necessity of such a feat, but the possibility of it shows up the advantages of a thorough knowledge of fuel burning in all its phases. Let the burner manage his fires so as to generate carbonic oxide, etc., in the arches, and it will find its way to the top, and will not burn until it comes in contact with air, even if the courses are white hot through which it has to pass. White hot bricks will not burn it, but cold oxygen will. With a close-topped kiln the burning may be at the top or bottom, as the burner may think fit, providing the crown of the kiln has inlets for the supply of air, to be closed, of course, when the burning is taking place at the bottom.

The gas producer and regenerative chambers in my next.

W. WAPLINGTON.

A VALUABLE GERMAN PUBLICATION.

WE HAVE BEFORE US the writings of the late Prof. Dr. H. Seger, collected in a large volume, published by Dr. H. Hecht and E. Cramer, of the Thonindustrie-Zeitung, 6 Krupp street, Berlin. This work, published at the request of the several clayworkers' associations of Germany, consists mainly of Professor Seger's contributions to ceramic journals and the accounts of his many important researches, a number of them having been obtained by permission from the archives of the Royal Porcelain Manufactory, with which establishment he was connected for some years.

As to the character of the work, we can only say that it stands unexcelled among the ceramic writings of the century, an ever enduring monument to the late master. Impelled by his unselfish devotion to science, he translated for practical men his scientific investigations, giving to the world the results of many years of persevering labor in all departments of ceramics. His clear intellect never rested until a subject was thoroughly investigated, never being content with a superficial skimming over of subjects. The results of Professor Seger's investigations are presented with wonderful accuracy and lucidity, and the data and tables given in the text are of inestimable value to the industry. Altogether, the book will be found an inexhaustible treasure of information to clayworkers, and its value is clearly shown by the appreciation accorded it by the German craftsmen. The work is divided into four books, as follows:

1. General Scientific Subjects Pertaining to Ceramics.
2. Special Branches of the Clay Industry—Brick and Terra Cotta, Earthenware and Stoneware, Refractory Ware, White Ware and Porcelain.
3. Traveling Notes and Letters.
4. Notes from the Archives of the Royal Porcelain Manufactory.

From the separate subjects we quote the following titles:

The Physical Analysis of Clay. Influence of the Fire Gases Upon Clays and Phenomena of Colorations Connected with It. Consumption of Fuels in the Kilns of the Ceramic Industry. Standard Cones and Their Application. Quartz Sand in Brick Clays and Its Peculiar Effect. The Position of the Continuous Kiln in the Clay Industry. Discolorations of Brick. Glazed Brick. Glazes Free from Lead. Brown Slip Clays and Their Composition. Chemical and Pyrometical Analysis of Refractory Clays. Relations Between the Composition of Glazes and Body. Influence of Sulphuric Acid Upon Glazes and Bodies. The Seger Porcelain. Examples for the Composition and Calculation of Bodies and Glazes According to Analysis, etc.

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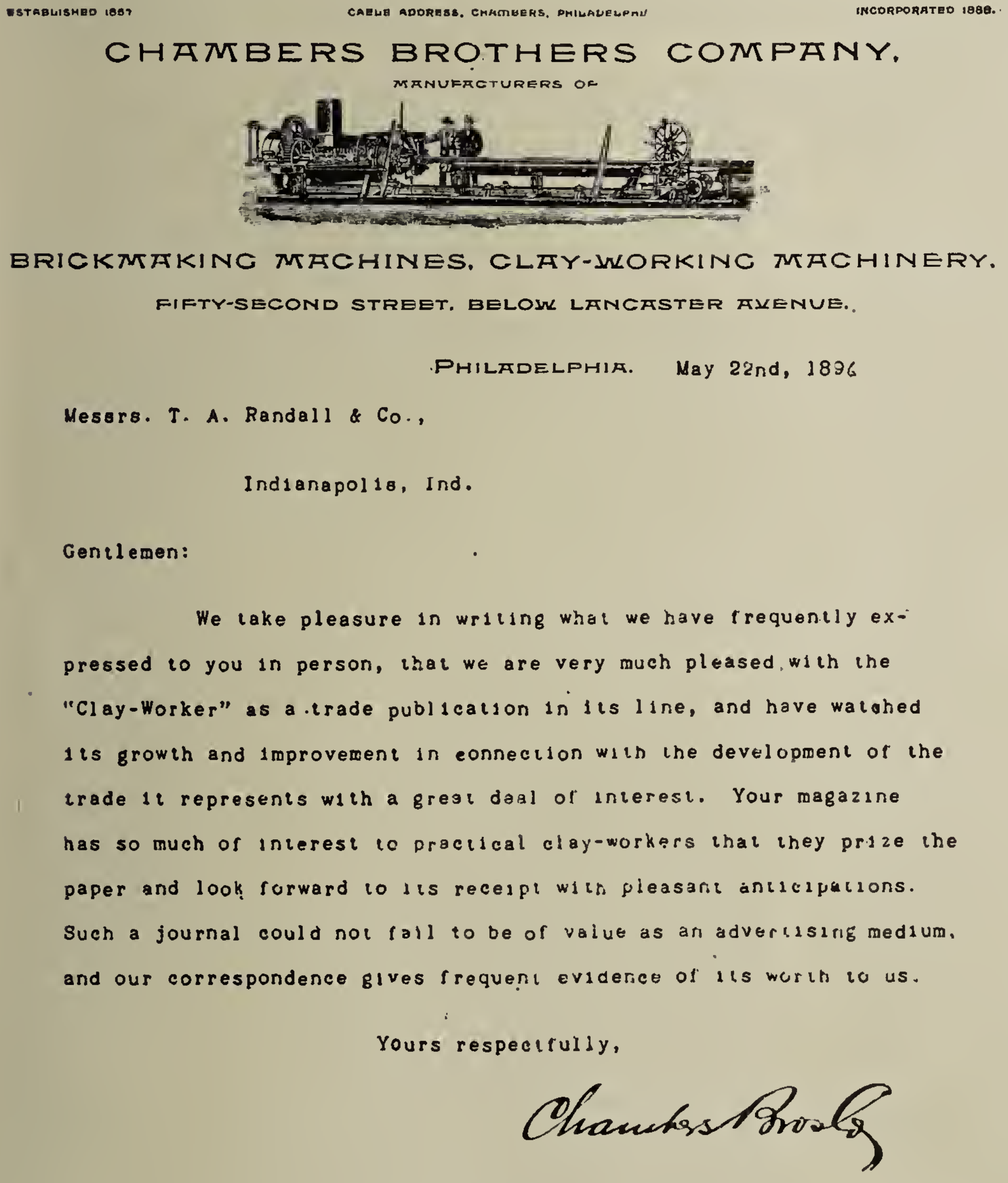

ESTABLISHED 1867 CABLE ADDRESS, CHAMBERS, PHILADELPHIA INCORPORATED 1888.

CHAMBERS BROTHERS COMPANY,
MANUFACTURERS OF
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FIFTY-SECOND STREET, BELOW LANCASTER AVENUE.

PHILADELPHIA. May 22nd, 1896

Messrs. T. A. Randall & Co.,

Indianapolis, Ind.

Gentlemen:

We take pleasure in writing what we have frequently expressed to you in person, that we are very much pleased with the "Clay-Worker" as a trade publication in its line, and have watched its growth and improvement in connection with the development of the trade it represents with a great deal of interest. Your magazine has so much of interest to practical clay-workers that they prize the paper and look forward to its receipt with pleasant anticipations. Such a journal could not fail to be of value as an advertising medium, and our correspondence gives frequent evidence of its worth to us.

Yours respectfully,

Chambers Bros Co

P. S.—WE HAVE JUST COMPLETED SALE OF A MACHINE, THAT IS UNQUESTIONABLY TRACEABLE TO THE "CLAY-WORKER," AND HAVE A FEW LEFT THAT ARE FIT SUBJECTS FOR YOUR CONTINUED EFFORT.—C. B. CO., AUGUST 26, 1896.

Praise is due to Messrs. Dr. Hecht and Cramer for the manner of compilation and arrangement of the different papers. The biography of Professor Seger, written by his friend and co-laborer, Dr. Hecht, and the portrait of the great experimenter are commendable additions to the work. Every clay-worker who is able to read the German language should have a copy of the book. The price is $5 at Berlin.

KENTUCKY'S VAST CLAY DEPOSITS.

NO SECTION in the South offers more brilliant opportunities for investment and brick manufacture than eastern Kentucky, and in Ashland is found the ideal location for a manufacturing center. Cheap fuel, always the main consideration in the cost of production in the ordinary lines of manufacture, is offered at rates lower than any other point that may be named. With the proposed extension of the Ohio & Big Sandy division of the Chesapeake & Ohio railroad, through the Big Sandy valley and the immense coal fields of Johnson, Floyd and Pike counties, all of which will be developed as soon as railroad communication is complete, putting their product on the local market in competition with the Pocahontas, Elkhorn and Kanawha fields of West Virginia, the Ohio product that will be admitted over the Ohio Southern, certain to enter the city immediately following the erection of the projected Ohio river railroad bridge, already planned, located and the plans before the government officials for acceptance, we will have fuel, in the language of President Ingalls, of the C. & O. railroad, "cheaper than any place on the face of the earth."

In the hills immediately back of the city there is bituminous coal of fine quality, and averaging as high as three and a half feet in thickness. No. 2 fire clay is also found in quantity, and the lands bearing both can be secured at very reasonable rates and prices. All of the plastic clays used at the local yards are mined almost within sight of them, and can be had from the individual miners at the lowest price possible for mining at living rates.

Back in the immense flint clay field, which covers an area estimated at forty miles square, in Carter and Rowan counties, the work of mining is comparatively in its infancy, although the supplies of a dozen large brick plants are now regularly furnished from less than half a dozen mines. This clay stands without a rival in the South, and is fully equal in quality to the best clay of Pennsylvania. This clay lies in drifts and pockets, much after the fashion of cannel coal, and is found at all heights up the mountain sides. Some of the mines lie with openings at the very base of the towering hills, while other veins show almost at the summit of the range, and the product is sent to the bottom by means of huge chutes. In all cases, though, the quality is the same, and all experiments have proven it to be all that could be desired.

In the mining it is worked much after the fashion of so much coal, the same system of working being carried out. The clay is, as the name implies, of a flint-like hardness, and has to be shot down by a liberal use of powder. It is of a bluish color when first mined, and turns white with the process of slaking, which immediately follows exposure to the air. With this feature comes the development of the peculiar non-plastic qualities of the clay. The action of the air and sunlight reduces the huge blocks to a heap of shot-like globules, tiny and still densely hard. In this condition there can be no adhesion procured, though many processes have been tested without avail. To secure this result, absolutely essential to the making of brick, the second grade fire clay is mixed with it in proportions admitting of satisfactory cohesion, still not interfering with the burning, with perfect results, of the brick. This proportioning of the quantities is a delicate work, and upon its being properly done rests entirely the quality of the brick furnished. A larger proportion of the second grade clay than is necessary always results in a correspondingly poor brick. And it may be well to add here that in the past the reputation of the local product has suffered somewhat by the dishonest methods of some manufacturers, who endeavored to make as much as possible on the stock in hand, and later quit the business, after doing it irreparable injury.

The territory embraced in this immense field is by no means all taken up. There are thousands of acres that are capable of furnishing supplies for years to come that at present are practically without value by reason of there being no means of handling the clay to the outside world, even were it ready mined and contracted. Beyond the line of the C. & O. railroad there is but one side line into the field, that of the Portsmouth & Tygart Valley Railroad Company, practically a branch of the Portsmouth (O.) Fire Brick Company, that operates immense mines in Carter and Rowan counties, along a fifteen-mile stretch of narrow-gauge railroad. Their principal offices are at Brinegar, Ky. This concern controls the territory adjoining their line on both sides, and have options, it is stated, upon a considerable area contingent thereto.

However, this is only one departure where there is ample room for scores of others. Mines are scattered along the C. & O. line at intervals, and all of them are having all they can do, although the price has dropped to 75 cents per ton, f. o. b. cars at the mines, where it used to be $1.25. At this rate, though, the operators appear to be able to make it pay, and increase their operations regularly. There will, in all probability, be considerable attention paid this line of work in the coming few years.

As stated above, the veins lie in pockets, and, though there have been some showing as deep as fifteen feet, there is no vein continuous at this rate. Near Olive Hill, where the Olive Hill Fire Brick Company has been operating mines for years, they had a vein of this kind upon which they depended almost entirely for their individual supply, though mining elsewhere for their outside customers. That vein has now dropped out as suddenly as it began, and, although it had appeared for years to be practically inexhaustible, they will be compelled to abandon the mine entirely. Fortunately, the hills are full of it, and, beyond additional expense and a change of location, they are not necessarily seriously crippled.

This company has one of the best arranged and appointed plants in the State, and has been doing fairly well since its beginning on a large scale a year and a half ago.

There are several other concerns that are mining clay for the outside trade alone, the largest of whom are K. B. Grahn & Co., of Louisville, with mines just beyond Olive Hill, at a small station called Fireclay. The capacity of these mines will reach probably four or five carloads per day. Their trade is principally in the South.

Wm. Cooper, at Enterprise, operates a mine individually, and is interested in another under the firm name of Cooper & Shay, both mines having a capacity of four or five carloads per week. On the lands of Mr. Cooper, of late, has been discovered a peculiar sort of sand and ore that has not yet been identified. The supposition is that it is possibly of a nature useful in the manufacture of glass, and samples have been forwarded experts for examination, but no report has been received to date. This same firm operates small mines at Carter, Ky., on the Kinniconnick branch of the C. & O. railway.

The Olive Hill Fire Brick Works have recently opened a mine at Aden, where Wm. Saulsbery, Sr., also operates in a small way. The combined output of the two mines will not exceed ten carloads per week.

The Limestone Mining and Manufacturing Company have mines of fairly good capacity at Limestone, and have for years shipped largely to the Portsmouth plants. This is one of the pioneer companies of the field.

Conley & Son also have mines near Enterprise, with probably a capacity of five carloads per week. This is comparatively a new venture, and they are increasing slowly.

Other companies owning mines in the field, but at just what points cannot at present be stated, are the Ironton Fire Brick Company and Parker & Austin Fire Brick Company, both of Ironton, O., while the several concerns at Portsmouth have territory under process of development. The Kentucky Fire Brick Company, with mines at Indian Run, in Greenup county, hold areas in Carter county, and secure some of their supply of No. 1 clay from that section, mining the second grade on Indian Run. This is also a Portsmouth company.

So far the local works have found it satisfactory to simply purchase supplies outright from the mines, a very reasonable rate of freight being allowed, and the price of clay being lower than ever before known. Combining these features with the great advantages as to fuel and the unexcelled possibilities as to shipping, both by river and rail, it requires but little consideration to comprehend the full import of our opening statement.

Ashland, Ky., Sept. 8. C. O. L.

CORRESPONDENCE

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LIGHT FROM THE EAST.

Editor Clay-Worker:

I note in the August "Worker" a readable article by Brother Eudaly (Brother E.'s articles are always readable), in which he gives us interesting news from the South and of our worthy President.

Then, casting his keen vision towards the East, he comments upon the question of holding the next Convention in Boston, and is somewhat fearful that this city of B. B. B. and B. B. is too far away from the center of civilization (or shall I say silverization?) in this year "eighteen hundred and starve to death."

Now, I feel that Brother Eudaly may be right, and, as I have an intimation of the same feeling from another source, I am inclined to fall in with the idea.

It will be remembered, perhaps, that it was Brother John Parry, of Cambridge, who, at Atlanta, in eloquent and fitting words, extended the invitation to the Convention to come to Boston, and he joins with me in the statement that, if it is thought best to postpone the Boston meeting, the brethren here are "agreeable."

We hear rumors of dull business and reduced profits from the West, and we send the stories back with an added shade of blue, and think possibly the Convention will fare better at some future day.

If these hard times continue there will be at least some "funeral baked meats" lying around with which to "coldly set forth the feast," etc.

I wish to "second the motion" made by Brother Eudaly in regard to having the ladies present at the "pow-wow," or, rather, I should say at the annual "banquet." I believe it will add much to the enjoyment and popularity of our Conventions, although I do not think it will be necessary to "put up two or three dollars a plate." Brother Parry and myself were in hopes to be able to provide such an entertainment here without cost to the visiting members, but, now it is proposed to go elsewhere, I would suggest an extra assessment of $1 per member to provide for this feature. This would have to be done, I suppose, by an amendment to the by-laws. Yours very truly,

Boston, Sept. 4, 1896. GEO. M. FISKE.

A Question of Business, not Politics.

Editor Clay-Worker:

The East is much interested in reports that originate in the Central and Western States on the opinions and conclusions of the press and people of those districts on the financial issues presented in this campaign. Our uneasiness has been partially allayed by the prompt action of all the representative journals in declaring for a stable money, and now our hopes are rising in the belief that soon these journals may be permitted, by the conversion of sufficient numbers of the thoughtful voters, to herald encouraging prospects of the final success of their declared principles.

It is peculiar to notice in this campaign that we find two sets of people advocating opposite methods for the bettering or sustaining of our financial system; the one who have done the business of the country for years, and who have a thorough knowledge of all the different transactions that make up our entire business, and necessitating the transferring of all our money and products, arrayed against a party with hardly a business man among them, whose only knowledge of business is gleaned by hearsay and the study of a subject with theory as a basis. Under such a condition reason teaches that wisdom is gained by experience and is safer to follow than mere conjecture.

Prosperous or unprosperous times are measured in business and not in money, and money has no use when there is no business; therefore, business is what is needed, and not money, as the latter is but the result of the former.

By increasing the volume of denominational money, but not increasing the intrinsic value of money in the same proportion, we have no greater medium of payment than its intrinsic value; consequently things exchanged for money will decrease in volume in the same proportion as is the increase of the medium of payment above the intrinsic value.

All industries of any considerable size have a journal for the recording and circulating of all matters of interest relative to their respective trades, and by no medium can so much good be done in a cause of this kind than by the thorough ventilation of the good of one system or the evils of the other.

In no business is the result of an able or incapable political administration so quickly felt in its trade as in that in which the Clay-Worker is one of the principal organs. Homes are only built by the accumulating of money from prosperous times; factories are erected when business demands them, and business buildings are needed only when the great throng of artisans have employment, keeping the mills running and requiring added room for storehouses, salesrooms and offices. Uncertainty in the value of money retards a business whose production is not perishable, but enduring through many years, and whose value is dependent on the necessity for its production. Building is the first to feel hard times and the last to recover when business is more prosperous.

We are told that this is a sectional question, but no greater mistake could be made, as the section paid with a silver dollar whose intrinsic value is less than its face demands also buys of the same section their products in the same ratio as which they were paid. But the party, let him be in any section, collecting a loan, investment or pay for service or value, is defrauded from just payment to the extent to which the debtor has decreased the intrinsic value of the medium of payment. Hence it behooves us to be very zealous of the system of finance under which we have become the richest, most prosperous and capable country in the world.

The idle assertion of the demonetizing of silver is without fact. Silver is as much a money to-day as previous to the repeal of the Sherman bill. A wooden house built within the fire limits of a large city is as much a house now as before others of a like material were forbidden.

Sober, diligent thought will convince all men of reason that a single country, in competition for the business of the world, must have a single standard. Double standards can be maintained only by the agreement of creditors and with nations with whom we do and must continue to do business.

Boston, Aug. 24. H. H. FERNALD.

Does Not Agree With "Buckeye."

Editor Clay-Worker:

In looking over the Ohio valley news in this month's Clay-Worker I see "Buckeye" has never seen the Royal Clay Manufacturing Company's plant at this place, or he has been badly misinformed as to the state of affairs of the concern, so I thought it would be nothing more than right to give the readers of your valuable journal a little information on that subject. The plant is in good running order at the present time, as compared with other sewer-pipe plants. True, they let the steam escape under the first floor, which caused it to rot in places. "Buckeye" says the floors are all rotten and sinking, and the pillars resting on the floor and supporting the roof have sunk, and it will cost $30,000 to repair it. Who ever heard of pillars resting on the floor to support the roof of a four-story building and carry the hundreds of tons of pipes on the other three floors? The pillars rest on a solid stone and cement foundation under the floor. I think they made a great mistake in not carrying the stone pillars up on a level with the floor before setting on the upright supports. The stone pillars are capped with a heavy timber, on which the posts stand, and by the steam escaping under the floor and there being no ventilation, it caused the timber to rot and the posts to settle down into it in places from one to three inches. All that is required to put the building in good condition is to raise the pillars up on a level with the floor and cut the posts off and set them on the pillars; take up the floor and fill up the space under it, which is from three to four feet deep; then put down a good brick or cement floor. Then there would be no better plant in this country, and, in place of $30,000, it would not cost over $1,200. The other three floors are in good condition. The plant is equipped with the best of machinery and four of the best steam presses that are made, and is the only palnt in this country that can make large pipe successfully—that is, 27, 30 and 36-inch pipe—and, with good management, can turn out pipe at less cost than most of the sewer-pipe plants in this country, and, I believe, will be a factor in the sewer-pipe business again. "Buckeye" says that, instead of $30,000 worth of pipe on hand, the receivers claim there is not

$4,000 worth of marketable pipe on hand. I am informed by indisputable authority that the company claimed they had $100,000 worth of pipe on hand, but the receivers say that owing to the low price of pipe at the present time they will not be able to realize over $25,000 from the stock on hand, which, I believe, is a fair estimate, and I know whereof I speak. I have been employed by the Royal Clay Manufacturing Company since they began to make pipe, and have had over thirty years' practical experience in the business, and will say again that, if placed under proper management, it would be one of the best paying sewer-pipe plants in this country.

JAMES CALDWELL.

The Money Question—The Silver Side.

Editor Clay-Worker:

In accordance with your editorial in the July issue, I wish to discuss the money question, irrespective of former party affiliations, upon business conditions and for the greatest good to the greatest number of our people. I have been a Republican voter for twenty-six years, and shall this year cast my vote for Bryan and free silver. I believe that the free and unlimited coinage of silver at 16 to 1 is for the best interests of the farmer, the business man, the manufacturer and working man, more especially for the brick manufacturer. I strenuously espouse the latter proposition for this reason: that by destroying one-half the available money of the world—that is, by demonetizing silver—gold, or money, has become so scarce or valuable that it is hoarded or invested in bonds, mortgages, bank stock, securities, etc., etc., and that its purchasing power has doubled so that a dollar income from those sources will purchase twice the quantity it formerly did. Therefore, under those conditions, capitalists will not invest in business houses or brick for houses while they have such a good thing in the investments they have, cutting off coupons and receiving dividends on gilt-edged securities without the trouble of buying brick and superintending the building of houses or incur the risks of business. But increase the volume of money by the free coinage of silver and it—the money—will become more plentiful, and stocks, bonds, etc., will not be sufficient for investment of all the money, but the latter will seek the channels of trade and manufacture, and benefit the farmer and artisan. This is according to a principal of political economy as old as time, viz.: if you decrease the volume of money you decrease the price of commodities and labor, and if you increase the volume of money you increase the price of commodities and labor. There is another phase of this silver question that strikes me, and that is: We have only been on a strictly gold standard since November, 1893, and how pinching, how trying and how lamentable have been the results. It has been, indeed, a fearful "object lesson" in our business experience, and people should pause before they vote to fasten it upon us for four years more. To recapitulate, we had free coinage to 1873, although specie payment discontinued from 1862 to 1879, and we were on the paper basis with something like, at one time, $59 per capita, and every one will acknowledge that was the most prosperous time in our history. We do not, by this latter remark, wish to return to a paper basis, but only offer, as an illustration, good times, with a plenty of volume of money. If silver remonetized it would not add seventy millions of dollars to our volume per annum or one dollar per capita; besides, silver is one of the precious metals, and when the Constitution says Congress shall have power to coin money and fix the value thereof, it meant gold and silver.

To resume our argument. After 1878 we had the Bland-Allison act, by which we coined, from 1878 to 1890, some 378,000,000 silver dollars, and then the Sherman purchasing act, by which we coined some 43,000,000 silver dollars, making a total of over 421,000,000 silver dollars coined to the repeal of the Sherman act in November, 1893. Since that time, alas! the banks have called in over $300,000,000 in discounts and circulation. Is it any wonder we have a stringency in the money market, and that they have taught us an "object lesson" in money matters? I quote these two acts, the Bland-Allison and the Sherman, to show that they afforded us relief by expanding the currency. These acts were makeshifts for free coinage, yet they helped to make money more easy, and now that they have been repealed what hope can the goldites give us for better times? We have read the esteemed J. K. Caldwell's able papers on the side of gold, and cannot subscribe to his views. The very first proposition is incorrect. Money is never intrinsically worth its face value; it is the stamp of the government and the legal-tender quality that gives its value. The government says: "This is a dollar, and shall be taken in payment of debt," and it passes as such just as the four hundred million standard dollars do. Here is one of many authorities: Blackstone, in his Commentaries, speaking of metal money, says: "Every particular nation fixes on it its own impression that the weight and standard (wherein consists its intrinsic value) may be known by inspection only." So our government says this is 371¼ grains fine and is a dollar, just as much as the gold dollar is a dollar, with its 23.22 grains. That is, when gold dollars were coined, but their coinage has been discontinued since Sept. 26, 1890, and the goldite people are battling under a fictitious standard. Another example, practical in its way: although the Mexican dollar contains more pure silver than our dollar, it won't pass at par in our country simply because it is not legal tender. About 1834 our government made it legal tender and it passed at par. International agreement has been defined as when "sheol freezes over," so 70,000,000 people need not wait to ask England to remonetize a product indigenous to our soil that the common people want. I notice Brother Caldwell says that the silver mine owners have invested in mines $547,000,000. Just think of it! Over half a billion of dollars! Do you think that if England had that much silver hid in the bowels of her soil she would demonetize silver? We thought also that the Republican party was in favor of protection to American industry and American products, and now she wants to throw discredit and ostracize one of her chief products and industries. What a shame! Go to! "Consistency, thou art a jewel."

The 53-cent nonsense has been fully exposed, because, with free coinage, there would be an extra demand for silver that would raise the bullion price. Demonetize gold, and what would gold bullion be worth? Money is governed by the law of supply and demand. If there is a demand for silver money its price would rise, or the price of bullion to make it would. About foreign nations dumping their silver here, it has been shown the falsity of the goldite position in that matter.

First—If we would get the whole dump of their silver it would bankrupt them or they would have to buy our commodities with the silver.

Second—No nation has enough silver or any other kind of money so that they can afford to dump here; in fact, they are continually buying silver from America.

Third—Most nations, especially European nations, take only fifteen ounces of silver to one of gold, and in France the ratio is 15½ to one. France is not going to pay freight and expense of collecting silver to lose half an ounce of silver on every dollar, because she would have to put in sixteen ounces of silver in this country to one dollar instead of fifteen and a half ounces in her own country.

Then, in conclusion, I am for free coinage of silver because the masses, or common people, are for it. They know and I know that in this single or gold standard money has become scarce and appreciated, congested in the money centers. There is no money without work, but without an expansion of our currency there will be no work offered or a chance to earn a living. Money is too dear to use; make it freer so it will circulate. There is no one it will better more than the brick manufacturer.

BURK W. BLAIR.

Cincinnati, Aug. 26, 1896.

The Money Question.

Editor Clay-Worker:

In your August number you name the conditions on which your columns will be open to the discussion of the silver question, namely, brevity, non-personal, non-political and non-partisan. This almost amounts to a prohibition, but we will respect the conditions as much as possible. The enemies of sound money have made the silver plank the chief plank and their candidate makes it his chief hobby. They insist on two things, and if silver is able to stand on its own merit, both should be dropped, viz.: the false ratio and the compulsory and tyrannical legal-tender act. It is true the government has issued legal-tender notes, but these are backed by the government promise to keep them at par with gold. It is true that national bank notes may be legal tender because backed by government bonds in the hands of the government, but silver coined under free coinage is not government money. It is coined out of Mr. Jones's silver for Mr. Jones's sole benefit, and it is an outrage, a crime and a despotism to compel the tens of millions of citizens who have no silver, by legal-tender act, to receive Mr. Jones's silver at double its par value. That is free and unlimited silver coinage. But that is only one of the evils attending the system. Others that are far-reaching follow. A nation that has more silver than gold in circulation cannot be said to be a gold-bug nation. I suppose we have the finest financial system in the world. Gold, silver and paper of nearly equal amounts, and every dollar of either has as much purchasing power as a gold dollar. We have in circulation in gold, $618,875,157; in silver, $627,925,632, over nine millions more silver than gold; greenbacks, $346,681,016; in national bank notes, something over $300,000,000—a total of over $1,800,000,000, over $23 per capita, whilst there is not a free silver country in the world that has as much as $10 per capita. It seems remarkably strange that a financial system like ours, with the three kinds of money so nearly equal, every dollar as good as gold, should not be entirely satisfactory. If silver men are honest, they should make the ratio such as to make the silver dollar equal in real value to the gold dollar. The fathers tried to do this, and tried three separate ratios. They thereby manifested their honest intentions. They also recognized a law of universal experience—that two metals of unequal value cannot be circulated on a parity. Both these principles are covertly recognized by the schemes in this free silver craze. The object of the silver mine owners and bullion owners is to almost double the value of their mines and their product by fiat of the government. If this is not the case, why do they cling so tenaciously to the ratio of 16 to 1 instead of an honest ratio of 31 to 1? The chief mouthpiece of the silver men often quotes Scripture and prostitutes it to base purposes. If it be lawful at all to quote Scripture in this connection, it would be refreshing to have some to sustain the 16 to 1 ratio.

The second reason we offer why the silver men are not honest in their belief in the potency of silver to stand up against all comers is in the fact that they demand an act, backed by the strong arm of the government, compelling people to take this choice money whether people want it or not. They claim silver is equal to gold as a money metal. Why not, then, let it stand on its own merits as gold does? They dare not do this. They are building on a foundation of sand. Their false theory is that the fiat of this government can raise the value of the silver bullion of this country and of all the silver bullion offered by other countries from 66 cents per ounce to $1.29 per ounce, as measured by the value of gold the world over. This is an invitation to the world to bring its silver here and get it doubled in value by the fiat of the government. They refuse to heed past experience, either at home or abroad. When we point them to the experience of other nations, to the deplorable condition of the workingmen in silver countries, to the fact that the cheaper metal always drives out the dearer, and other established facts, they tell us that these don't apply to them. "We are a great Nation, and can do what others have entirely failed to do." They have a catch phrase they use on every occasion that is no more appropriate to them than to the sound money men. It is that "this Nation has the right to legislate for itself without asking leave of any other nation." No one questions this. It is as much the property of the sound money men as it is the silver men. It is thrown out on all occasions as a catch phrase, carrying with it the covert insinuation that sound money men deny this. But their whole stock in trade depends on the government fiat making silver equal to gold and making 16 equal to 31. If this fails, as it certainly will, they carry down to suffering and distress and misery millions upon millions of American people, and all for the pecuniary benefit of a few mine owners. Probably not one of the principal ones is worth less than two millions, and some of them are worth near fifty millions. It is as clear as a sunbeam that if free silver comes in gold will go out. This will reduce our circulating medium about $600,000,000. Then every dollar in silver coin and silver certificates will fall to the value of the silver bullion back of them. This will reduce the actual value of this part of our circulating medium about one-half. The net result of free coinage at 16 to 1 would be to contract our currency about nine hundred millions, viz.: six hundred millions in gold retired and three hundred millions in depreciation of silver and silver certificates. Such a state of things, reasonably to be expected under the supposed circumstances, would close thousands of banks, prevent any which might keep open from helping manufacturers, and so throw out of employment millions of men.

I aim to be brief, but it is almost impossible. Let me give your readers extracts from English and French experience, illustrating the power of "government fiat," as this is the corner-stone of the silver men's superstructure.

The English, just two hundred years ago, tried what was known as the "campaign of the little shilling," which was an attempt to depreciate the currency, or make something out of nothing. The result was disastrous, and great public distress followed. In 1790 the French were deeply in debt. The people commenced clamoring for more money, just as our silver men are doing to-day. They demanded the issue of paper money. The Minister of Finance resisted as best he could, but his counsel was disregarded. The issue commenced; first, 400,000,000 francs. These were based on the real estate of the churches, which had been confiscated by the government, and, later on, the estates of fleeing noblemen and large land holders, which were also confiscated. As the landed property for which the assignats were made convertible amounted to about 7,000,000,000 francs, the paper currency was considered good. In a few months the first issue was exhausted and another followed, until, in nine months, 1,800,000,000 francs had been issued. This was followed in December, 1792, by 1,300,000,000 francs more, in all 3,700,000,000 francs. Then depreciation had set in and distress followed. A special income tax was levied. A law was passed fixing the maximum price of the necessaries of life. During the winter of 1792-93 mob violence prevailed, and the mob was bought off by another issue of paper money. During 1793 six years' imprisonment in irons was decreed as a penalty for selling specie for more than its nominal value. This penalty was increased to twenty years, and the issue of paper money had now increased to 4,600,000,000 francs. In the same month, August, 1793, the national debt was repudiated. By the end of 1794 the paper money issued amounted to 7,000,000,000 francs, and all confidence was by this time destroyed. Many turned to investments abroad. To stop this a law was passed making investments by Frenchmen in foreign countries punishable by death. (This is some indication of what American liberty would be under the despotism of legal-tender act and preventing specific payments on contracts.) By July, 1795, 16,000,000,000 francs had been issued. The value of the paper then was 100 francs for 4 francs in gold. (In American language, $20 for 80 cents.) By the beginning of 1796 the amount of paper issued was 45,000,000,000 francs. Of this 36,000,000,000 was in circulation. By this time one franc in gold was worth 288 in paper. Sugar was worth 500 francs a pound, soap 230 and candles 140 francs a pound. A carriage drive cost 600 francs and a carriage for a day 6,000 francs ($1,200). All other prices inflated in the same proportion except the wages of labor. (Note that, brother workmen.) A man who borrowed 10,000 francs in 1790 could pay this debt of $2,000 with about $7 in gold in 1796.

This was just one hundred years to a day before the celebrated Chicago convention proposed another wildcat scheme. The foregoing is taken from a paper by E. W. Magill, President of Swarthmore College, Pennsylvania. Although I have not given one-half of his paper, yet there is enough to show the effects of fiat money. Many men in our day seem to think the fiat of a strong government is omnipotent in the matter of making money. It is hard to believe that the American people will yield to the clamor of the few interested parties to ruin our credit, disgrace our country and bring suffering and distress on the poor, and yet we must say that recent events are calculated to shake one's confidence in humanity. It is another reminder that eternal vigilance is the price of liberty.

One word more. If the silver men want the money of the daddies, as their exponent claims they do, why do they insist on a legal-tender act? The fathers had no such act.

J. K. CALDWELL.

The Vital Issue.

Editor Clay-Worker:

If, as is generally supposed, political issues, past legislation or proposed legislation have produced the present financial and industrial depression and the enforced idleness of so many of our craftsmen, it surely behooves us to study these issue, and it is eminently proper for you, Mr. Editor, to give in your columns such instruction as may aid us in arriving at just and rightful conclusions, so that when we come to cast our ballots next November we may do so intelligently and wisely as business men, and not as partisans. Hence I believe the financial school which you have inaugurated may prove of even greater value to your readers at the present time than Father Crary's school or the proceedings of the "Mud Puddle Club," and it might be wise to give some of our old teachers a vacation of two or three months, especially since most of us have learned their oft-repeated lessons by heart, and, instead, let some of our learned and thoughtful brickmakers tell us what they know about the monetary question. But let those who express their views in your journal consider that patriotism, no less than common sense, compels that discussion of this question should be conducted with toleration, with fairness, with cool argument, without asperity and with recognition of the sincerity and honesty of those who hold different opinions. Let them have a true comprehension of the gravity of the issue involved in this campaign and of the almost religious fervor with which a great and eminently patriotic portion of the electorate is now studying it, and let them understand that sneers, however biting, are not to take the place of reasoned truth in its determination, and in this connection I must say that by publishing, in your editorial last month, the original (?) remark of Professor Orton, that "the free silver craze will run its course, like the measles and itch," you not only injure your cause, but the Professor as well, in the opinion of all fair-minded men, who believe that a man of his culture and education should not speak thus ridiculously and disrespectfully of at least two-fifths of his fellow-citizens, especially since there is no evidence that he has made any special study himself of the monetary problem. A broad-minded man, who has studied a question thoroughly, not only gives respectful consideration to those who differ from him in their conclusions, but is apt to be more guarded and less positive in his statements. Ignorance and dogmatism generally go together. There are many of us who have not yet solved the monetary problem, and many who think they have solved it are not able to demonstrate it. To discover what is right and what will be well for the country should be the purpose of every honest man, and in entering upon an investigation he should lay aside all party prejudices. He must be prepared, by a careful study of facts, to sift the arguments on both sides. He will find that he cannot always rely upon the information or logic of political speakers and partisan editors, for they desire to win without compunction as to the method of winning. Most of the speakers who are sent about the country to enlighten us upon these questions are lawyers, paid advocates, who adopt the methods of the jury pleader to awaken the prejudices of their hearers and to enforce their points. Speaking of this matter, President Andrews, of Brown University, a monetary scientist, who represented this country at the international monetary conference, said:

"Never since slavery days has the press in the parts of the country familiar to me displayed such disregard for truth and such stubborn obtuseness to the most obvious considerations as it does at present on the silver question. This means that the money power, seated in London, but with representatives in New York, Philadelphia and Chicago, is determined to continue the appreciation of gold, and determined, therefore, that the facts shall not be known. The bankers and the press are almost entirely under its influence. I think the money question at the present time the greatest question of civilization."

Now, Mr. Editor, I belong to that class of independent voters, erstwhile called "mugwumps," who consider themselves paramount in all elections, since they hold the balance of power, not collectively as a unit, for they are not all on the same side, but individually, and to me the most encouraging sign of the times is the large and increasing number of independent voters, the "bolters," the men who will not be led from their convictions by the manipulations of the political boss or party leader. So long as there is a considerable number of citizens who will not blindly follow the lead of party we need never despair of our Republic.

Now, I have said enough by way of introduction to explain my attitude in approaching this great question of the hour, viz.: whether this country shall open its mints to the free and unlimited coinage of silver as well as gold, at the ratio of 16 to 1, independent of any other nation, or shall continue upon the gold standard until an international agreement for bimetallism can be made. There is not space in this journal for a general discussion of this question in all its bearings, but, fortunately, it is not necessary to know the whole history and philosophy of money in order to understand the points at issue between the parties asking for our suffrages. To vote intelligently at the coming election it is necessary, first, to know the actual difference between the policies of the parties as laid down in their respective platforms, and, second, the facts bearing directly upon these policies, and then it is only a question of correct reasoning. It is not essential in this contest to know whether the demonetization of silver in 1873 was the "crime" alleged by the silver men or not; nor need we go into the complicated question of the rise and fall of agricultural and other products. If, after a careful study of the question, a man can believe that our monetary legislation has had nothing to do with the fall in prices of all commodities in the past twenty years, let him assign other reasons for it, but his conclusions upon this need not lead him to declare for or against the free coinage of silver. Moreover, it is not necessary that one should understand all the pros and cons of monometallism versus bimetallism, since there is no party in this country advocating monometallism as a settled policy except the so-called National Democratic party, which recently adopted a gold standard platform at Indianapolis, but it is doubtful if this party can secure sufficient subscribers in many States to entitle them to a place upon the Australian ballot. Most of the monetary scientists of the world are now bimetallists, and nearly all the nations of Europe are ready to return to bimetallism. President Francis A. Walker, in his speech at the annual meeting of the Bimetallic League, held in London, July 13, 1896, said: "Were the city of London to give its consent, bimetallism might at once be established on a broad and enduring basis. Of all the vast expanse of the globe, one square mile alone blocks the way to the adoption of a world's money as wide as the world's trade." But London will never consent, and in this she is supported by some of the greatest statesmen of England. Even Gladstone himself, in a speech in the House of Commons, in 1893, appealed to the greed of his countrymen by declaring that since England is the great creditor nation of the world, it would be foolish for her to encourage any arrangement by which her debts might be paid in a "discredited" metal.

In the discussion of this question we can also leave out of consideration the profit which free coinage might give to the silver mine owner, as this is not an argument for or against the free coinage of silver no more than it is for or against the free coinage of gold. The people who use this as an argument are generally those who believe in a protective tariff, the aim and end of which is always to make a profit for some special industry at the expense of the whole people.

Our friend Caldwell lays great stress upon this point, but the process of reasoning by which he arrives at the conclusion that the dollar which the mine owner would take from the mint would be worth 100 cents to him and only 53 cents to any one else is beyond my comprehension. Surely the silver mine owner would make more money under international bimetallism, as professed by Mr. C.'s party, than under the free coinage of silver by the United States alone. At any rate, the silver mine owner must receive his greatest profit when the silver dollar is on a parity with the gold dollar under bimetallism.

Probably most of your readers would agree that the free and unlimited coinage of silver at the ratio of 16 to 1, by the United States alone, would be a good thing for this country, provided it would raise the price of silver or lower the price of gold, or both, so that the government could maintain the coins of both metals on a parity. But would it do this? Here we have, Mr. Editor, the vital point in this controversy, the one we must investigate and answer for ourselves before we can decide upon which side to throw our influence, and, with your permission, I will endeavor to give your readers in the next number the results of the reading and thinking upon this subject of an idle and impecunious brickmaker.

ADAM CRANK.

The Necessity of Stability in Monetary Affairs.

Editor Clay-Worker:

For the last fifty years we have studied to increase wealth. Now the great problem is presented as to the fair and proper way of using, controlling and distributing wealth. It will take a very wise and righteous philosopher and statesman to solve this problem. Every man, woman and child, rich or poor, in the United States, is deeply concerned in its fair, just and proper solution.

—We Must Have Parties to Make the Body-Politic Healthy.—

A party long in power, without opposition, would become arrogant, corrupt and reckless. At best, parties go wrong, and the true, patriotic, non-partisan citizens must stand ready to either reform the wrongs of a party in power or else displace it by electing the better party. There is always a balance of power element in good society sufficiently strong to displace the most evil and elect the least evil.

Just now the money question is on top. Even the staid (supposed to be non-partisan) Clay-Worker has something quite sensible and "apropos" to say about money. But the subject is so abstruse and "enveloped in differential ideas" that few if any discrete or careful people will undertake to formulate a settled theory of money. It is not and cannot be made a party question. It is entirely a side issue. All parties are mixed up in it, and the more they try to make a party question of it the more they muddle it and stultify themselves. All agree that gold and silver should be money. All agree that it should be on a "parity." All agree that a just parity cannot be fixed so long as one of the metals is much cheaper to get than the other. All agree that these conditions have existed, may exist and will exist. The gold men ask: "If it costs as much to mine one pound of gold as it does to mine 32 pounds of silver, do you want us to take 16 to 1?" The silver men say: "If it costs no more to mine one pound of gold than it does to mine twelve pounds of silver, do you want us to give you thirty-two pounds of silver for one pound of gold?" The gold men say: "We are perfectly satisfied at 16 to 1, provided that all the single standard gold countries will agree to it." The silver men say in reply: "Then you will agree to a dishonest ratio and help us to cheat the people, provided that the gold countries will join you in the fraud." The silver men here seem to have the best of the argument, for if it be robbery to make a dollar of a half dollar in the United States, unless by the consent and approval of the gold standard countries, it is difficult to see how a crime in the United States can be made innocent and virtuous simply because England or any other or all countries might declare it to be so.

If we look at the gold and silver question with common sense we see that, in true theory, they are only commercial commodities, and, let alone by the authority of sovereign government, would go in the market like brick or any other thing in business trade. If, perchance, gold could be found and put on the market (in weight) as cheap as silver, no one would contend that one pound of gold would be worth as much as sixteen pounds of silver. If the parity of gold and silver is to be kept up by their real bullion value, then it would be fair to demonetize both, and let the government go into the market and buy the bullion, fix the ratio according to cost, coin it into money to suit trade and commerce, and issue certificates therefor, which should be a full legal tender, and at all times exchangeable for gold or silver coin, at the option of the government. This would end all dispute as to ratio. There would be no free coinage; the government would buy all the bullion it might need in the open markets of the world, and whatever profit there might be in coining would go into the treasury to lighten the burdens of the people. This would be a "fair, square," equitable deal all round. The gold and silver miners would get all that their metal was worth, the government would control the volume of currency instead of banks, and the people would have a sound national currency, that would not likely fluctuate, either in value or volume. Of course, paper money would be the principal circulating medium of exchange, and could always be made sufficiently elastic by the government to suit any deficiency in the revenues.

The popular cry now is for free, unlimited coinage of gold and silver at a ratio of 16 to 1; so no other plan will do until this is settled by the verdict of the people in the next presidential election. If the people decide to try free coinage it will open a new school for solving the most important subject ever before the business of the world. Once settle the money question on a solid, sound, self-adjusting principle, to suit the industrial and commercial wants and needs of the people, and the surest guarantee for permanent liberty and prosperity will have been achieved. If the Democratic party can do this, all right. If the Republican party can do it, all right. If either do it, we should rejoice, but in either case we should hold them strictly responsible for the performance of their pledges.

We must all admit that public affairs have gone wrong, or, perhaps, to better express it, have never been right. Let us all do our duty, as honest patriots, and God will bless our efforts, irrespective of the man we elect for President. The money question is of primary importance to all, and especially to brickmakers. We can make no calculations in our business until the money question can be permanently settled. Many have failed. Many are discouraged and will likely close up until the outlook is more inviting and assuring, and only those who have some special reason will try to start new plants. The best thing for brickmakers to do is to curtail their product, keep a small stock of first-class brick on hand, and, by all means, keep out of debt.

All should study the money question. Don't let parties blind you. Study all sides of the question; think and act for yourselves, and when you vote let it be the act of your own honest conviction and deliberate judgment. Politicians will not buy your brick or sell them for you, but they will promise you everything you want, and when you put them in office they will have the office and you will still have your wants.

I don't distrust or wish to belittle all public men. Thank God, we always have had and always will have enough of good and great men to preserve the life of our great Republic. Our chief trouble is that we become too much wedded to parties. We should do with parties just as we do with men who work on our brickyards. If they serve us well, keep them; if not, discharge them. Politics is business, voting is business; office holders are servants in our country, and the faithful servant will do his master's work and will. "If he doeth it not, he shall be beaten with many stripes." J. W. C.

Ohio Valley News.

Editor Clay-Worker:

Business continues very dull with the sewer pipe and brick manufacturers, and they say never in the history of the business was the demand for their product so light. Very few of the works are running, and such as are are running about half their capacity.

The Chelsea Pottery Company closed their plant at New Cumberland, W. Va., Aug. 8, and gave notice to their employes to seek employment elsewhere, as they had no idea when they would resume, and, under no circumstances, before next spring.

An echo of the great failure of the Royal Clay Manufacturing Company, of Uhrichsville, O., an account of which I have furnished in my July and August letters, was heard this week in the failure of Mr. W. B. Simpson, a wealthy wholesale dry goods dealer of Wheeling, W. Va. Mr. Simpson was a large stockholder in the Royal, and was personal indorser for over $60,000 of their paper.

The American Brick Works, of Freeman's Landing, W. Va., consisting of two complete brick works and 127 acres of valuable mineral rights, were sold at trustee's sale, Aug. 31, to John H. Atkinson, of New Cumberland, W. Va., for $15,000. That this is a desirable piece of property at this low figure is demonstrated by the fact that three years ago Messrs. Freeman and Stewart, the owners, were offered $60,000 for their interests.

Elizabeth Connor, otherwise the Excelsior Sewer Pipe Company, of Elliottsville, O., has brought suit against the Calumet Fire Clay Company, of the same place, charging the latter with encroaching on the clay mine property, she claiming that the Calumet Company is working over the line. The Calumet Fire Clay Company, in their answer, also accused Elizabeth Connor of the same. The case is to be tried next week before a board of arbitration appointed by the court, and who are practical clay men, consisting of Chas. A. Freeman, Secretary of the Central Sewer Pipe Company, of Pittsburg; 'Squire Jas. Ball and S. T. Minor, President of the Minor Fire Clay Company.

The Island Siding Brick Works, at Brown's Station, O., that has been idle for over eight months on account of a disagreement among the stockholders, will resume operations in the near future. The difficulties have been adjusted, and under new management the plant is being made ready to start at once.

The Standish Sewer Pipe Works, at Penrith, W. Va., are idle and are likely to remain so for quite a period. The deed of trust by which the Standish Clay Manufacturing Company became possessors of this plant has been successfully attacked in the lower courts by the creditors of Anderson Bros., the former owners. The suit will be bitterly fought through all the courts, and it will probably not be finally decided for considerably over a year.

The Sebring Pottery Company, of East Liverpool, O., will establish a branch at East Palestine, O., at a cost of $60,000. The citizens of East Palestine gave the Sebring Pottery Company a bonus of $25,000 for locating there. BUCKEYE.

Rich in Raw Material.

Editor Clay-Worker:

I am very much pleased with J. W. Crary, Sr.'s, article in the August Clay-Worker, "A College for Brickmakers on the Industrial Plan." I think his is a feasible idea for beginning on a small scale, and would further say this is a central point, situated near a good market (Kansas City, Mo.), with cheap fuel, both wood and coal, water in abundance and an inexhaustible supply of clays of nearly all kinds—buff, red, white, terra cotta, as fine as any, and as good fire clay as there is in the United States, and as fine clays for paving brick, drain tile and sewer pipe. You can count on me for a liberal amount of stock and at least two students, and a good, hearty support in securing land and liberal donations to such an institution, and would be pleased to hear from any who wish to assist in starting this ball to rolling. OSCAR JENKINS.

Creighton, Mo.

Wants a Clay Dollar.

T. A. Randall & Co.:

Inclosed please find $2 to cover my subscription to the Clay-Worker till August, 1897.

I must say that I am more than pleased with your paper, and that I consider each number good value for a year's subscription.

We have not yet arrived at the dignity of having our works photographed—in fact, it takes so much time to keep our debts paid that we have no time for anything else. If the Canadian government would turn "silverites" we might have a chance to make some money. I know of no reason why I have not as good a right to take 53 cents' worth of brick and call it a dollar as my neighbors have to take 53 cents' worth of silver and call it a dollar.

I wish you every success. HECTOR McLEAN.

Bridgeton, N. S.

A LARGE MAJORITY.

Our genial Chicago friend, J. Dixon Doyle, who, we believe, is a Democrat from way, way back, is authority for the statement that of the sixty-eight brickmakers of Cook county sixty-five will vote for McKinley. We are wondering what Dixon will do.

This Department is devoted exclusively to Invention and Patents relating to the Clay Industry, and is edited by Mr. Edward C. Weaver, attorney and counselor, in patent law, McGill Building, Washington, D. C. Copies of any patent with drawings will be sent at cost, namely: ten cents for each copy. Any information and advice in regard to patents will be gladly given. Address all communications to the editor.

LICENSE.

A LICENSE GIVEN by a patentee to some other person to make or manufacture his invention is a personal license and not transferable to another. Of course, the terms of the instrument itself may give rise to a different construction, as where there are express words extending the right to an heir or an assignee.

In the case of Keller et al. vs. Stolzenbach et al., decided in 1884, in an existing partnership, one of the partners invented a useful machine upon which a patent was granted. The total expenses attending the securing of a patent and a considerable litigation ensuing was borne by the partnership. From evidence, however, these expenses were repaid many fold by the use of the machine in the partnership business. After the partnership had dissolved, the other partner claimed an implied license to make, use and vend the invention, but this was not sustained by the judge's decision.

Any instrument granting patent rights, in which either the right to make, the right to use or the right to sell is excluded, becomes merely a license, and process against infringers can only be taken in the name of the inventor. Sometimes, however, the licensee's name may be joined as a plaintiff.

—New Inventions.—

A license usually contains a clause of limitation or means for revocation or annulment. When this has been omitted, the licensor cannot revoke without the consent of the licensee. The remedy would be by process of law for a breach of the contract, if such existed. Otherwise the license would still remain in force.

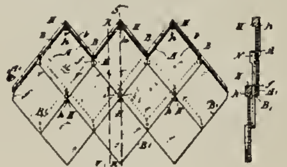
562,798—TILE. Heinrich Brocker, Limbach, Germany, assignor to Julius Theodor Kohler and Wigard Willhain, same place. Filed July 15, 1895. Serial No. 556,025. (No model.) Patented in Belgium March 1, 1895, No. 114,357; in England March 1, 1895, No. 4,438; in Switzerland March 1, 1895, No. 9,858; in France March 14, 1895, No. 247,399; in Hungary March 16, 1895, No. 3,079; in Austria March 31, 1895, No. 451,135; in Italy July 15, 1895, No. 75,237, and in Spain July 15, 1895, No. 17,499.

Claim.—A tile having on two adjacent sides of its upper surface ledges A and B, forming between them a channel b, said channel having one vertical and one slanting wall as specified, corresponding ledges at the opposite adjacent sides of the reverse side of the tile, to engage over and in said ledges A and B, and a channel h at the top corner of each tile, said channel commencing at a point lying in the plane of the upper part of the ledges A and B, and opening out and widening on to the upper surface of the said tile in the manner and for the purpose substantially as described.

563,252—BRICK OR TILE CUTTING MACHINE. Jacob Bensing, Malinta, O. Filed Aug. 22, 1895. Serial No. 560,113. (No model.)

Claim.—1. In a brick and tile cutting machine the combination, with a revolving cutter and a subjacent frame having an endless track, of a carrier arranged for movement on the track, said carrier consisting of flexibly connected sections, each comprising a base plate and guide standard and a transverse bar secured between the ends of the standards and projecting beyond such standards, a plurality of which bars are adapted to aline and abut when one or more carrier sections occupy a straight portion of the track, substantially as specified.

2. In a brick and tile cutting machine, the combination with a frame having a track and a superimposed, revolving cutter, of an endless carrier consisting of a series of loosely connected sections, each section comprising a pair of opposite base plates, vertical guide standards narrower than the same, and crossbars arranged upon and offset from the standards and terminating in vertical alinement with the edges of the base plate, the base plates and crossbars of a plurality of said sections abutting when the same are arranged upon a straight portion of the track so as to render that portion of the carrier rigid and prevent any of its sections in that portion from having any independent movement, substantially as specified.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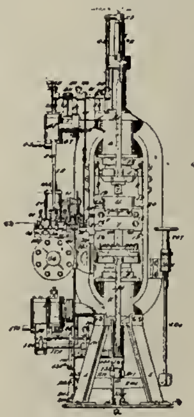
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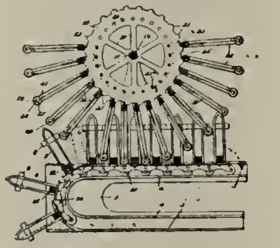
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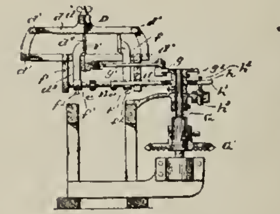
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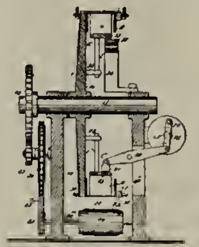
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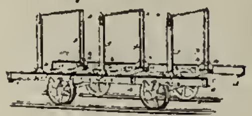
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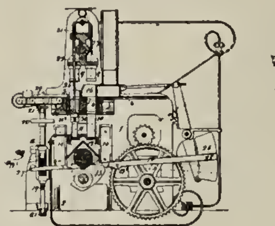
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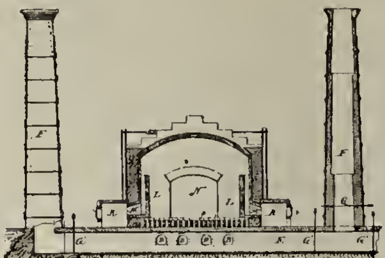
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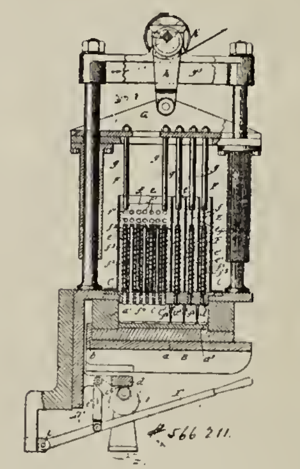
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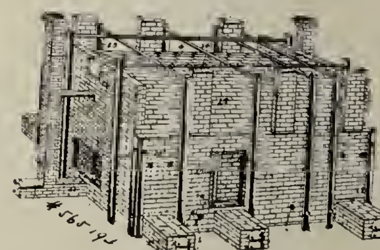
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3. In a brick and tile cutting machine, the combination with the frame having a track, the endless carrier arranged for movement thereon and consisting of a series of flexibly connected sections, having guides at their opposite ends, of a rim supported revolubly above the carrier, U-shaped arms pivoted thereto and carrying cutting wires, bolts extending from the terminals of the arms, anti-friction rollers arranged loosely on the bolts, pins extending from the arms above the rollers and

provided with anti-friction rollers adapted to contact with the guides of the sections when the arms are moving upward, substantially as specified.

565,111—HYDRAULIC BRICK MACHINE. Willis N. Graves, St. Louis, Mo., assignor to the Hydraulic Press Brick Company, same place. Filed March 26, 1895. Serial No. 543,288. (No model.)

Claim.—1. In a hydraulic brick machine, the combination of upper and lower rams, pistons carrying the rams, cylinders in which the pistons fit, a low-pressure pump communicating with the cylinder of the lower ram, a high-pressure pump with which the low-pressure pump communicates, communications between the high-pressure pump and the cylinders of the upper and lower rams, and valves located in said communications provided with means for operating them, whereby the lower ram is first moved by low pressure and both rams then moved by high pressure exerted through force from the low-pressure pump, substantially as set forth.

565,210—BRICK MACHINE CUT-OFF. Philip H. Kells, Adrian, Mich. Filed Feb. 10, 1896. Serial No. 578,729. (No model.)

Claim.—1. The combination with means for supporting a column of clay, and a transversely reciprocating cut-off mechanism of the guide plates located on opposite sides of the path of the column of clay and at a distance apart greater than the width of the column, means for moving all of said guide plates transversely in the same direction to bring the guiding plates on the side opposite the cut-off mechanism into engagement with the clay column and means for operating the cut-off mechanism, substantially as described.

565,291—BRICK MACHINE. Charles S. Meyers, Sharpsburg, Pa., assignor of two-thirds to Albert E. Johnson and George I. Core, same place. Filed May 18, 1895. Serial No. 549,823. (No model.)

Claim.—1. The combination with a rotary part carrying brick molds and plungers movable in said molds and adapted to exert an interior pressure on the molds, of the plate conforming to the curvature of the rotary part and comprising a fixed portion and a pivoted lower section for exerting external pressure on the material in the mold, connections between a rotary shaft and said pivoted section for imparting motion to the section and the oiling device supported by the fixed portion of said plate, substantially as specified.

566,105—BRICK PRESS. Thomas Whittaker, Accrington, England. Filed Nov. 8, 1893. Serial No. 490,355. (No model.) Patented in England April 12, 1893, No. 7,456.

Claim.—1. In a brick machine, two molds in close proximity, mechanism for feeding pulverulent material to the first mold, mechanism for feeding the brick from the first mold to the second, two sets of plungers for each mold, and means for actuating all the plungers from opposite directions, simultaneously, toward an intermediate position in the molds, whereby the bricks are pressed and repressed from both sides, all combined substantially as described.

565,594—BRICK KILN. Aaron M. Bishop, Green Spring, O. Filed July 22, 1895. Serial No. 556,765. (No model.)

Claim.—In a kiln, the combination of a vertical flue at the end wall, a companion vertical flue located at the side of the kiln, a duct connecting the two vertical flues, a furnace for supplying heat to the said duct, and a block arranged in the duct and adapted to be moved therein to control the passage of the heat to the said flues, substantially as set forth for the purpose described.

566,157—BRICK KILN. Harry J. Flood, Chicago, Ill. Filed March 24, 1892. Serial No. 426,274. (No model.)

Claim.—1. A brick-burning apparatus or plant, comprising a kiln chamber having valved exit openings in its top and a perforated floor, burning furnaces provided with flues which open into the upper part of the kiln chamber, drying-off furnaces at the side of the kiln chamber below the level of the floor, parallel perforated walls or stringers supporting said floor, said walls or stringers being provided with openings or arches in alinement with each other, forming transverse passages extending between opposite walls of the kiln chamber in alinement with the drying-off furnaces and communicating at their ends with the same, a plurality of tunnels located beneath said passages and provided with openings which lead into said passages and which are disposed at intervals across the bottom of the kiln chamber, movable slide covers for said openings and a stack communicating with said tunnels, substantially as described.

566,211—MACHINE FOR MAKING DECORATIVE TILES. Julius Mohs, Brandenburg, Germany. Filed Aug. 23, 1895. Serial No. 560,197. (No model.)

Claim.—1. In a tile-making machine, the combination, with a receptacle for the powdered material having a discharge outlet, of a coiled spring located within said receptacle, over the outlet, and automatic mechanism for intermittently actuating the said spring, substantially as set forth.

566,420—MANUFACTURE OF POTTERY TILE, etc. Edward A. Shaw, Buglawton, England. Filed July 5, 1895. Serial No. 555,061. (No specimens.)

Claim.—1. In the process of manufacturing pottery, forming the green ware and impregnating the green ware with a binding material to toughen and harden the same without biscuit firing, substantially as described.

2. In the manufacture of glazed pottery, tile and like ware, the process substantially as hereinbefore described, consisting in impregnating the green ware with a solution of soluble glass, then drying the ware, then glazing and firing the same.

3. In the manufacture of glazed pottery, tile and like ware, the process substantially as hereinbefore set forth, consisting in impregnating the green ware with a solution of soluble glass, then drying the same, then ornamenting the hardened coated ware, and finally glazing and firing the same.

566,490—BRICK DRYING CAR. Samson D. Wright and John W. Hornsey, Cleveland, O., assignors to the Ball-bearing Car Wheel and Manufacturing Company, same place. Filed Nov. 1, 1895. Serial No. 567,630. (No model.)

Claim.—1. In a brick drying car, the combination with the frame beams of the brackets secured thereto having horizontal projecting screw sockets b and the vertical face sockets f, both sockets being on the same side of the bracket and in vertical alinement, the screw pipe m engaging said screw sockets and the truss standards engaging said vertical sockets, substantially as described.

WHAT USERS THINK OF WILLIAMS'S SHALE BREAKER AND PULVERIZER.

Office of National Brick Company,
Bradford, Pa., Aug. 15, 1896.

Messrs. Milton F. Williams & Co., St. Louis, Mo.:

Gentlemen—We have been running your shale pulverizer for about sixty days, using hard shale, that has to be thoroughly wet all the time in order to make a fine brick, and we can heartily state that the machine will pulverize either shale or clay, wet or dry, finer and much faster than any machine we have ever used or seen, and we therefore consider it the most useful and economical pulverizer that has ever been placed before the progressive brickmakers of this country.

The machine will pulverize of dry clay or shale from 80 to 120 square yards per day. If clay or shale is very damp or wet, from 40 to 60 yards. It will pulverize this amount of clay fine enough so that it will pass through a screen 18-mesh, No. 22 wire.

Believing that these are better results than we have ever seen from any other clay-crushing machine, we therefore consider it the most useful pulverizer that any brickmaker can have.

Wishing you every success, we are, yours very truly,

(Signed) NATIONAL BRICK COMPANY,
P. B. BROUGHTON, Superintendent.

MERGED INTO ONE.

The Frey-Sheckler Company and J. W. Penfield & Son Consolidated.

THE READERS of the Clay-Worker will doubtless be surprised to learn that two of the largest and best known clayworking machinery concerns in the United States, namely, the Frey-Sheckler Company, of Bucyrus, O., and J. W. Penfield & Son, of Willoughby, O., have been merged into one mammoth stock company, styled the American Clayworking Machinery Company. To this company has been sold the machinery manufacturing plants, patterns, patents and good will of both the old concerns. The arrangement is not in any sense of the word a trust or pool, but is a permanent change in organization. The sale and conveyance of the two plants is absolute, and the new company will hereafter be vested with the entire manufacturing business of both the old ones, and will take full and complete charge of both plants.

Both of the parties to this transaction have been long and favorably known to the clayworking fraternity. It is now forty years since the business of the Penfields was started by J. W. Penfield, while that of the Bucyrus Company commenced some four and thirty years ago. As the years have gone by the facilities, equipment and trade of the two concerns have steadily increased, until they have come to be recognized as the representative clay machinery manufacturing concerns of the United States. For years they have been active rivals and strong competitors. Each has been unceasing in its efforts to excel the other, both in variety of patterns of machinery produced and in their quality and performance. Each has had immense plants, claimed to be more extensive and better equipped than any other in America or Europe. Each has maintained a corps of skilled employes and salesmen and has reached out in every possible direction for extension of business relations and increase of trade. Each has perfected and controlled valuable patents in the field whereby increased efficiency of machinery has been secured, both as to saving of labor, economy of operation, ease of adjustment and maintenance, and quality and quantity of product. Each has produced and placed upon the market a most complete and extensive line of machines and appliances for the manufacture of the various forms of clay products; in fact, to their combined efforts, more than anything else, is due the present highly developed and perfected state of the brick machinery of to-day.

CLAY WORKING MACHINERY, ENGINES, ETC.

Works of American Clay-Working Machinery Co., at Bucyrus, Ohio.

The conditions leading to the change in organization may be briefly stated, as follows: During the past year the clayworking trade has greatly felt the depression existing in all other lines of business. Owing to this fact, the prices of machinery have been steadily on the decline, and dangerously extended terms of payment have been conceded to purchasers of this line of goods. At the same time, the cost of producing and selling machinery has continued to be about the same, being largely out of proportion to the results obtained. Furthermore, there was liability of expensive and annoying litigation between the two concerns as to the ownership of valuable devices and improvements. After fully considering the situation, the two rivals decided, in the interests of economy, to make a truce. An examination of the law convinced the parties that any temporary traffic arrangement would be too frail an arrangement for the great enterprise they had designed, therefore it was arranged that a new company—the American Clayworking Machinery Company—should be organized, and that each of the old companies should sell to it their manufacturing plants, patents, patterns and good will, and that each should thus retire from the business. It was readily demonstrated that by this arrangement such improved methods of manufacture and such a system of marketing the machinery could be secured as to materially lessen the proportionate expense in these departments of the business, thereby making it possible to produce the highest grade of clayworking machinery at the lowest possible cost, a feature of decided advantage not only to themselves as manufacturers, but also of great benefit to the purchasers of this class of goods. As above stated, this arrangement has been consummated, and the machinery manufacturing concerns known as the Frey-Sheckler Company and J. W. Penfield & Son are now things of the past.

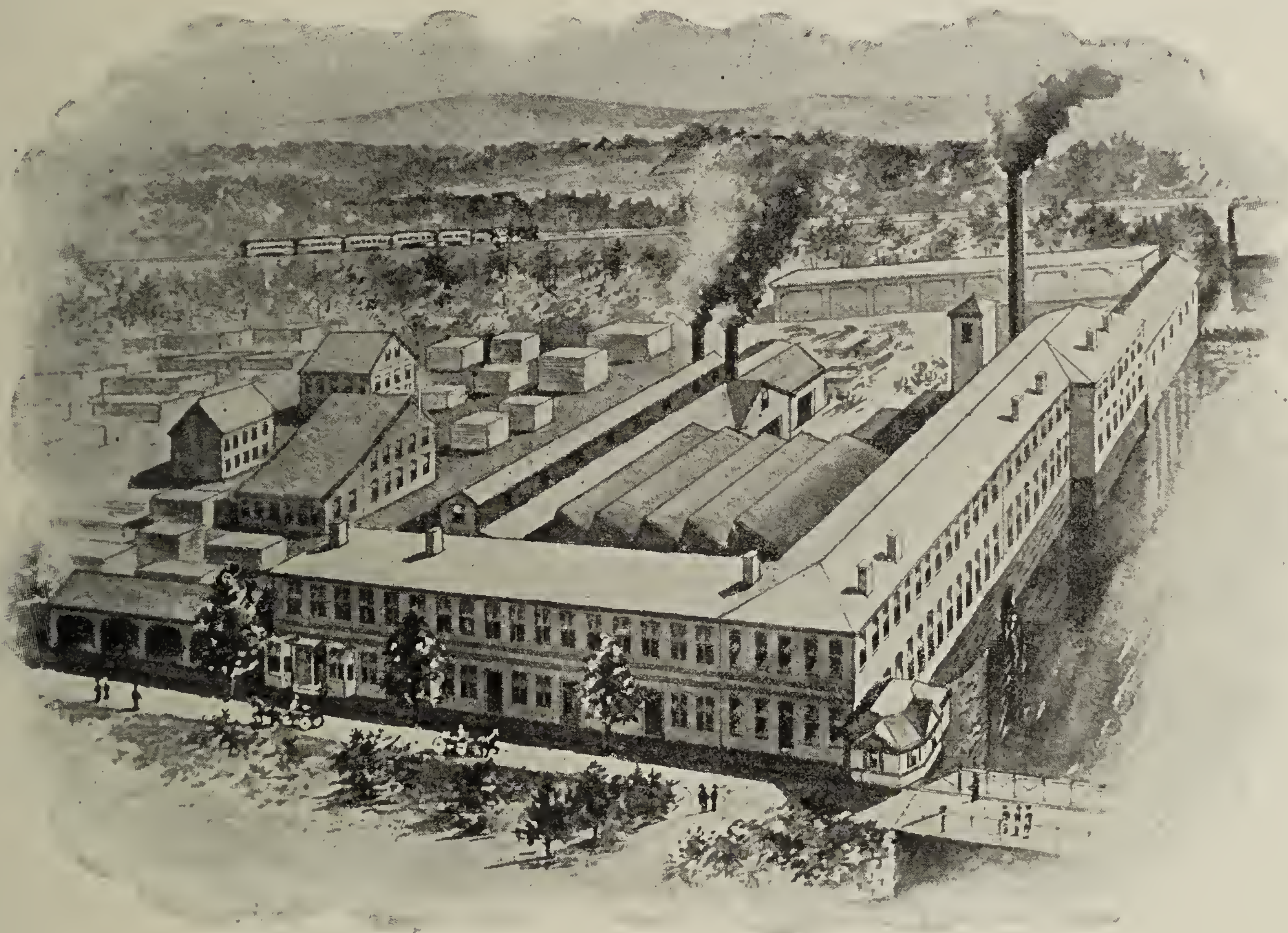
The American Clayworking Machinery Company is incorporated with a capital stock of $600,000. In the selection of officers, Mr. J. W. Penfield, who is widely known as a pioneer manufacturer of clayworking machinery, has been chosen as President, the other officers of the company being as follows: First Vice President, R. C. Penfield; Second Vice President, C. W. Fisher; Secretary, W. W. Reehl; Treasurer, J. B. Gormly; General Manager, W. C. Lemert. The general offices of the company will be located at Bucyrus, O. The several departments of the two companies will be merged, and the list of machinery produced will comprise all of the lines formerly made by the individual concerns.

By this consolidation of interests there is formed the largest, most valuable and best equipped enterprise of the kind in the world, both as to personnel, manufacturing facilities and equipment, patents owned and controlled, and variety of clayworking machines and appliances produced. Furthermore, by this arrangement the liability of impending patent litigation between the two old concerns and the expense and annoyance contingent thereupon will be entirely obviated. The patents acquired and controlled are some sixty in number, and, it is claimed, comprise the bulk of the most valuable clay machinery patents in force.

The aggressive characteristics, staying qualities and financial equipment of the new company give every assurance that it can and will defend its rights to the manufacture of its special patent mechanisms, and, furthermore, that it will demonstrate, by new creations of inventive genius, its capability for maintaining the leadership in its special field. The prices of machinery will not be advanced, but competition will be met by improved methods of manufacture and by the greater economy in cost of selling made possible by the new arrangement, as well as by the superior quality of the goods produced.

The business deal above recounted is certainly the most important ever transacted in the history of the clay machinery business. By it is formed the most valuable property of its class extant—larger, better equipped and of greater capacity than any similar concern in the world. The lines of machinery produced embrace nearly every conceivable form of clay manipulating appliances, and, together with the resources and facilities of the new concern, will enable it to fully equip any clayworking establishment with a complete and perfect outfit, entirely suited to its requirements, and at the lowest possible price consistent with the furnishing of first-class goods. An effort will be made to become acquainted with every clayworker in the country, and, by a complete understanding of his wants, to be better able to intelligently anticipate and meet them. The many thousand clayworkers in this and other countries may be fully assured that the new company will leave no stone unturned to keep fully abreast of the times in every respect, and that it will continue to be in a position to successfully equip any clayworking establishment, whether large or small, with any and every appliance required or that may in any way contribute to the maximum general efficiency of the plant or to the highest attainable degree of convenience, saving of labor and economy in cost of production of the wares.

All correspondence with reference to new machinery or relating to the business of the new company should be addressed to the American Clayworking Machinery Company, Bucyrus, O. For the present, however, orders for repairs for machinery originally shipped from Willoughby, or correspondence relating to such orders, should be addressed to the American Clayworking Machinery Company, Willoughby, O. The clay testing department of the company is located at Bucyrus, and all clays to be tested should be forwarded to that point. See ads on pages 240 and 241.


Works of American Clay-Working Machinery Co., at Willoughby, Ohio.

STRAIGHTENING A CHIMNEY.

The straightening of a chimney stack at a brick and tile works located at Earnest, Pa., was recently accomplished in a novel manner. According to a description published in the Engineering News, the stack is 122 feet high, 11 feet square at the base, tapering somewhat at the top, and weighs 400 tons. The walls are 36 inches thick. The top was found to be leaning 45 inches from the vertical line. To right the chimney 10½ inches of brick work was removed from the foundations on three sides. As the bricks were removed, square blocks of wood were inserted, one after another, until three sides of the structure rested on the blocks. Between the blocks substantial brick piers, six inches high, were built, leaving a space four and a half inches between the top of the piers and the bottom of the undermined brick work. The blocks were then set on fire and kept burning evenly. If one burned faster than the others the fire on that particular block was checked so that all were made to burn uniformly, and as the blocks were reduced to ashes the stack slowly righted. As the top gradually swung back through the 45-inch arc small fissures appeared near the base. In every groove a steel wedge was driven to maintain the weight of the walls. The entire work consumed one day, and the reduction of the wooden blocks to ashes required one hour.

Written for the CLAY-WORKER.

THE SOCIAL SIDE.

Fire-Brick Makers' Annual Clambake at Dighton, Mass.

The CLAY-WORKER has had another very agreeable and pleasant meeting with its New England friends and patrons.

The genial and faithful Secretary of the National Association of Stove Brick Manufacturers, B. C. Pierce (Superintendent of the Presbrey Stove Lining Company, Taunton, Mass.), sent his usual kindly invitation requesting the presence of the Clay-Worker at their annual social festival.

With vivid recollections of previous enjoyment derived from the hospitality of Dighton, we gladly accepted, and went in company with H. A. Perkins, of Perkins & Pett, Stamford, Conn.; Benjamin Fox, of Fox & Co., Reading, Pa.; Frank S. Brown, of Rogers & Co., Royer's Ford, Pa., and Charles A. Bloomfield, clay miner, of New Jersey.

This party of five clayworkers had a jolly time of it, both going and returning, via the palatial steamship, Puritan, of the Fall River line.

Arriving at Dighton, they were met by host and commander-in-chief of the feast, Gideon C. Francis, who tendered a right royal welcome.

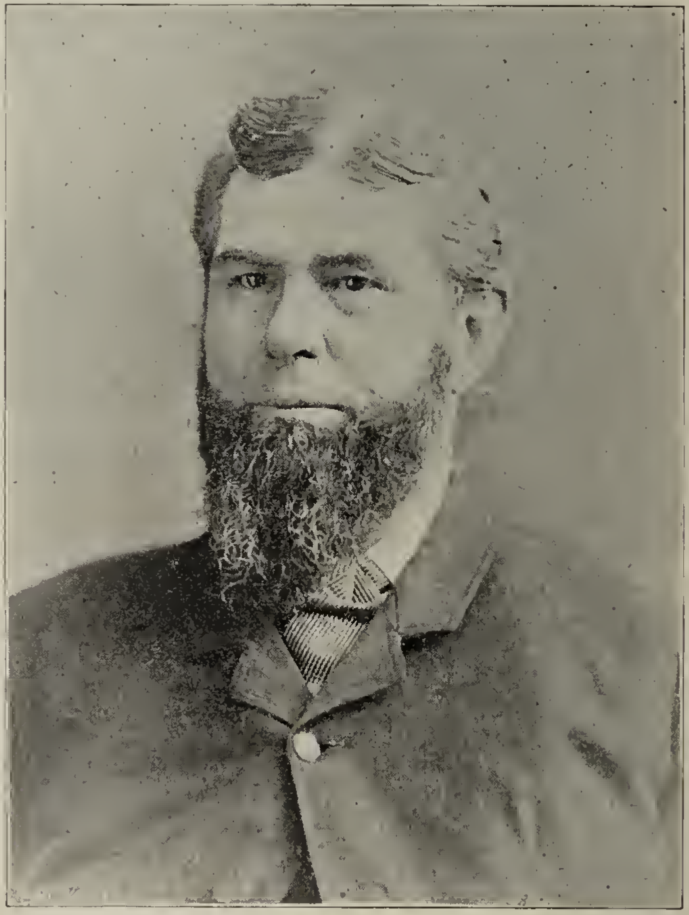
Gideon C. Francis is the manager of the Dighton Stove Lining Works, and has won a national reputation for making the very best grade of stove brick. To many a brickmaker accustomed to the slipshod methods and accumulated scrap of some brick works a visit to these works would be a revelation. No molds in sight except those in actual use; clean floors and carefully arranged piles of brick in every condition of manufacture. As is well known, the molds for making stove lining brick are made of wood. They are very numerous, usually a set of six different shapes being required to make the brick for one stove. These molds are often several thousand in number and of many varieties. They are costly and easily destroyed by fire. This our friend Francis well knows, and, being a prudent man, he stores them in a separate building that is fireproof, and at night, when the works close, each workman has to carry the molds he has been using during the day to the storehouse and deliver them to the storekeeper. To some this may seem costly, but those who have suffered from loss of molds by fire can understand the saving of anxiety and risk it affords; moreover, any manufacturer who ever stops to think of the expense wasted in time and patience and temper due to hunting for various molds, stuck away in holes and corners by the caprice of workmen, or left lying around by disorderly employes, can realize that Francis's method of orderly and safe storage is both cleanly and profitable.

The Dighton works are built upon the shore of the Taunton river, about midway between Fall River and Taunton. The buildings are commodious and well kept, and the view from them is beautiful in the extreme. The beauty of their surroundings in the summertime must make the time of the employes one long holiday, while the clay-laden ships lying alongside continually remind one that there are other places beside Dighton.

All the fire clay used here is brought in vessels from New Jersey, so that the Taunton fire-brick makers are not limited to local qualities of clay, but may and do select the best at all times.

While the reputation of G. C. Francis as a good brickmaker wins for him the respect of his fellow-craftsmen, his supreme ability as a provider of clambakes for his friends and their ladies gains for him the kindest regards of all those who have had the great pleasure of partaking of the good things he provides for them to eat and drink on these annual occasions. A Rhode Island clambake is a royal feast that must be eaten in the open air, by the shore of salt water, and under a blue canopy, draped with silvery clouds, in order to be thoroughly appreciated. A good Providence generally has co-operated with friend Francis in furnishing these external accessories to the brickmakers' clambake. The menu consists of delicacies such as only the brickmakers of the old colony have within their reach—succulent clams, delicious bluefish, palatable lobster, tender chicken, mysterious sausages, mealy sweet potatoes, green corn that is sweet and several other items, all obtained from the immediate neighborhood. All this is cooked in steam made from sea weed placed upon a platform of heated stones. What a whetting of one's appetite to see all this preparation for the inner man, while indulging in a glorious feast of friendly reunion and review of our business, social and political experiences of the past year and forecasting our hopes for the future! Verily, the fire-brick men who make the brick for our firesides are a social set and given to hospitality.

Thinking of this goodness reminds us that these things cost, and there must be a treasury. Here we are brought into contact with another good fellow, who, however, does not pass around the hat. To-day all is pleasure, "without money and without price." So we must introduce to our readers another member of the Dighton works, W. Z. Whitmarsh, the Treasurer of the company.



Gideon C. Francis, Manager Dighton Stove-Lining Co.

This gentleman is busy welcoming the visiting friends from New York, Connecticut, New Jersey, Pennsylvania and elsewhere—a numerous crowd—and, with the aid of an army of co-operators, the welcome is most perfect.

It will be seen by the partial list of those present that the ladies lend their good graces to the occasion, and help, as they always do, to make the meeting enjoyable in every way. But here we want to say that they have no part in the cooking or service; it is a brickmakers' feast. May be they did give some quiet tips at home and some nods and winks to their lesser halves, who were doing the work apparently.

W. Z. WHITMARSH, Treasurer Dighton Stove-Lining Co.

The association was represented by B. C. Pierce and C. A. Bloomfield, of the Presbrey Stove Lining Company; A. W. and W. N. Parker, of the Taunton Stove Lining Company; A. H. Winslow, of French & Winslow Stove Lining Company; G. A. Lincoln, Enoch Goff and Nathan Walsh, of the Union Stove Lining Company; Joseph and John Williams, of the Williams Stove Lining Company.

Among the visitors were Mr. and Mrs. R. F. B. Rounds, of Somerset; Mr. and Mrs. J. Walker Parker, Mr. and Mrs. W. N. Smith, Mrs. F. Bicknall, Mrs. Goff and daughter, Mr. and Mrs. J. F. Burt, Mr. Otis Stanley, Miss Emily Parker, Miss Sophia Williams, Mrs. R. A. French, Mrs. G. C. Francis, Mr. and Mrs. Chase, of Dorchester; James Taylor, of Port Monmouth, and many others connected with the stove-lining industry by friendly ties.

After the clambake the usual business meeting of the association was held, and, as might be expected from such an assembly, was very gratifying to all parties.

At 4 p. m. the tables were again spread with fruit, cake, icecream, lemonade and coffee. After these had been served and disposed of, a most hearty vote of thanks by all present was tendered to Mr. and Mrs. Gideon C. Francis for their courtesy and kindness in conducting this enjoyable affair, and Mrs. Francis was also thanked for taking such good care of so good a man. Then three cheers were called for and given with a right good will to friend Francis and his wife, and then the company dispersed, promising and hoping to meet again after the election.

JAMES TAYLOR.

Don't advertise once and then stop. You would not take medicine that way. The first dose does not often help you.

PAVING BRICK BEST.

Detroit's Board of Public Works, in its recent annual report, speaks of the relative value of different paving materials as follows:

For streets where the traffic is not too heavy cedar on concrete forms an excellent pavement at a reasonable cost, and one which is easily and cheaply repaired. It is practically noiseless, but not so easily cleaned as brick and asphalt. The material is at our door, with no costly transportation charges added, and when it is taken into consideration that a street can be resurfaced with cedar once in five years, and thus perpetually kept in order, at a cost not exceeding the interest on the first cost of asphalt surfacing, its value as a paving material in Detroit would seem to be sufficiently established. The first cost of asphalt is heavy, and, while it makes a beautiful street with costly cleanings, repairs are frequent and expensive, and the efforts of the board to induce contractors to repair under their contract guarantees have not always been successful. Brick pavements are smooth, easily cleaned, adapted alike to light and heavy traffic, of medium cost, and, although objectionable on account of noise, are perhaps the best all-round pavements in use in the city to-day, although a sufficient length of time to determine their durability has not elapsed since their introduction into our streets.

OLD BRICK MADE AS GOOD AS NEW.

What is termed one of the most practical exhibits of manufactured articles is the brick cleaning machine exhibited by the American Brick Cleaning Machine Company. It is the invention of Samuel Prescott, of Sutton, Mass., and has never been exhibited publicly before. Builders who have seen the appliance say it is a valuable one. It breaks no bricks and does the work better and twice as fast as the most expert can do it with a hatchet. The tool can also be used in beveling brick, an expensive process when done by grinding upon a stone. The invention consists of an adjustable holder for the brick and a sort of plane, having, besides a scraping blade at one end, a series of steel spikes.

CHAS. A. BLOOMFIELD, New Jersey's Clay Miner.

THE CLAY-WORKER

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A Practical Illustrated Monthly Magazine, devoted to Brickmaking and allied Clayworking Arts and Industries.

THIRTEENTH YEAR OF PUBLICATION.

OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

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Correspondence on all subjects of interest to Clayworkers solicited. All communications should be addressed to
5 Monument Place.] T. A. RANDALL & CO., Indianapolis.

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THE FUTURE.

There is too much of productive possibilities and too much of good sense in this great country of ours to have everything spoiled by a little that is bad. We have had months during which business has not been profitable. It is a long road which has no turning. We believe that the turn is immediately ahead. Those of us who have been looking on in the spirit of discouragement must remember this. Many have been known to sink down during a period of this kind, lose their grip and see only visions of dull times during the rest of their lives. There is sure to be a betterment. We must be ready for it when it comes. This has been a new kind of depression. It came from a lack of confidence. There was plenty of capital in the country ready to be poured into all kinds of business the minute that it was considered safe. The cloud of uncertainty is lifting, the worst of the scare is over, and confidence is returning. There is a future, and now is the time to get ready for it. We wish to suggest to those who want to buy clayworking machinery, now is the time to buy it. To those who wish to make contracts for skilled help, now is the time to do it. To those who will have wares to sell, now is the time to let the world know it. The man who is dead in the shell to-day will have some difficulty in making the world understand that he is alive two or three months from now.

THE MONEY QUESTION.

We give, with much pleasure, the paper of Brother Blair on the money question, which will be recognized as a very able presentation of that side of the controversy now going on. The Clay-Worker attempts to influence no man's vote at the coming election, hence it does not controvert his opinion, but it is due, particularly to our younger readers, to furnish some data, taken from the late circular from the Treasury Department, which bear upon the general question. How far his figures tally with these official figures every reader must judge for himself. First, he assumes that what he calls demonetizing silver destroys one-half the available money of the world. It is too large a job to regulate all the world, hence we give figures only as to the United States. Up to and including 1873 there had been coined, from 1837, when the new ratio (16 to 1) was established, only 6,570,719 silver dollars. In the same time there had been coined in gold $830,012,402, more than 126 times as much. But this does not tell half the truth. Every one of these silver dollars was worth more than a gold dollar. The official circular says: "By the act of 1834 silver was undervalued and was attracted to Europe by the more favorable ratio of 15½ to 1 (Information, page 37). As a matter of fact, hardly a dollar of our standard silver dollars ever went into circulation here. They were worth in gold from $1.02 to $1.05½, and the Spanish milled dollars, worth 98 cents in gold, were used in all commercial transactions, with an occasional 5 franc of about the same value. How the ceasing to coin such a dollar could destroy one-half the available money of the world while 126 times as much gold money remained it is difficult to see.

THE VOLUME OF MONEY AND PRICE OF COMMODITIES.

The official circular from which we quote is fatal to another of Brother Blair's opinions: "If you increase the volume of money you increase the price of commodities." The circular says: "There were in circulation in 1895 $850,087,664 more than in 1873, an increase per capita of $4.89, and increase of 27 per cent." Have prices increased 27 per cent. since 1873? Again, the same official circular gives the highest per capita circulation of war times (1865) at $20.57, which was the highest ever reached before 1881. Brother Blair, however, does not do his own cause justice, for he estimates that if silver is remonetized—meaning, we suppose, freely and unlimitedly coined—it would add $70,000,000 annually to our circulation. The output of our own mines alone last year was $72,051,000. But the free and unlimited coinage scheme does not limit us to our own product, but invites the world to bring its grist to our mill, where it shall be ground at our expense to its advantage, and we are not to be limited to the product of any current year, but all the accumulations of the past are to be coined into standard dollars, worth 100 cents in gold. Mexico can and will bring her 53-cent dollars and have them converted into our 100-cent dollars, else it will not be unlimited. The output of the world last year alone was $226,000,000, not to mention the accumulation of former years. Brother Blair is entirely too modest in assuming that our annual increase of money would be only $70,000,000; it would be more than five times that much to begin with, and it would increase annually, for the world's silver is constantly increasing. In 1870, the year the proposition to cease coining silver dollars was introduced into Congress, our mines yielded only $16,000,000 and the mines of the world only $80,000,000; now we put out $72,000,000 and the world $226,000,000 annually. The free and unlimited coinage of all this silver would make money plenty in the hands of the silver owners, and we could fix almost any price on wheat or brick among ourselves, but what would we do with it when we wanted to trade with other peoples?

THE FALL OF SILVER.

There is one feature of this gold and silver question we have never seen noticed in the discussions on either side. The official circular gives the ratio of gold and silver as a commodity in London for 210 years, with this remarkable result: Only for three years in the 210 was the ratio less than 14½ to 1, while for 106 years it has not been less than 15 to 1, and only three times in the 210 years had it been as high as 16 to 1, until 1874, and now it is 30 1-3 to 1. We venture to assert that no other two commodities known in civil life were ever so constant in their relative values for 187 years. Something else than abandoning its free coinage must be looked for as a cause of the late disparity, especially since in the eighty-seven years preceding this we have coined only 8,031,238 dollars, while in these last eighteen years we have coined 430,790,041 silver dollars, and yet the disparity continues to grow greater every year.

A CASE OF OVERPRODUCTION.

One other fact is worthy of notice. When, in 1870, the proposition was first made in Congress to cease coining dollars altogether, it met with little opposition from any quarter. The mint had been so poor a customer for our silver to put into dollars that even Senator Stewart, himself a wealthy mine owner, favored it. In the Senate he said: "Gold is the universal standard of the world. Everybody knows what a dollar in gold is worth." (Congressional Record, 1874, Vol. 2, Part 2, 1677.) The bill was pending more than two years, and thoroughly discussed. The situation was this: Silver at that time (1870) was 15.57 to 1 in the markets of the world, and there were no indications that it would ever vary more than it had for two hundred years, a little up and a little down. It had been about that figure for four years, the mint using but little of it, for dollars, to be exported as bullion. Even when the bill passed in 1873 the ratio was yet below 16 to 1 (15.92). But from causes we gave in our July number—the discovery of new mines, the invention of improved machinery and of new methods for obtaining it—the output of all the mines of the world rapidly increased. Our own mines, which, in 1870, yielded only $16,000,000, in 1874 yielded $37,300,000, and the ratio went up to 16.17, and it has kept going up until it is now 30 1-3 to 1. Nobody blames the mine owners for wanting the government to make dollars at 16 to 1, but a great many voters are opposed to it. If the Clay-Worker understands the contention, it is simply this and nothing more. We express no opinion nor seek to influence any man's vote. We have thought these figures from the latest official statement would interest our younger readers, at least, and hence we have produced them. Let every man draw his own conclusions, and vote as he thinks will be most promotive of good to his country, and not his own interests merely.

AN OPEN QUESTION.

Another and a very readable communication on the money question is contributed by "Adam Crank." We trust that his next letter will be more specific and demonstrate that he is a crank in name only. He takes issue with Mr. Caldwell as to the value of the so-called 53-cent dollar. We think the latter gentleman capable of fighting his own battles, but will suggest to "Adam" that the silver dollar that is to be, if free silver prevails, will be a full legal tender, and consequently will be worth 100 cents to the mine owner, at least so far as the payment of wages to employes and the liquidation of debts. This fact will tend to increase the value of the silver in a dollar, but whether it will bring it to par with gold and keep it there is not so clear. Perhaps "Adam" will enlighten us on this feature in his promised communication in the October Clay-Worker.

BRICK BUILDING.

On a preceding page the reader will find an interesting article on brick building by Mr. Morrison. An architect who has given a good deal of attention to dwelling house construction, and who has had enough experience to understand the disposition of people with respect to the use of material, says that most people build houses of wood because they feel that they can make more show for the money than they can with brick; that it is the desire of most people who build a dwelling house to ape the form of arrangement and construction of wealthy neighbors and acquaintances. Not having enough money, they spread on a very thin, pretentious veneer of wood. On the other hand, this architect says that many of his brothers are responsible for many of the shoddy frame houses which are built. Many architects like to get a thin glitter of popularity from the building of freaks in wood. Our friend says that he is sure that many who build frame houses could be led to build in brick if an architect of strength and tact should present the really good reasons for building of brick. The common expression, "A brick house, with stone foundation and slate roof," carries with it the suggestion of dignity, strength and stability, and if a man is really after character and the good opinion of his townsmen there is nothing which he can do in the house building line which will develop more of quiet esteem than the building of a substantial, attractive brick house. A well-built brick building will be in a good state of repair long after many of our frame monstrosities have gone into decay. If one is disposed to build a well-designed, relatively plain, interesting structure, rather than something which is tawdry, pretentious and common in wood, he will find that the satisfactory brick building will cost little more than the temporary display in wood. As the community gets older there will be less of this cheap building. As the rate of interest gets lower people will look to see that their investments are more substantial. As soon as any one thinks about it, he is reasonably certain to build a brick house. It is the tawdry, thoughtless builder who so readily runs to wood.

THE GUARANTY BUILDING.

We present on the first pages of this number an article on the Guaranty Building in Buffalo, together with several illustrations. It was designed by Mr. Louis H. Sullivan, architect, of Chicago. The terra cotta work was furnished by the Northwestern Terra Cotta Company. From every standpoint this is a very creditable piece of work. From an artistic point of view one must place it at the head of tall buildings in America, which means at the head of the commercial structures of the world, for no place else has commercial building been carried to the state of excellence in which we find it in this country. Constructively, this building is admirable. It is one of the great object lessons which must attract people toward the larger use of clay. The fact of clay having been handled in this way, and in connection with this very successful building, must bring this material into yet higher esteem. It is well to understand that it is the public demand which will make the use of terra cotta more general in all our buildings. It is not many years since in the history of clay products when a building of this kind would have been an impossibility. From the new requirements of the commercial world has developed a new method of building construction, and growing out of this there comes, in a few instances, the proper recognition of the functional demands of work of this character in its composition and decoration. The Guaranty Building clearly illustrates such a development.

A NEW LIGHT.

We believe that by the time this number of the Clay-Worker reaches our readers a large number of them will have seen the light which is dawning in the business horizon. During recent months businesss life has suffered paralysis. The business people of the country have been waiting to see what would be the outcome of the judgment of the voters with respect to the property rights of all. It is now the view of many that this question is reasonably sure to be settled in a manner best suited to our business interests. Some of our friends, representing Eastern loan concerns, have been restrained during recent months, having been directed to withhold applications for loans. Within the last few days there has been a marked easing of this situation in this community. These gentlemen have been informed by their principals that the situation is very much improved, and that they now regard it as safe to once more begin making loans. The better sense of the community is asserting itself, and the wild cries of agitators are doing their work in bringing about a compact organization for the defeat of the reckless element, regardless of party lines. It is safe to say that when issues are squarely made, as they have been by the St. Louis and Chicago conventions, that the people are reasonably certain to decide aright. One's faith is frequently shaken in this proposition by the dangers ahead but the old proposition that right is right and must prevail is, we feel, sure to be demonstrated again.

BRICKMAKER POLITICIANS.

It is reported that D. V. Purington, Chicago's leading brickmaker, is stumping Illinois for sound money. Here in Hoosierdom, "Jesse" Adams, "the brickmaker to the President," is laboring effectively in the same cause. We believe we have neglected to announce that "Jesse" was recently elected President of our Board of Trade. By the time this issue of the Clay-Worker reaches our readers, Cincinnati's boss brickmaker, J. Milton Blair, will be filling the same position for the Chamber of Commerce of that city. He and his brother "Joe" are hustling for McKinley, notwithstanding "Burr's" desertion to the silver cause, as related in another column. Burr has been trying to convert his steadfast friend, Anthony Ittner, of St. Louis, to that ism, but in vain. Father McAvoy is looking after his end of the Quaker City politically, while the boys are running the brickyards. Frank is running the Phoenixville Paving Brick Plant to its full capacity, and has but few brick on the yard. At Cleveland, ex-President Eggers is in the thickest of the fight. Being a personal friend of Governor McKinley, it may be imagined that he is leaving no "stone unturned" in the latter's cause, while his neighbor, Mr. Richardson, is directing his efforts in the opposite direction. But we cannot go on with the enumeration, for the list would include nearly every representative brickmaker of the country, for all of them are active in politics, either upon one side or the other. None are on the fence, so far as heard from.

THE SOUND MONEY CONVENTION.

Indianapolis is noted as a city of conventions of all sorts. One of the most remarkable political conventions ever held in America was held in our city on the 2d and 3d inst. It was remarkable, first, in its personnel, being composed very largely of men who are eminent not only in the party to which they belong, but in the Nation. There was not one who could be ranked with the ward worker or office seeker, who cuts so prominent a figure in most political conventions. Its deliberations were dignified and business-like, and so many able speeches were never before made in any political convention without being interspersed with occasional weak ones. In tone they were all distinctively Democratic as relates to all issues which differentiate the Democratic party from the Republican, showing no quarter to what they regard as Republican political heresies, indorsing only so much of the Republican platform as opposes the free coinage of silver, though not laying as much stress upon bimetallism.

BREAKING DOWN SECTIONAL LINES.

But, after all, the coinage question seemed secondary in all the speeches and resolutions to what the delegates denominated the paramount issue before the American people—the supremacy of law. They held that the country could survive any financial policy, free silver or no silver, but it could not exist if the President might not enforce every federal law in any State and the Supreme Court's decision might not be final until reviewed and overruled in the regular way; hence they seemed to attach more importance to that question than to the money question, though ostensibly called to consider the money question exclusively. It must have been reassuring to the thinking people of the Nation, as they read the proceedings every morning, to find the Buckners of the late rebel army shoulder to shoulder with the Palmers of the Union army, defending, so eloquently and persistently, the very principle of government the South went to war to overthrow. This, with the eloquent denunciation of the spirit which arrays one section against another, and which would divide our people into classes whose interests are antagonistic to each other, was regarded by conservative men of all parties as the most noteworthy feature of the convention. It nominated a ticket and adopted a platform. With these the Clay-Worker has nothing to do, but it cannot well refrain from commending that truly American patriotism which discountenanced all appeals to classes to array themselves against each other, if there can be classes where all are free and equal.

TRADE LITERATURE.

The Jeffrey Manufacturing Company, Columbus, O., has out a new and very handsome catalogue of their famous elevating and conveying machinery, which includes all kinds of chain belting. They make a specialty of machinery and appliances for mining and handling coal. It is well-nigh marvelous how skillfully this and similar material is handled by their mechanical appliances, most all of which operate automatically. Their clay conveyors and elevators are also very effective. If you want anything of the sort write them for particulars.

We are indebted to the Scientific Publishing Company, 253 Broadway, New York, for a copy of Vol. IV of "The Mineral Industry," which contains a vast amount of very valuable information relating to the development of all the mineral resources of America. It is undoubtedly the most valuable and exhaustive statistical work published in this country, and will be found invaluable alike to the engineer, chemist, metallurgist and others who desire to know the quantity and value of any or all of the mineral products of the United States. It is a large book, substantially bound in cloth, and will be sent by the publishers to any address on receipt of price, $5.

FOREIGN BUSINESS.

In certain of our high grade clay products and clayworking appliances there is an opportunity for foreign business. In the West Indies, in times of peace, in Mexico and the Spanish American countries we should be looking for business. The governments of foreign countries have been instrumental in developing foreign business for their people. The time must come when our government must do the same thing for our people.

A SOCIAL CALL.

Mr. and Mrs. W. A. Eudaly, of Cincinnati, graced the Clay-Worker sanctum with their presence on the 8th inst. It was not a business trip, but just a social call incident to a visit to relatives in this vicinity. "Brother" Eudaly, be it known, was born right here in Hoosierdom, in a little log cabin on his father's farm. Both the farm and the cabin disappeared long years ago, just how many he refused to say, but as the site is now in the heart of a city having nearly 200,000 inhabitants, the reader may form his own opinion.

OBITUARY.

Mr. Hordee Leverett Trammell, of Rome, Ga., father of G. W. Trammell, of the Morrison-Trammell Brick Company, died Sept. 2. Mr. Trammell was born in 1829, and had been engaged in brick manufacturing and building for thirty years. He was a brave, generous hearted man, dearly loved by his kindred and friends, and enjoyed the esteem of all his acquaintances. His death is deeply regretted by all who knew him.

AN ANSWERED QUESTION.

Throughout our glorious land
There's a question now at hand,
The settling of it worries great and small.
Is it silver? Is it gold?
Is our money sound and cold?
Some complain that they have none at all.

Don't worry, my good friend,
Times are on the mend,
And the secret of success never dies.
There's no silver, there's no gold,
Nor will anything be sold,
Unless the ones concerned will advertise.
—F. C. Voorhies, in Fame.

A GREAT ADVERTISEMENT.

Old Noah sat upon the deck
And watched the beasts come on,
From six o'clock a. m. until
The day was nearly gone.

And he'd been keeping tab a week,
As new ones came each day,
By two and two from everywhere,
Which Noah stored away.

He knew he soon would have a load,
Just as he had it planned,
And that he'd get away on time
And be the first to land.

Then Noah smiled in pleased content,
And, feeling downright glad,
He took the Mesopotamia Times
And read his cute "Want ad:"

"Wanted—At once, a pair of beasts
Of every living kind,
In good condition, and I want
The best that I can find.

"I pay the highest price, in cash,
For stock without a mark
Or blemish when delivered. Please
Apply at Noah's Ark."

Old Noah laid the paper down,
And, smiling, said: "Bedad,
I never would have got a load
Without that little ad."
—W. J. Lampton, in Fame.

THE VERY NEW WOMAN.

She's all that one could wish for; she's healthy and all that.
Her hair is rather thin, but then her cheeks are round and fat.
There's a sweet, bewitching dimple in the middle of her chin;
And the thing that most distresses her may only be a pin.

Her lungs are truly lusty and her eyes are clear and bright;
For she never burns the midnight oil—she's not so erudite.
She's bound to rule the universe, especially man;
Already he's her willing slave—dethrone her if you can.

Perplexing thoughts contract her brow; some problem she would solve;
Just how to raise her trampled sex no doubt she would evolve.
Her long-pent-up emotions burst in one crescendo shriek—
She's just a tiny baby-girl—
Born
Last
Week.
—Ella Starr, in Judge.

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Books for...

Brickmakers.

IT IS pretty generally conceded that wonderful progress is being made in the ancient and heretofore unprogressive art of brickmaking. Among the best evidences of this is the fact that the brickmaking craft is no longer without a literature of its own. There are now some good practical books treating on the manipulation of clay—the making, drying and burning of brick. The list is not so large but that every brickmaker can afford to have them all. Get them and read them.

"BRICKMAKERS' MANUAL," Morrison and Reep	$3.00
"BRICKMAKING AND BURNING," J. W. Crary, Sr	2.50
"TABLE OF ANALYSES OF CLAYS," Alfred Crossley	1.00
"VITRIFIED PAVING BRICK," H. A. Wheeler, E. M	1.00
"PRACTICAL FARM DRAINAGE," J. J. W. Billingsley	1.00

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, **ST. LOUIS, MO.**

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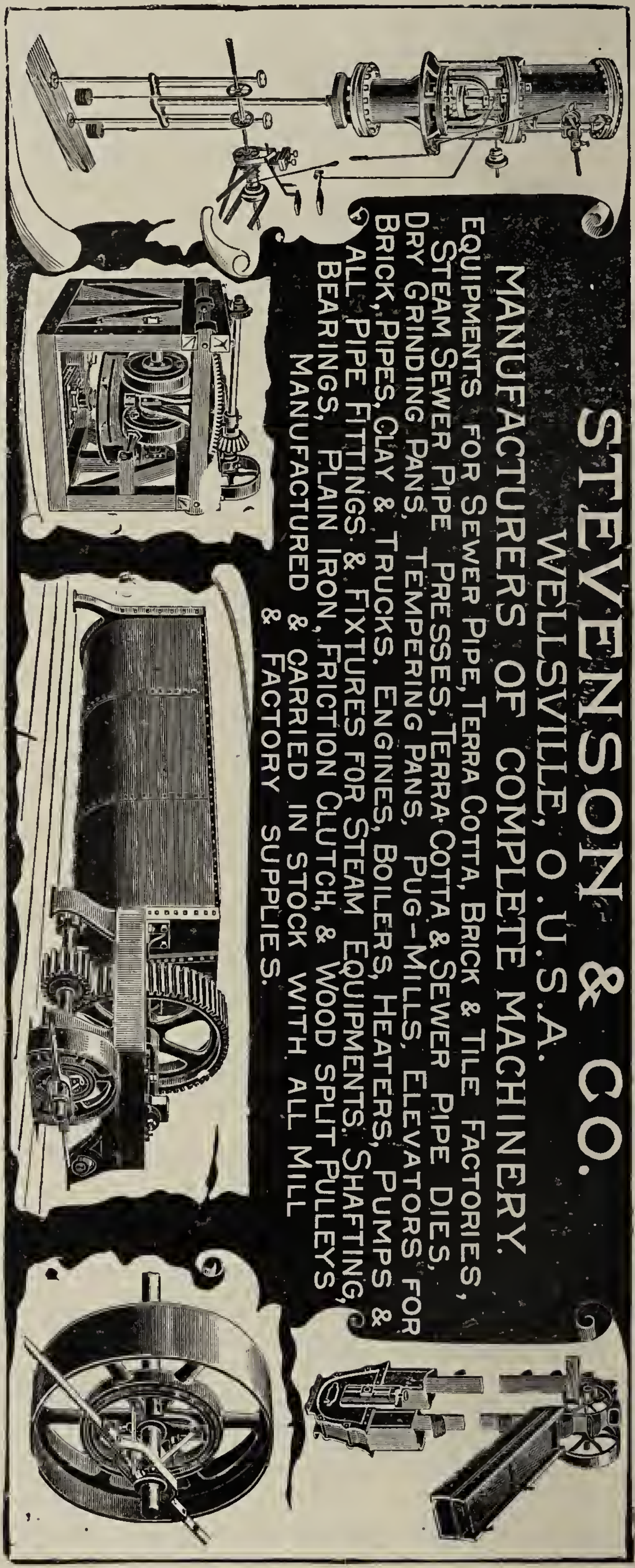
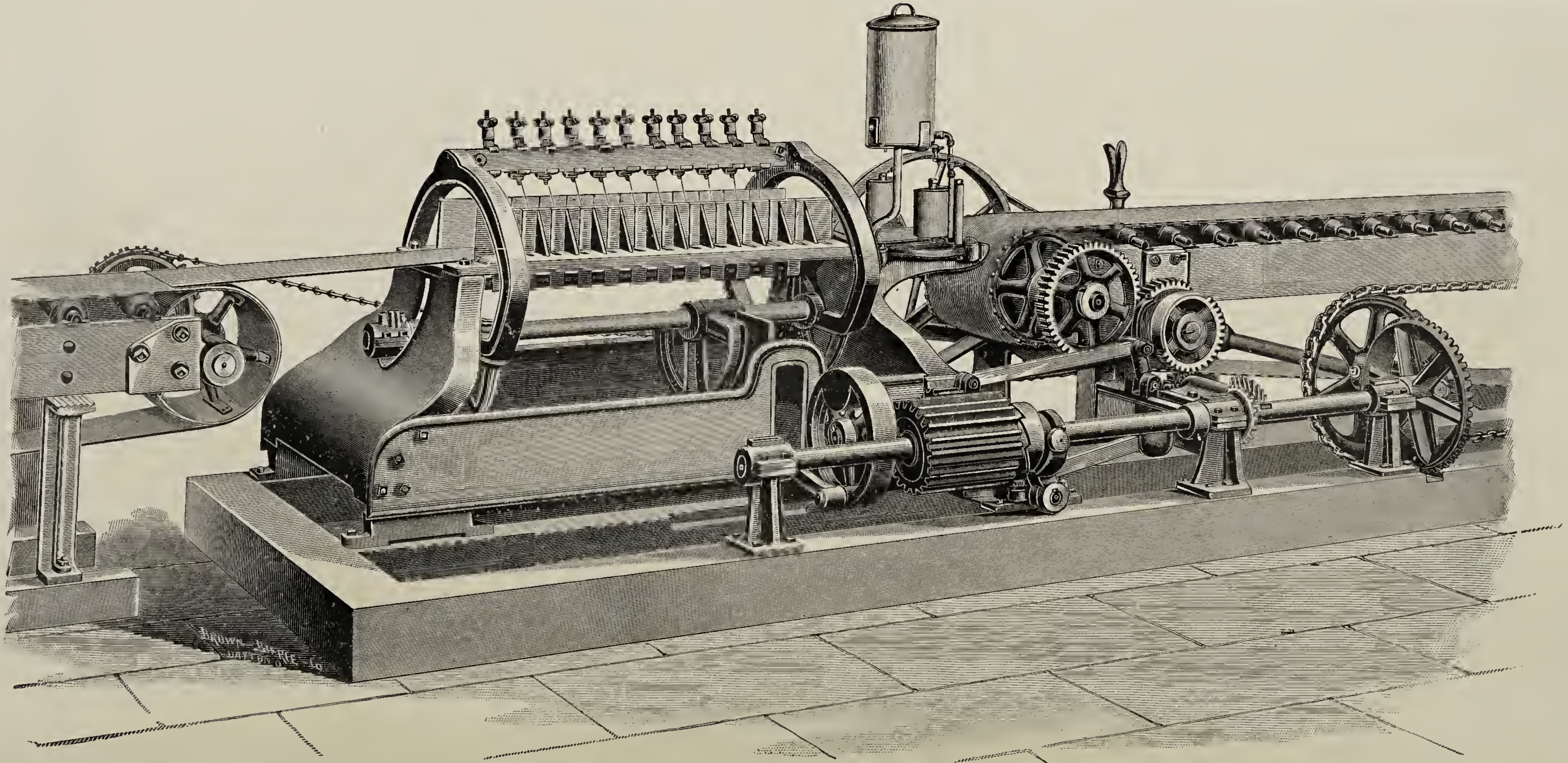


STEVENSON & CO.
WELLSVILLE, O. U.S.A.
MANUFACTURERS OF COMPLETE MACHINERY.
EQUIPMENTS FOR SEWER PIPE, TERRA COTTA, BRICK & TILE FACTORIES,
STEAM SEWER PIPE PRESSES, TERRA COTTA & SEWER PIPE DIES,
DRY GRINDING PANS, TEMPERING PANS, PUG-MILLS, ELEVATORS FOR
BRICK, PIPES, CLAY & TRUCKS. ENGINES, BOILERS, HEATERS, PUMPS &
ALL PIPE FITTINGS & FIXTURES FOR STEAM EQUIPMENTS. SHAFTING,
BEARINGS, PLAIN IRON, FRICTION CLUTCH, & WOOD SPLIT PULLEYS
MANUFACTURED & CARRIED IN STOCK WITH ALL MILL
& FACTORY SUPPLIES.

JUST THINK OF IT

The Most Perfect and Wonderful Piece of Machinery in their Whole Brick Plant.



Raymond's Side Cut Automatic Table.

Messrs. C. W. Raymond & Co., Dayton, Ohio.

P. O. Verona, Pa., July 9, 1896.

Gentlemen—We take pleasure in saying that we are perfectly satisfied and well pleased with your Automatic Cutting Table furnished with our second Daytonian No. 1 Brick Machine. Having confidence in your ability to turn out first-class work we purchased your Automatic Cutting Table and in so doing we were not disappointed, as we have every reason to believe it the only perfect one on the market. We therefore gladly recommend it to do splendid work and to accomplish all that you claim for it. It is no experiment, as our experience for the last five months has been such as to prove to us beyond a doubt that it is a pronounced success. We look upon it as the most perfect and wonderful piece of machinery in our whole Brick Plant and we express our wish that your efforts may be crowned with a rich reward.

We will be pleased to answer any inquiries we may receive.

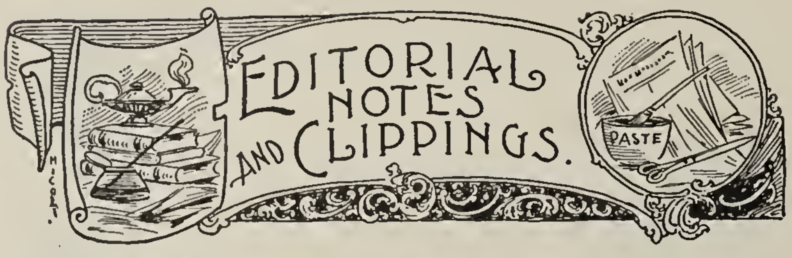
Yours very truly,

(Signed) BLATCHFORD, MEEDS BRICK CO.
H. P. Meeds, Jr., Treasurer.

C. W. RAYMOND & CO.,

Send for Catalogue.

DAYTON, OHIO.



EDITORIAL NOTES AND CLIPPINGS.

A new tile factory has been started at Velasco, Tex., by M. Huntington.

Mr. Mauch, of Austin, Minn., will open a new brickyard at Dexter, Minn.

Chamblin & Murray is the title of a new firm organized at Paducah, Ky., for the manufacture of brick.

I. N. Shugart, of Rochester, is organizing an enameled brick company to manufacture brick at New Brighton, Pa.

The Jones Brick Company, Knoxville, Tenn., which has been shut down for about a month, has resumed operations again.

The East End Pottery, at East Liverpool, O., has been purchased by E. J. Owen and G. Trenele, who will operate same.

J. K. Mills is erecting a new brick plant at Braddock, Pa., and expects to have it in operation the latter part of the month.

The Freeman Fire Clay Company, at Freeman, O., are constructing a new thirty-foot down-draft kiln at their upper factory.

The Griffin Clay Manufacturing Company has been incorporated at Griffin, Ill., by F. A. Griffin, A. R. Batley and C. F. Hemenway.

The Laramore Brick and Tile Company's new plant at Alvin, Tex., is fast nearing completion, and will be in operation in a short time.

The new brick and tile works at Creston, Ia., will soon be completed, and manufacture of the products will be started in a week or so.

The Pennsylvania Enameled Brick Company, Oaks, Pa., advise us that they desire to purchase a second-hand dry press, also a hand press.

T. M. Cull, Charlestown, W. Va., advises us that he would like to purchase a second-hand dry pan, 8 or 12 feet diameter, for crushing fire clay and shale.

Blatchfords & Co.'s brick works, near Oakmont, Pa., on the Allegheny Valley Railroad, were destroyed by fire Tuesday night, Aug. 25. Loss not ascertained.

The Ohio Land and Clay Company, Columbus, O., advise us that they desire to purchase a dry pan instead of a dry press, as stated in the August Clay-Worker.

The Edinburg (Va.) Manufacturing and Mining Company have completed their new plant, and will commence manufacturing brick at the rate of 40,000 a day.

Jos. Bruck & Sons, Peru, Ind., write that they are in the market for thirty thousand first-class sidewalk brick, and would be glad to correspond with manufacturers.

The works of the Congo Fire Clay Company, at Empire, O., which were destroyed by fire last winter, have been rebuilt, and will be in full operation in the near future.

Watson & Simpson are building an addition to their sewer pipe plant at Crawfordsville, Ind. While they are not saying much about it, their business is growing steadily.

The Great Western Fire Clay Company, of Toronto, O., have in the course of construction a new thirty-foot down-draft kiln for the more convenient handling of large size sewer pipe.

Frank Koplinski, an employe of the Standard Brick Works, Milwaukee, Wis., was killed by the caving in of a clay bank. Quite a number of men were working with him, but the rest managed to escape.

The Crossley Manufacturing Company has been incorporated at Trenton, N. J., by Jos. and David Crossley, A. E. Hunt and Clifford Coombs, to manufacture brick and tile. Capital stock, $100,000.

The brickyard of Marcy & Gardner, at Amherst, Mass., was damaged by fire to a slight extent Aug. 26. Men are now at work rebuilding the burned section, and the plant will soon be running full time again.

The large brick works of J. M. Leach & Co., Kokomo, Ind., were partly destroyed by fire early in the morning of the 10th inst. Origin of the fire is unknown. The loss, which is estimated at $3,000, is covered by insurance.

Jos. Cherry will establish a new brick plant at Dracut, Mass. As Mr. Cherry is already connected with a successful firm of brick manufacturers at Amesbury, Mass., there is no question as to the success of the new yard.

The Conococheague Brick and Earthenware Company has been incorporated at Hagerstown, Md. The incorporators are Victor, David K., C. F. and V. M. Cushwa and M. E. Cullen. The works will be located at Williamsport, Md.

Albert E. DeRosay, of Plaistow, N. H., has carried off the prize of the season in the shape of a 2,000,000 order of brick, which he has just finished shipping to Boston. It is said to be the largest order ever turned out in that vicinity.

Our able contributor, R. G. Fraekelton, like all forceful men, has a hobby. He is a bird fancier, and has a fine line of homing pigeons, and will be pleased to correspond with any of our readers whose fancy leans in the same channel.

Jno. J. Maloney, Superintendent of the Basic Brick Company, Johnstown, Pa., and Miss Maggie Moore, of the same place, were married in that city Sept. 1. After a short trip the young couple will go to housekeeping in their own home.

The Markle Fire Clay Company's works, of Cloverdale, O., which have been closed for some months past, are undergoing extensive improvements preparatory to resuming operation about Sept. 1, under the management of Kennedy, Kling & Co.

Henry T. Thorpe, on whose land near Terre Haute, Ind., a fine deposit of clay and shale has been found, has interested a number of capitalists with him, and announces that a pottery will be erected on the Thorpe farm in the not far distant future.

Geo. Foley, of St. Paul, Minn., has purchased a large tract of land near Mendota, on which he contemplates the erection of a plant for the manufacture of brick, as the clays in that vicinity are said to be especially adapted for fine building brick.

McGarrity & O'Brien, formerly of Great Barrington, Conn., have purchased the old brickyard at Torrington, Conn., and will put in improvements which will make it a modern plant. They will commence to make brick as soon as they can get the plant in shape.

P. G. Wikel, Superintendent of the Wigton (Pa.) Fire Brick Works, was found dead in his bed Aug. 20. He had taken dinner with his family, and was apparently in the best of health when he retired. Death is thought to have resulted from neuralgia of the heart.

Wm. G. Pierson, the well-known manufacturer of sewer pipe, died at his home in Brooklyn, N. Y., from the effects of an accident he met with several months ago, when his carriage was run into by a trolley car. Mr. Pierson was fifty-one years old, and had been in the sewer pipe business twelve years. Mrs. Pierson and two sons survive him.

The well-known firm of A. M. & W. H. Wiles, brick machine manufacturers, of Grassy Point, N. Y., dissolved copartnership on Aug. 24, but their extensive plant and business will be run the same in the future as in the past, and with the same management as heretofore. The firm simply dis-

[CONTINUED ON PAGE 226.]

WANTED:

To Give
Information About,

The "Monarch" Brick Machine, (Horizontal,)

It is big, strong and simple. Weighs almost 12,000 pounds.

Has double pug-mills giving 14 feet of tempering capacity; double presses, which produce the most powerful pressure of any machine, and being "all in the mud," don't wear a bit; bearings where clay **cannot** get into them.

It is the only "soft mud" machine put on the market for years that had a new **fundamental** idea in it. All others have been improvements or modifications only of fundamentally **wrong principles.** Fully explained in circular. Seventy-five in daily use.

The "Iron Quaker" Brick Machines, Horse and Steam Power.

For 15 years, the acknowledged leading Upright Machines. Comparitively low in price. List of hundreds in circular.

The "Wellington" Mould-Sanding Machine.

A new one. The simplest, best, and at same time, lowest priced.

Ball Bearing Brick Barrows.

These good things don't need even pushing along. Load them, balance them, and then a slight inclination carries them along. Wheelers increase their days work 20 to 30 per cent. Order a sample one.

Double-Deck Pallet Trucks. The best of all.

Moulds. All kinds. Machine; hand; shapes; lined, etc., etc.

Cast Iron Dryer Cars. The best pattern. Roller bearings. Low prices.

Kiln Castings. Doors and frames. Furnace fronts. All kinds grate bars.

FOR SALE.

Odd sizes of molds. New. Not been used:
5 Molds, 8¾ x 4¼ x 2⅜ in. 9-16 in. partitions.
20 Molds, 8 13-16x4 3-16x2 7-16 in. 9-16 in. partitions.

Second-hand, but used a few days only:
10 Molds, 9½ x 4⅝ x 2¾ in. 9-16 in. partitions.
19 Molds, 9½ x 4 9-16 x 2¾ in. ½ in. partitions.

All of above are six-brick Machine Moulds. Cherry.

Also, 10 3-brick hand molds, new, 8¾ x 4¼ x 2½ in.

Elevators, Dump Tables, Sand Barrows,
All Styles of Trucks, Dump Carts, Represses,
Disintegrators, Engines, Boilers,
Shafting, Pulleys, Hangers, Etc.

The Wellington Machine Co.,
Wellington, Ohio.

EDITORIAL NOTES AND CLIPPINGS.—Continued.

solved so as to form an incorporation, and is now known as the A. M. & W. H. Wiles Company. The sons of the two former partners are members of the new company. The firm is known all over the United States and in foreign countries as well, having been in existence over forty years, while the machine shop has been established fifty years.

A. Thaison, at Laredo, Texas, is at present running his brick machine to its full capacity. He will furnish the brick for the San Antonio sewer works now under construction. He has already shipped about 300,000, and will continue for the next three months.

Chas. Lemke, one of the pioneer brick manufacturers of Wisconsin, died at Cedarburg, where he has been making brick and tile for the last twenty years, on the 2d inst. Mr. Lemke was born in Mecklenburg-Schwerein, Germany, sixty-three years ago, came to America in 1854, and went to Wisconsin, in which State he has made brick and tile ever since.

Our venerable correspondent, Mr. J. W. Crary, Sr., of Bluff Springs, Fla., writes, under date of Aug. 31, that his thermometer registers 75 degrees, which, he says, is 20 degrees below their regular summer heat, and adds: "If you suffer from heat in summer, come here; if from cold in winter, come here; if sick, come here. So come here anyway, if you want to be happy."

The Petersburg (O.) Fire and Brick Company, through their attorney, P. C. Booth, have filed a suit in the Common Pleas Court against James P. Withrow, of Pittsburg, for the sum of $6,007.83, claimed as due for brick furnished during the repairs at Etna furnace. Interest is claimed on $1,800 from May 15, 1896, and $4,307 from July 3, 1896. The plaintiffs asked for an order of attachment, which was issued.

On account of the general depression in business the following sewer pipe works are shut down awaiting better times: Mack Manufacturing Company, New Cumberland, W. Va.; McMahan, Porter & Co., New Cumberland, W. Va.; Freeman Fire Clay Company, Freeman, O.; Ohio Valley Fire Clay Company, Toronto, O.; Jefferson Fire Clay Company, Toronto, O.; Markle Fire Clay Company, Cloverdale, O. All brick works running.

In a recent letter, John Carter & Son, of St. Catharines, Ont., say: "We are having quite a busy season here, and feel as if we will be able to make some money. We have as good and convenient a yard as we have seen, but are troubled with small stones in our clay, and would like to adopt some method of extracting them, especially from the clay out of which we make tile. Would like to have some of the Clay-Worker scribes tell the comparative cost of burning brick with wood and coal. We have used wood so far, but are thinking of trying coal. We look on the Clay-Worker as an old friend, and inclose herewith our subscription for the following year."

The offices of the Colliery Engineer Company, proprietors of "The Colliery Engineer and Metal Miner," "Home Study," and the International Correspondence Schools, in the Coal Exchange Building, Scranton, Pa., were partially destroyed by fire on Sunday morning, Aug. 30, 1896. Their printing plant was in another building, and they had reserves of all instruction and question papers, drawing plates and other supplies and stationery used in the schools in still another building, so that their business will not be seriously interfered with. "The Colliery Engineer and Metal Miner" and "Home Study" will be out within a few days of the usual time, and they are again conducting the instruction in their schools as usual. They have secured quarters on the three upper floors of the new Mears Building, corner of Washington avenue and Spruce street, Scranton, and are now prepared to enter new subscriptions to their publications and also to enroll and commence promptly the instruction of new students, as before the fire.

PACIFIC COAST NEWS.

THE CLAY INDUSTRIES on the Pacific Coast were never in a more demoralized condition. Building operations are practically at a standstill and little or no sewer work is being done. Taken at its best the Coast is not a great field for clay workers being, architecturally speaking, a wooden community. There are not more than a dozen brick residences in all of San Francisco, and the fire proof buildings can be counted on the fingers of both hands. Prices for clay products, including brick, tiling terra cotta, pipe and pottery, are at the lowest notch and many establishments are going to the wall. It has come to be a question of the "Survival of the fittest," or at least of the survival of those who have sufficient reserve funds to carry them over the depression.

Among the plants that have failed or closed down are Steigers in South San Francisco, the Stockton Pottery & Terra Cotta Co , A. Maddox, Sacramento, Tracy Bros., of the Mission, San Francisco. The condition of the brick business may be measured by the failure of the Union Pressed Brick & Terra Cotta Co., at Vallejo, the plant of which was sold to Gladding & McBean at five cents on the dollar of its original cost. Operations will not be resumed at Vallejo. The Vallejo plant has not been worked for three years and the City Trustees there have indicated their willingness to encourage the industry, but trouble would be experienced in the transportation of an adequate amount of clay to the works.

The eighth annual picnic of the Brickhandlers' Protective and Benevolent Union of California, was held on Aug. 16th. A large crowd was present and spent an enjoyable day in the Oak Groves and pretty lodges of the Schuetzen Park. The officers of the Union are: President, C. P. Ellegard; Financial Secretary, P. J. Schmidt; Recording Secretary, C. Andrasen; Treasurer, Wm. Bohle; Trustees, Charles Bund, Peter Olsen and Henry Feltman.

N. Clark & Sons' Pottery, at Alameda, Cal., shut down temporarily the middle of last month, throwing forty men out of employment. They have as much stock on hand as they can handle and are only filling contracts which they have under way.

Messrs. Dodd, Lemke & Rankin, of Albuquerque, New Mexico, were in Cerrillos, looking over the ground with a view of establishing a large brick yard with modern machinery in that vicinity.

The Oregon Pottery Co. is shipping clay from Troutdale, Oregon, to Portland. They have a contract with W. P. Pelton to furnish the clay for a term of years.

The first kiln of brick burned by R. C. Faulkner, at Long Beach Cal., turned out 178,000. He reports the clay in that locality the best he has ever seen.

George Steiger, of San Jose, attended the sale of the property at their Redwood City, (Cal.) Pottery, and at that time stated that he thought the works would resume in a month.

Three brick yards are now in active work at Nelson, B. C., and brick is rapidly taking the place of wood for building purposes. The brick sell at about $8 per thousand.

The pottery at San Pedro, Cal., is turning out a large quantity of useful and ornamental articles of superior quality.

The State Reform School Brickyard, at Whittier, Cal., has just finished burning the first kiln of brick, number 300,000. They are to be used in erecting some new trades' buildings and are a great saving to the state.

The first extensive shipment of kaoline from the big beds east of Ashland, Oregon, is now being made. The Pacific Pottery Co., of Portland, has contracted for the delivery of twenty tons of the kaoline for use in the manufacture of pottery. There are almost unlimited quantities of the material on the Dead Indian Mountain, twelve miles east of Ashland, and should the test prove satisfcatory to the Portland Co., a pottery plant may be established near the deposit.

A new brickmaking machine has arrived from Chicago, for the pottery at Antioch, Cal. It is a Boyd pattern, having a capacity of 3,000 per hour.

Drying Brick Safely With no Cost for Fuel.

EDWARD D. EMERSON, Prest.

WARREN H. SANFORD, Agent

SALES SUBJECT TO STRIKES AND ACCIDENTS
OR CAUSES BEYOND OUR CONTROL.

Somerset & Johnsonburg Mfg. Co.

CAPITAL $400,000

MANUFACTURERS OF

VITRIFIED PAVING BRICK,
FIRE PROOF BUILDING BRICK,
ENAMELED BRICK.

SOLE AGENTS & OWNERS IN
U.S.A. & CANADA
OF THE JOHNSON PATENT
BRICK MAKING MACHINERY.

FACTORIES.
SOMERSET, MASS
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FIRE BRICK, CUPOLA & FURNACE LININGS.
CAPACITY 20,000,000 BRICKS PER ANNUM

PRINCIPAL OFFICE SOMERSET, MASS.
BOSTON OFFICE, 166 DEVONSHIRE ST
BOSTON TELEPHONE 2757.
LONG DISTANCE TELEPHONE AT SOMERSET

Somerset, Mass Aug. 26th. 1896.

S. G. Phillips, Esq., Rahway, N. J.

Dear Sir:--Replying to your enquiry regarding Dryer. We are pleased to say the dryer has now been running five weeks and so far has given the best of satisfaction, drying our pressed brick for enameling in 10 hours, size of the brick (9"x4½"x3") without warping or checking.

A vacuum gauge to the exhaust, that heats the dryer, shows our variable cut-off engine to be made condensing, and it is safe and not over estimated in any point of view to say, the dryer is so far working all right, and costing us no extra power, or firing, as we also do our former work and yet are saving 20 per cent. in our fuel.

We consider the dryer to be doing all if not more than promised and hope soon to add to our present capacity another two track section.

Yours truly,
SOMERSET & JOHNSONBURG M'F'G. CO.,
By Warren H. Sanford, Treas.

See "ad." on Page 238.

THE NEW YORK MARKET.

AUGUST 31.—Fine brickmaking weather and only two yards molding, and one of them will run out the last pit on the 8th inst.

I was in hopes, when the yards started in April, that my remarks in the Clay-Worker about an early start would mean an early quit would be without foundation, but they have proven too true in this place. One of the yards has all of its brick burned; in fact, all who have ceased molding could have finished burning this month, but are letting the last kiln stand for cooler weather.

The returning sunshine of prosperity certainly did not throw its rays over the brick industry to an extent to warrant any better, if as good, returns as the previous year or years. The unduo haste to start, in the face of an effort by some to get all to agree to wait till the middle of May, is beyond explanation. Some of the causes given were childish, and only went to show the lack of sound business knowledge. If a manufacturer was depending on tho local trade to help him out, he certainly knew that a comparison of the stock under the shed and his books would show if the demand was better or that he had stock enough on hand to meet the demands of his customers as compared with preceding seasons. At the present date there is a yard here that has stock enough of the make of 1895, unless trade increases, to supply the demand until new brick are ready in 1897, not to say anything about the kilns mado this season, and the men are considered close observers of the trade. Without a doubt there was a current of thought among the brickmakers in the early part of the year, which they did not give open expression to—the feeling that "something" would occur that would make 1896 a fine season, and he would begin early, so that he could take advantage of the improved market, without due consideration of what effect his course, if others as well should be trying to take advantage, would have on that unknown "something."

There was only one thing certainly that they could have any hope from, and it was like the hope of a drowning man grasping at a straw—that straw was the formation of the Consolidated Brick Company. The course of each should havo been to strengthen the structure, especially those who were stockholders, by a reduced output. The opposite course was pursued. One would think that, as the Chinese have in the past used "noise" to scare their antagonist, so the formation of a company to benefit them was all that was required to reach the desired end; certainly if such were the views entertained, they have had time and cause since last May to become disabused of any such notion. There have been means and methods used during the past month that should cause each and every stockholder in the Consolidated Company to put his shoulder to the wheel and push for all he is worth to make the organization a success. A fair fight is an honorable one. When the truthful line is left it would seem as if it should "consolidate" all to a renewed effort in the fight.

—The Peculiar Condition—

Of some manufacturers as regards room under shed and shipment occurred about the first of the month, and if proof was needed to show what "some" have claimed for the market this case makes a bad showing for their claim. The supply and demand is so nicely adjusted that the same grade of brick being in market, the one held by commission men will be bought by dealers, while the other held by the company will lay at the dock waiting sale, in some cases a month. Three members of the company required to ship more brick; in other words, their boats were held in market and they needed room. They asked permission of the company to allow them to load extra boats and send them in to the commission men for sale, as the dealers were buying stock from them. They were granted the privilege to do so. The reports which came from the transaction were numerous, and it would seem that it would have been better to have let the matter rest there than to publish it abroad in a garbled form, especially as the parties, as well as the shipper, knew the cause of shipment.

Aug. 1, in the leading paper given to all matters relative to real estate, the following appeared: "The feature of the market has been the practical collapse of the Association of Brick Manufacturers. We understand that this week there have been several important withdrawals from the Association, and, while the Association will probably continue in name for the remainder of the season, as an actual factor in the market it is practically at an end. With the collapse of the Association has come a general demoralized condition of the market." As the Englishman would say, "that is a facer," and no doubt was to those who did not know the merits of the case. Strange that the journals of the city did not contain any mention of it. Was it put in a paper which was read only by those who knew all the ins and outs of the trade in the hope that it would be copied? It looks so.

Aug. 8.—In the next issue of the paper, although not given as prominent a place as the former announcement, this was found: "The report that the Association of Brick Manufacturers was in a weakened position was positively denied by the Treasurer of the company." What next? Has some one been out with a gun? It looks so.

Aug. 15.—Not sandwiched in, as the last report, is a paragraph by itself: "It appears that we have been misinformed as regards the report that there have been important withdrawals from the Association of Brick Manufacturers. It seems that some members of the Association who have been especially anxious to make sales have done business latterly through commission men, but they are, we understand, by no means out of the Association, which continues the principal receiver of brick in this market."

I am confident that the facts as to the sales were as well known to the writer of the foregoing as they were to me at the time, which was before the first of September, but too late for the August number.

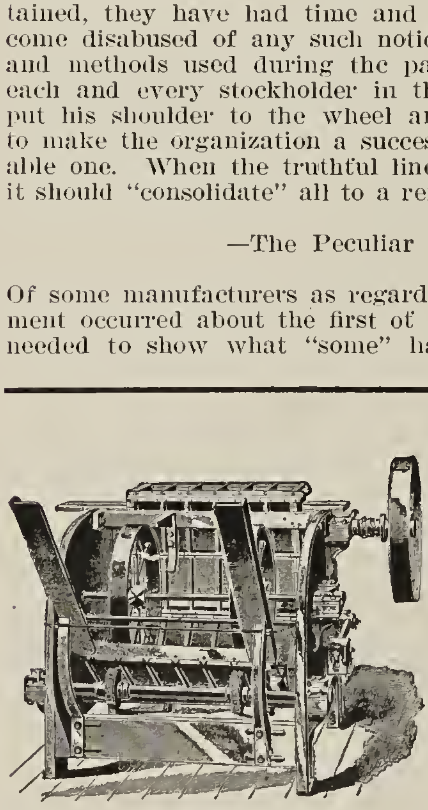
—To Sustain—

What I have written in the past two months in regard to dealers buying commission brick and letting the others lay, I place before your readers the report of the New Jersey correspondent of the Haverstraw Messenger of Aug. 4, or four days after the misleading statement in the New York paper, but containing nothing about the collapse of the Association:

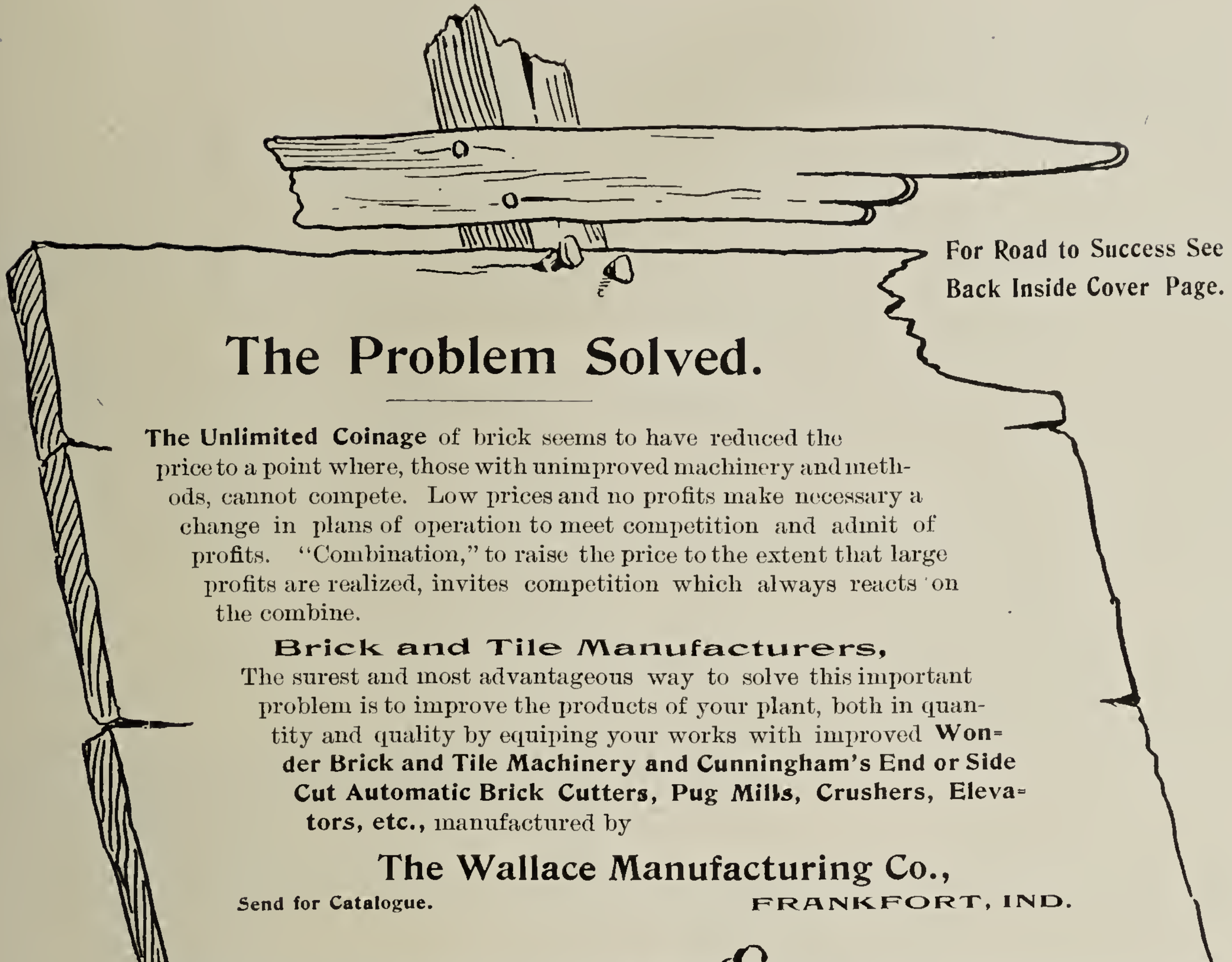
"New York, Aug. 4.—Forty-odd to fifty-odd cargoes of brick lying on sale here all the time. Jobs working slowly. Manufacturers asking for extra boats to get brick from kilns to make room for green brick. Prices declining from mere weight of having brick here two or three weeks or more, and not an offer on them during that time, while some other grades from same localities are going right along."

No doubt your readers will think it strange that a report

[CONTINUED ON PAGE 230.]



Your Best Friends
Are to be Found in
The Only Sander,
That will sand any size of mold. No expense to keep in repair.
The Jumbo Barrow
Which holds 150 brick is the best and cheapest. Is perfectly balanced.
The Disintegrator
Which saves your more and costs you less than inferior machines, and our
First-Class Supplies
Such as Barrows, Trucks, Molds, Dump Tables, Dump Carts, Conveyors, Pug Mills, Brick Wagons, Grates, Doors, etc.
No expensive Belts to Wear out. Our Prices are away down to Rock Bottom. Give us a Trial. Send for Catalogues.
The HORTON M'F'G. CO., Painesville, Ohio.



For Road to Success See Back Inside Cover Page.

The Problem Solved.

The Unlimited Coinage of brick seems to have reduced the price to a point where, those with unimproved machinery and methods, cannot compete. Low prices and no profits make necessary a change in plans of operation to meet competition and admit of profits. "Combination," to raise the price to the extent that large profits are realized, invites competition which always reacts on the combine.

Brick and Tile Manufacturers,

The surest and most advantageous way to solve this important problem is to improve the products of your plant, both in quantity and quality by equiping your works with improved **Wonder Brick and Tile Machinery and Cunningham's End or Side Cut Automatic Brick Cutters, Pug Mills, Crushers, Elevators, etc.,** manufactured by

The Wallace Manufacturing Co.,

Send for Catalogue. **FRANKFORT, IND.**

THE NEW YORK MARKET—Continued.

from the New Jersey market would contain the latest out, the collapse of the Brick Company. No, but it called attention to the fact, though in general terms, that brick from same localities and grade are readily sold by some commission men; it would have been square to put it that way, instead of reading between the lines.

—The Company's Reply.—

In answer to a letter of inquiry as regards facts in the matter in question, I place before your readers the article in the Aug. 1 issue of the Record Guide, reflecting on this company, and which has absolutely no foundation. It was inspired by some commission agent or agents, who are doing all that they can to injure this company by spreading and circulating false reports:

"While it is true that some of our stockholders are selling some of their stock through other agents, it has been done with our sanction in all but two instances, and to relieve the wants of the manufacturers themselves. In other words, they had to ship more brick at one time than we could readily dispose of, and they asked permission to put some of them in other hands to obtain quicker sale on a falling and overstocked market. This is simply a private matter of our own, and can in no way be twisted or distorted to reflect upon the standing and stability of the Consolidated Brick Company.

"THE CONSOLIDATED BRICK COMPANY.
"T. S. PECK, Treasurer."

Mr. Peck's explanation is a plain one and agrees with the information given to me at the time in every point. Those conversant with the colony of brick men at Fifty-second street know that when these men took their extra boats to the commission they no doubt told them their reason for so doing.

—Front Brick.—

The Excelsior Company, of Haverstraw, has been experimenting with clay from the bottom of the Hudson river, making front brick, but thus far has not been able to turn out a satisfactory article. They have burnt two kilns, or about 600,000, but not sufficiently hard. They are going to make another kiln and put in coal dust. Whether they will do any better time will reveal.

—The Market—

Is one that calls for lots of nerve, both on the part of the manufacturer as well as the agent. In one case, when the returns reach him, his nervous system will not collapse at the small amount returned from a cargo of a quarter of a million or more brick, when he had reckoned on more. The agent requires no end of nerve to tackle dealer after dealer and coax and beg of him to take some of his stock, to be met with an offer that knocks all the nerve out of him, and he returns to his office to gain strength to make another effort along the line, only to be met with probably a lower offer. Then he says to himself, "Why do the manufacturers keep shipping, and, too, when they know how the market is?" It would take a wiser man than Solomon to explain why they do; they just do.

—Current Prices for Brick.—

Aug. 1.		Aug. 29.
$3.50 @3.75	New Jersey ordinary	$3.50 @3.75
4.00 @4.25	New Jersey good	3.87½@4.00
4.00	Common hard ordinary	3.75 @3.87½
4.25 @4.37½	Common hard good	4.00 @4.12½
4.50 @4.75	Common hard fine	4.25 @4.50
4.87½@5.12½	Common hard special	4.75 @5.00

A loss of 25 cents per thousand in a month, with the best Jerseys selling, top, $4, paying 9 shillings freight and a shilling commission, leaving $2.75 net. One would think the brickmaker would batter up his shed and then throw the hammer in the river, and not ship. There are some shipping, even at that low rate.

A. N. OLDTIMER.

DOWN IN JERSEY.

Editor Clay-Worker:

Business in the clayworking line here is, comparatively speaking, dull. All the factories are moving, but only on small orders or stock.

Contrary to reports in July, the C. Pardee works have not closed down, but are now running the hollow brick department in full blast, under the management of Mr. Marcus Shantz, formerly Superintendent of the Isaacs plant, further up the Raritan. It is said the plant is now an incorporated concern, with Mr. Pardee as President. About 180 men are given employment. The brick, sewer-pipe and tile departments are idle. Some valuable improvements are being made in rearranging machinery, etc., which will make things work more conveniently when the business boom comes around after November and McKinley's election.

The Raritan Hollow and Porous Brick Plant is now running on half time. This is the first time in the history of this company that time has been cut short. Immense stocks of brick are stacked around the yards ready for shipment, but orders are scarce.

The next plant on the river, the Weber works, is busy making fire brick and gas retorts. The Ostranders are also running on fire brick.

The Standard Hollow Brick Works are moving the wheels, under the management of Robert W. Lyle, but are stacking up material.

The Terra Cotta Works are running light.

When business picks up again builders can find all the material they wish by coming to Amboy.

The Valentine Bros.' factories at Woodbridge and Valentine's Station are moving along as usual on stocks. Henry Maurer & Son are also running. All these old stand-bys have plenty of boodle, and do not like to lay off men if possible. Of course, with the terra cotta folks, they cannot run much on stock, as every new building has a particular design of its own, and requires new molds.

There have been some changes in the office force of the Staten Island Terra Cotta Company, at Spa Springs. A Mr. Marrick is now chief manager there, and is said to be an expert. Mr. James Toomey is still in charge of the brick and terra cotta departments. Assemblyman Geo. H. Tice, formerly in charge of the shipping department, is now out for Sheriff of this county, and is busy looking after his fences, with fair prospects of scooping in the fees of the office after the November election. Milton Edgar, the clay dealer and veteran politician, is working night and day for Mr. Tice, and that goes a long way towards an election, as Mr. Edgar is a hustler, as well as a grandpa now.

The Staten Island Terra Cotta Works are now slated to close down in all departments for six weeks. This will throw many men out of employment very near cold weather, and is to be regretted.

Meeting Mr. Philip Gibson, the expert brick manufacturer, on the street on Sunday afternoon, we could not help but notice the great improvement in his appearance. Asking him regarding his health, he said he feels "A No. 1 again." While we are pleased to notice this, we fear some one who desires his services as an expert superintendent will be after him and take him away from our city. We desire to keep all good citizens here in our midst, and hope, if Mr. G. has any intention of getting down to work again, he will strike something near home.

The red brick men in the South River district are still pounding away during this fine weather, but trade is dull all around. The building of small dwellings in this city is still progressing lively, but as they are principally frame it does not help the sale of brick as would brick houses.

The American Enameled Brick Company, of South River, is running full time on large orders. This firm has a large sale on their single-fire enameled brick, which give good results.

Mr. Woodcock, for many years master mechanic of the Perth Amboy Terra Cotta Works, died this afternoon. Mr. Woodcock had been ill with typhoid fever, and, until yesterday, was considered as getting along finely, but a relapse ended in death to-day, leaving a widow and several grown-up children.

Perth Amboy, Sept. 1. W. R. O.

OF INTEREST TO DECORATIVE POTTERS.

M. K. HELOUIS has contribted to the French Society for the Encouragement of National Industry a paper on vanadium and its application to ceramics, says the Moniteur de la Ceramique.

The mineral is found in an anthracite mine in the South American Cordilleras, at an elevation of 4,800 metres. In this mine, which is easily worked, the vanadium is found in combination with the coal in abundant quantity. The carbon burns freely, and, by its complete combustion, leaves on an average only 2 per cent. of cinders. The cinders, entirely calcined, are exactly the shade of ombre, and contain from 14 to 25 per cent. of vanadium in the form of tetroxide of vanadium (VO_4), vanadic acid (VO_5), etc. M. Helouis has perfected a process for obtaining from the cinders the mineral and its combinations at a moderate price, which will undoubtedly increase its commercial importance as a colorant.

Speaking of its application to ceramics, it appears that M. Helouis has obtained with the acid (VO_5), fluxed at high temperature upon ware of the grand feu, very remarkable tones of green gold, while the oxides of vanadium would supply decorative potters with the most beautiful shades, which are indestructible in the highest temperatures.

SELECTING A BOILER.

It has somehow always impressed me that the average user of a steam boiler lost no inconsiderable money through giving too little attention to price. There are boilers and boilers, and the man who will furnish one for $2,000 is morally sure of the job as against the man who wants $2,500. That $500 may be the dearest $500 ever saved. I am speaking now of boilers presumably equal in lasting qualities, convenience, etc., but one which will evaporate materially more water than the other with a given amount of coal. Other things being equal, the coal pile becomes the objective point. The boiler goes right along eating up the coal pile, and it does not have to eat up much more to pay a mighty big interest on $500 difference in price.

When a man knows nothing about boilers it will generally pay him to consult an honest mechanical engineer before purchasing. It is not like expending a few dollars, more or less, once for all. The boiler is to board right with him, presumably, year after year. It will eat of his substance day after day. —Rural Mechanic.

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

WANTED—Employment by man understanding iron and woodwork, laying, setting or burning brick; recommends to this effcet from an experience around works of thirteen years. Address
9 1 1 p BOX 1394, Care Clay-Worker.

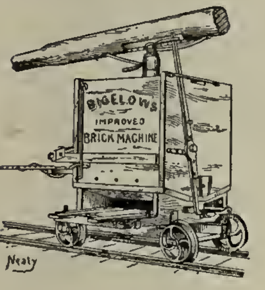
FOR SALE—Very cheap; one 75-horse Atlas engine, one 80-horse Atlas boiler, one 4-mold dry press, one Stedman disintegrator, shafting and belting, all in first-class condition. Address C. H.,
9 1 c Care Clay-Worker.

WANTED—Situation as superintendent, foreman, or charge of setting, burning, repair and erection of kilns, either dry clay, stiff clay or vitrified street paver works. Can superintend erection of works. Practical in every branch. Also a kiln builder. Good references. Address, SUCCESS,
9 t f, 75 p Care Clay-Worker.

PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

BRICK MACHINERY.

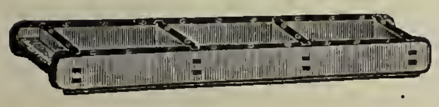


One Horse power. Capacity 12,000, 10,500 and 6,000 per day. Least requirements necessary. Trucks and moulds furnished. All machines set up and started, purchasers are not required to pay for them until they do good work. For particulars address

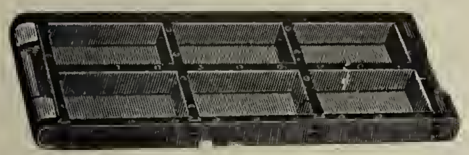
A. E. BIGELOW, Spaulding, Ill.

ARNOLD'S BRICKYARD SUPPLIES.

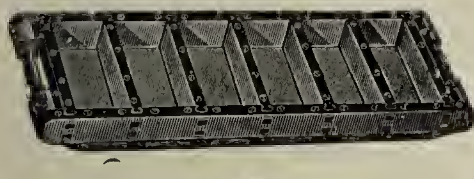
They are the Best that are Made.



3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds. A large stock of Haud and Machine moulds of the standard sizes ou hand to fil orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best.** Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

WHEEL-BARROWS For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc.

All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.

NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
6 t f d Wellsburg, W. Va.

FOR SALE—170 acres of fine shale land adjoining Springfield Paving Brick Company, where the best shale brick are made. Railroad trackage.
EDWIN A. WILSON,
7 3 dm Springfield, Ill.

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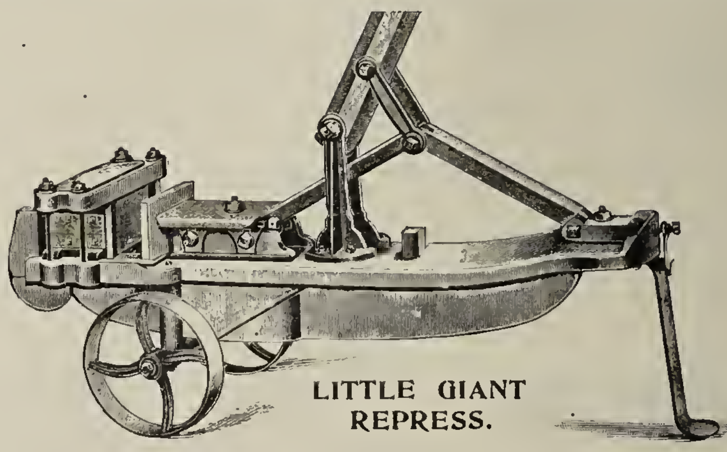

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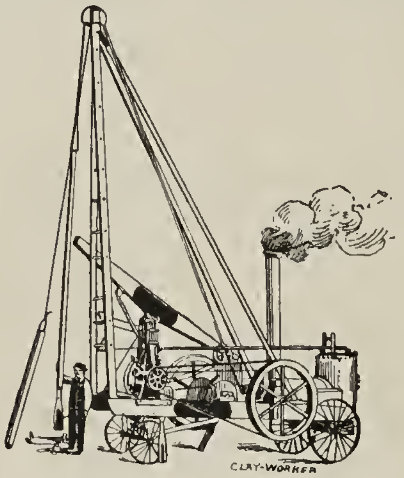

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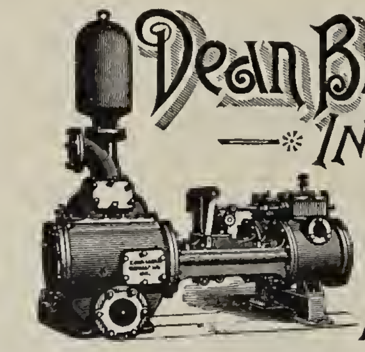

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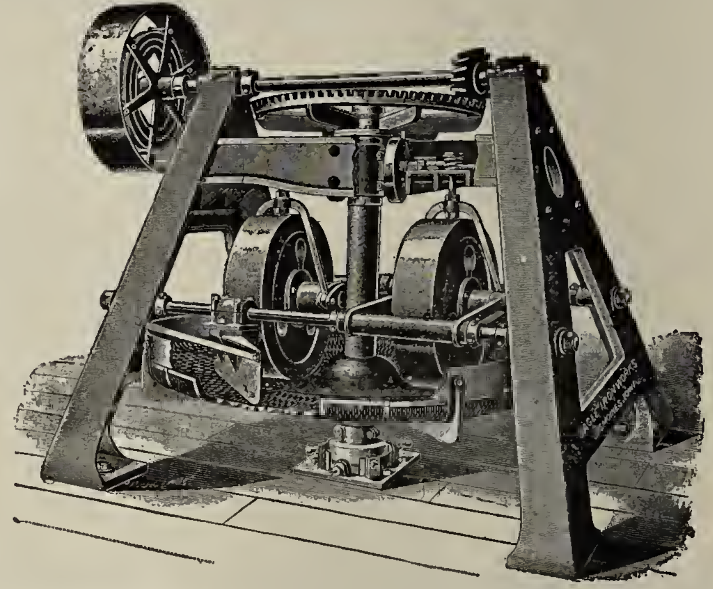

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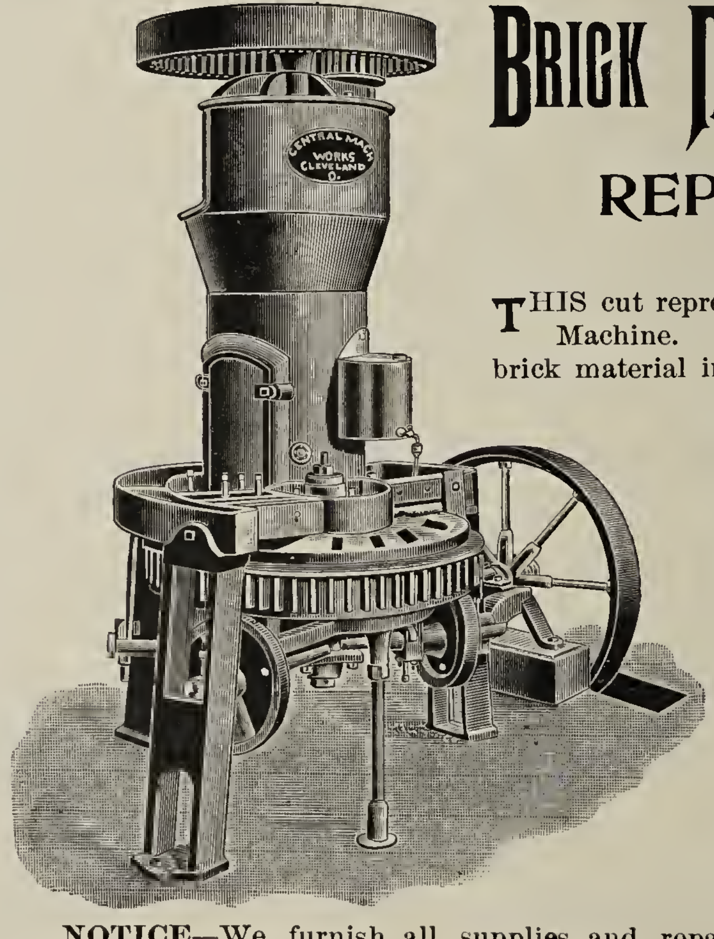
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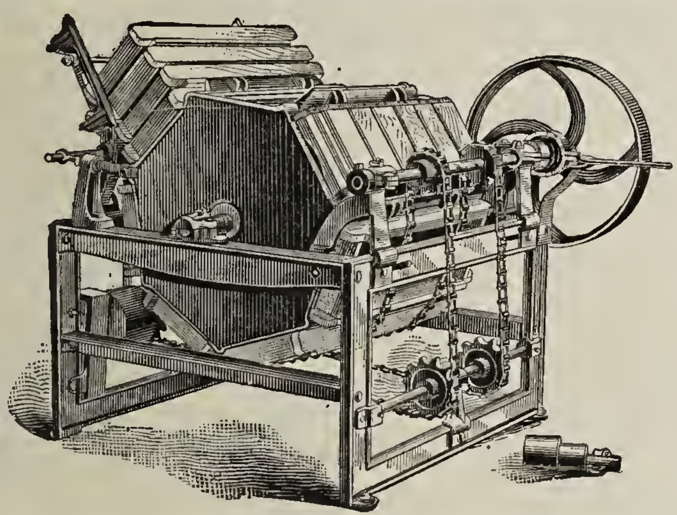

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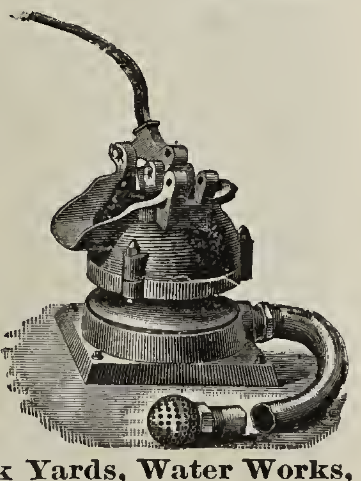

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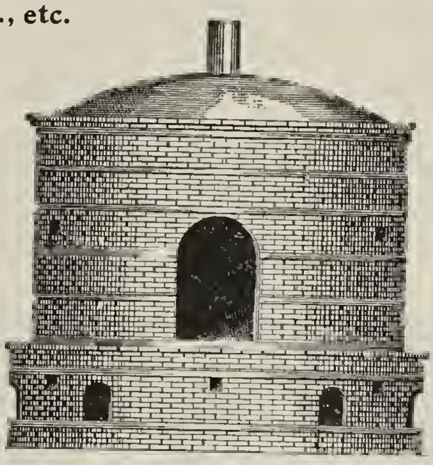

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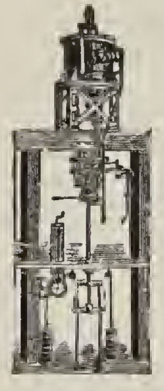

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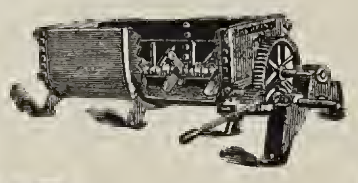

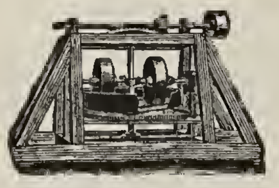

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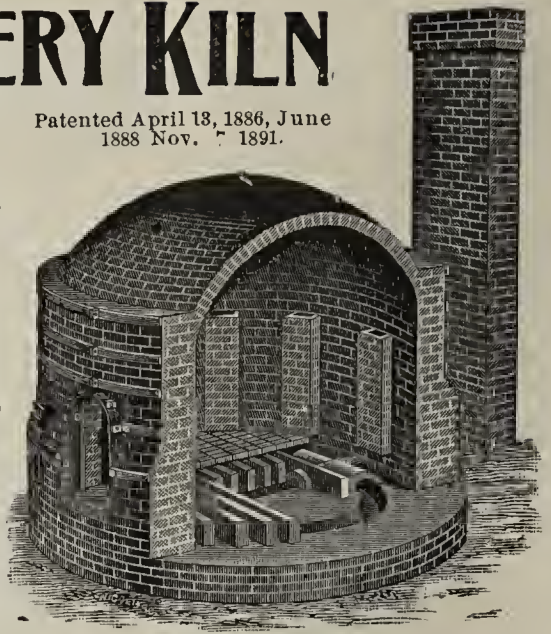

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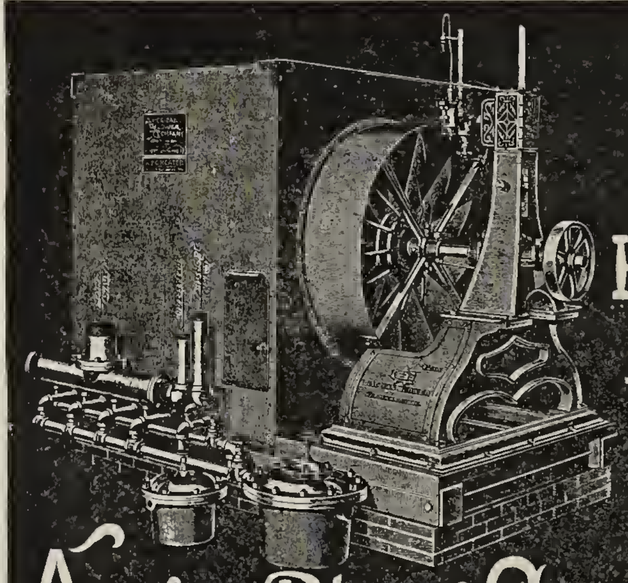

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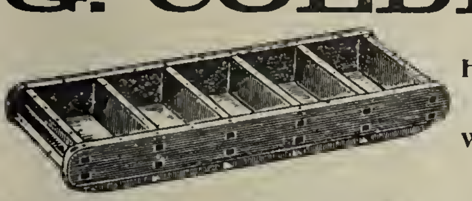

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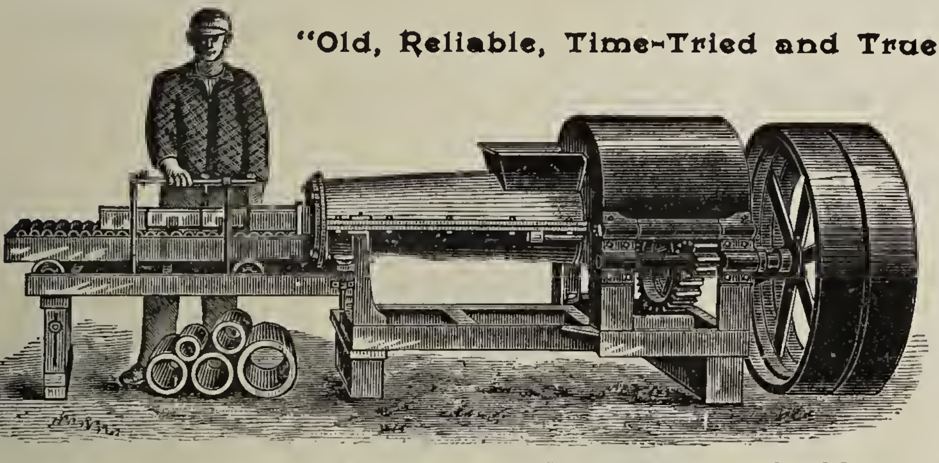

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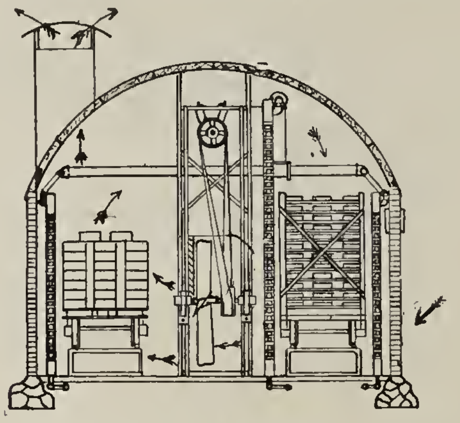
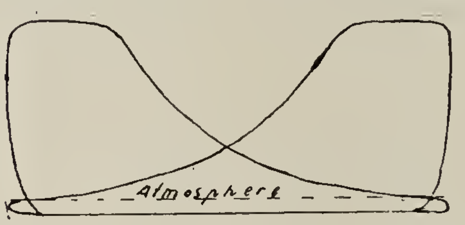
The Safety Dryer,

Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No. 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.

WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

WASHINGTON, D. C., June 7th, 1895.

S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our —— You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

FORDS, N. J., April 9th, 1894.

MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.

MR. S. G. PHILLIPS, Woodbridge, N. J.

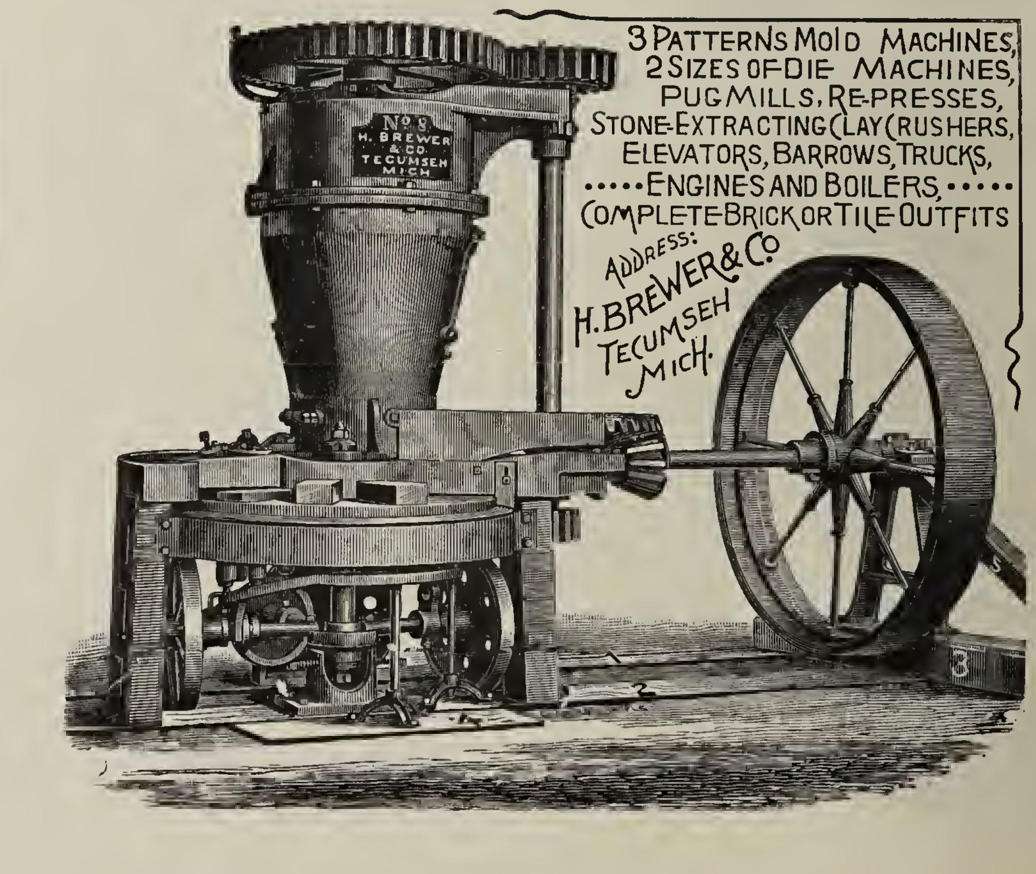
DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

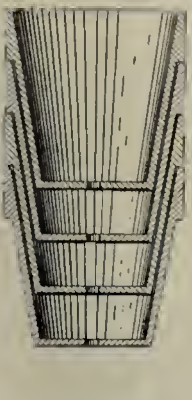
Yours respectfully,
CHAMBERS BROTHERS CO.,
J. H. Chambers, Gen'l Mgr.

S. G. PHILLIPS.
Agent and Patentee,

161 Grand Street.

Rahway, N. J.





Make Money

WITH THE ONLY SUCCESSFUL

Flower Pot Machine.

(PATENTED.)

No expert workmen required.
Capacity in 10 hours:

6,000 two-inch Pots;	3,500 five-inch Pots;
4,000 four-inch "	2,000 seven-inch "

Write for Circular and prices.

The Rockwood Mfg. Co.,
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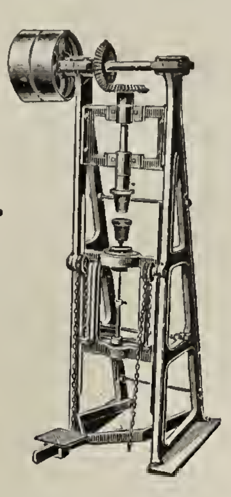


THE "AJAX" BRICK MACHINE

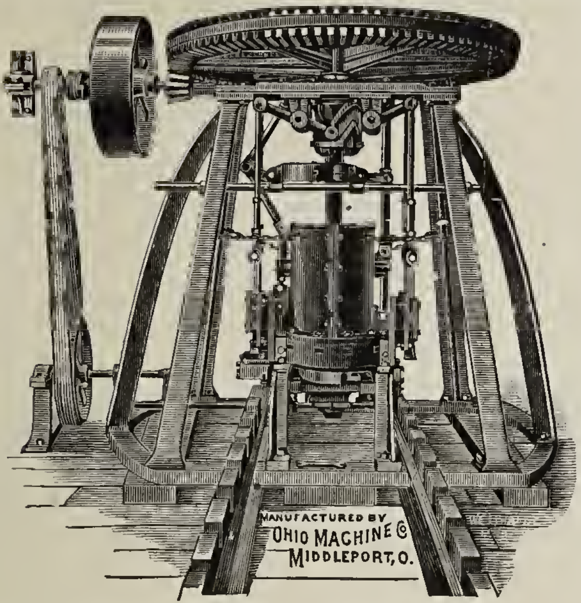
MANUFACTURED BY

Ohio Machine Co.,

Middleport, Ohio.

Under the very Latest Improved Grant-Murray Patent.

This machine is constructed with the object of giving to purchasers the very best results obtainable for the money invested. It is at once Simple, Durable, Convenient, and Easily operated. We claim these machines make the strongest brick in the market, a brick that is very superior for Street Paving and building purposes. Their superior quality as pavers may be ascertained by reference to some of the leading cities of Ohio and West Virginia. This machine works the clay very stiff, pressing all the clay into each brick that it will possibly contain, thus imparting the quality requisite to a No. 1 Paving Brick. We guarantee these machines to our customers, and solicit investigation as to their merits. For further particulars please correspond with



OHIO MACHINE CO.,

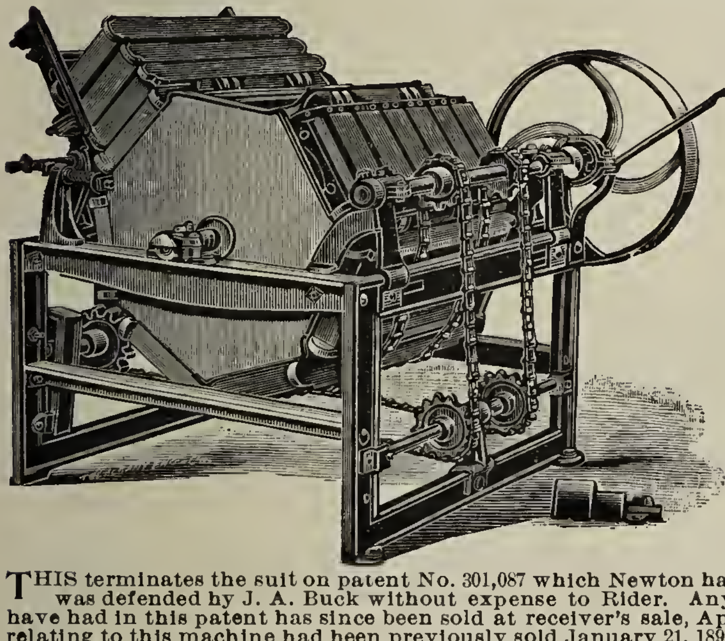
MANUFACTURERS.

We manufacture the Grant & Murray Patent Repress Brick Machine, pressing 4 brick each revolution and 40,000 per 10 hour day.

Middleport, Ohio

BUCK'S NEW CHAMPION

Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.

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TAKE THE
BIG 4
TO
ST. LOUIS

SALUTATORY OF

The American Clay-Working Machinery Co.,

Bucyrus, Ohio,

Successor to
The FREY-SHECKLER CO., Bucyrus, Ohio,
. . and . .
J. W. PENFIELD & SON, Willoughby, Ohio.

To the Trade:—

We extend hearty greetings to you, and solicit your correspondence and patronage.

Our combined works at Willoughby and Bucyrus form by far the largest and best clay machinery establishment in the world. Our facilities are the most complete of any. Our perfected system of manufacture enables us to produce the highest grade of clay-working machinery at the lowest cost consistent with good goods.

Our line of Clayworking Machinery is the most comprehensive and complete, in existence. We make an almost endless variety of styles and sizes of Auger and Plunger Brick or Tile Machines, Dry-Press and Semi-Dry Press Brick Machines, Steam and Horse Power Sand-Molding Brick Machines, Automatic, Semi-Automatic and Hand Power Cut-off Tables for brick and tile, Steam and Hand Power Brick Represses, also Dry Pans, Wet Pans, Pug Mills, Granulators, Disintegrators, Crushers, Sewer Pipe Presses, Horizontal Steam Presses, Reduction Mills, Clay Conveyors and Elevators, Winding Drums, Dryer Cars, Clay Cars, Transfer Cars, Turn Tables, Barrows and Kiln Castings,—in fact almost every conceivable form of clay-manipulating and clay-handling appliances. We produce a superior line of Gas and Gasoline Engines. We handle the celebrated Bucyrus Steam Tunnel Brick Dryer, also improved Systems for Brick Burning. We can furnish the right equipment for handling **any** material suitable for the manufacture of clay products.

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WE KNOW HOW.

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OUR PRICES ARE RIGHT.

OUR GOODS ARE GUARANTEED.

Let us hear from you and figure on your requirements. Address

The American Clay-Working Machinery Co.,

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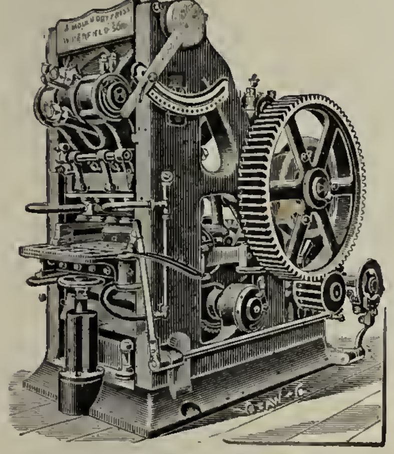
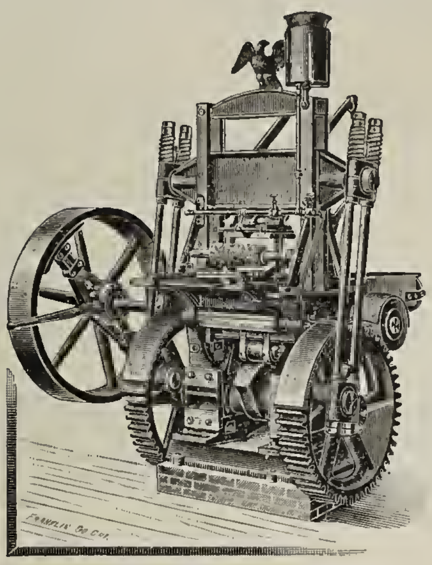
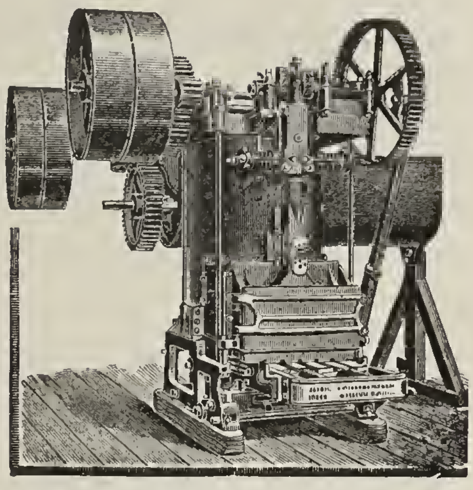
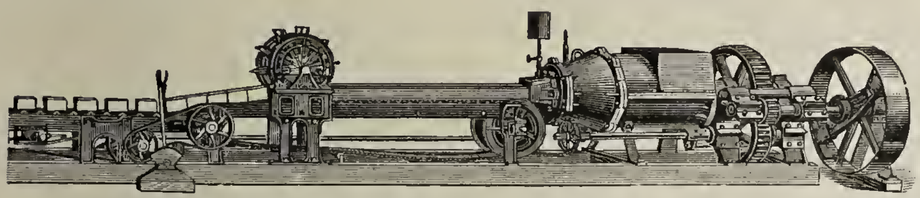
Works at Bucyrus, Ohio, and Willoughby, Ohio.

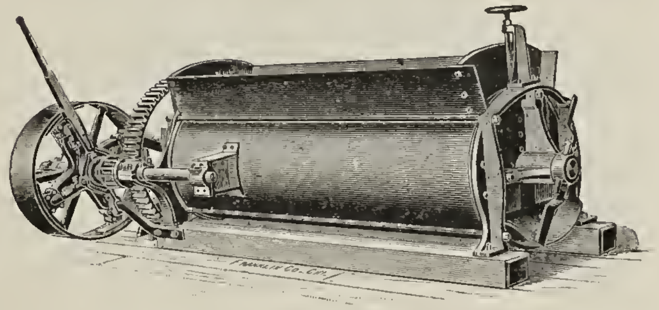
Some of Our Goods.

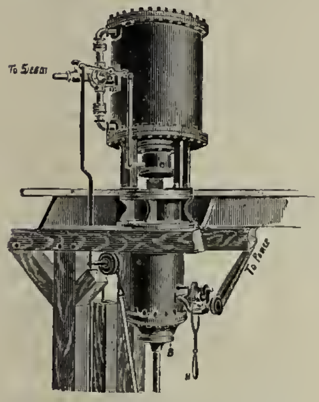

Dry Press Brick Machines.

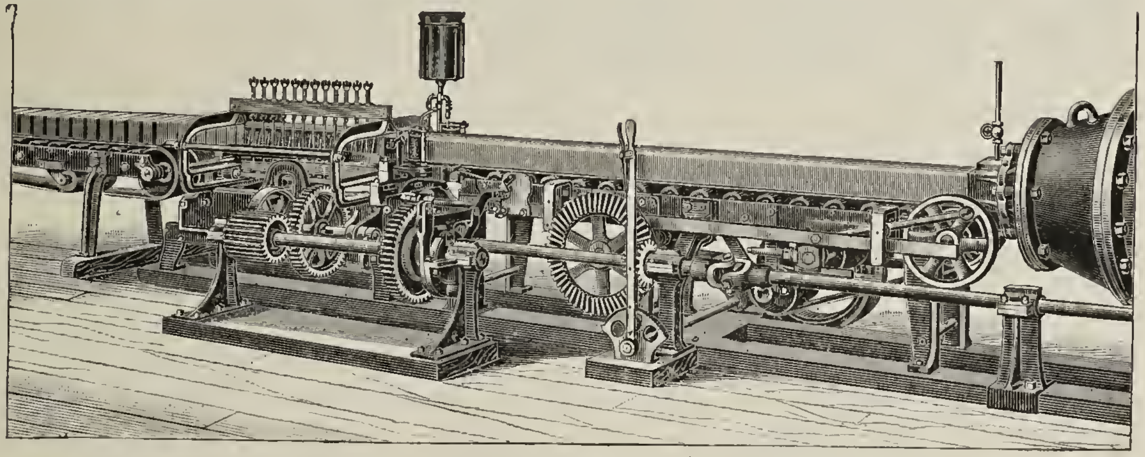

Brick Re-Presess.

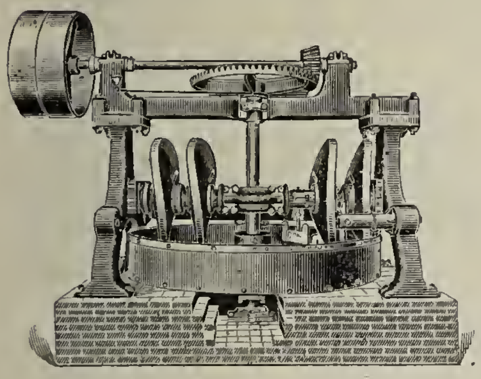

Sand Mold Brick Machines.

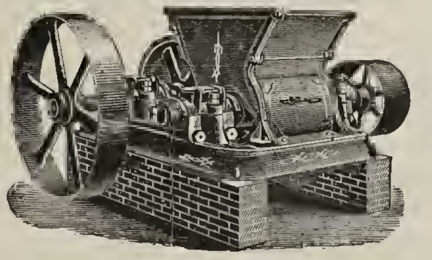

Auger Brick and Tile Machines.

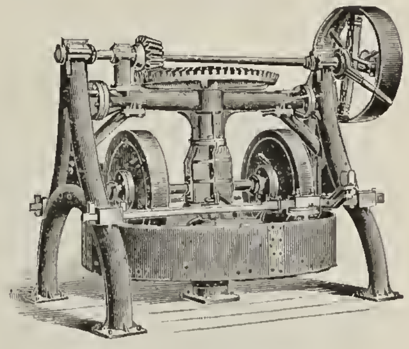

Pug Mills.


Sewer Pipe Presses.


Automatic and Hand Power Brick Cutters.


Special Clay Grinding Mills.


Disintegrators.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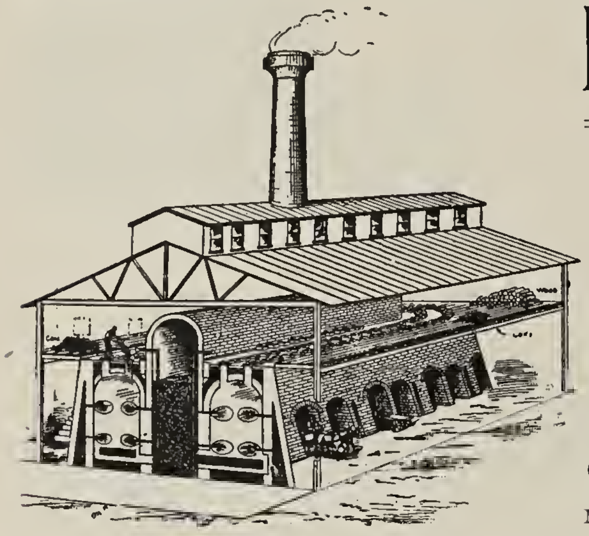

Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

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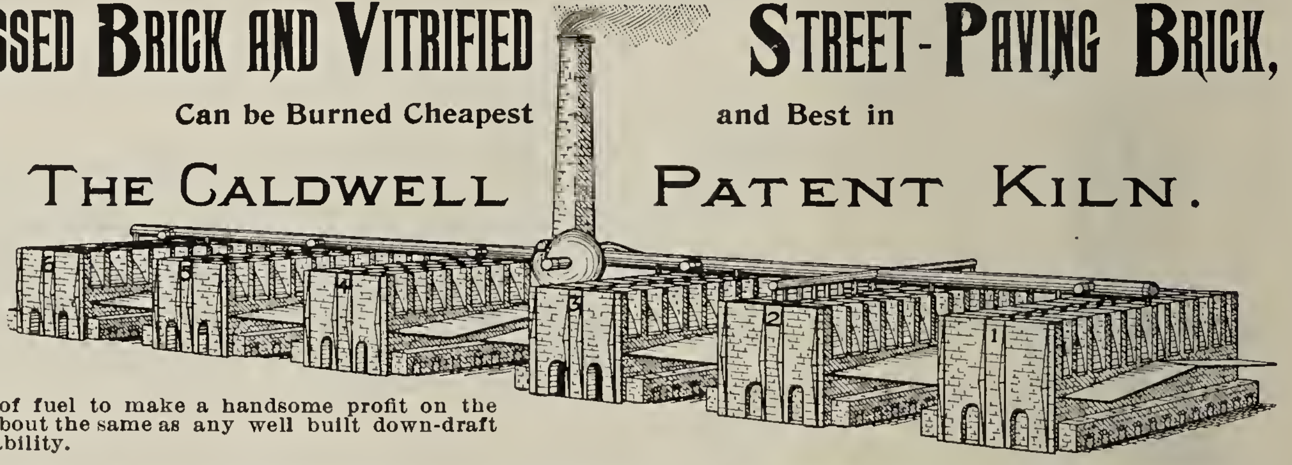
Mention the Clay-Worker. **HELENA, MONTANA.**

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.



Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

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Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

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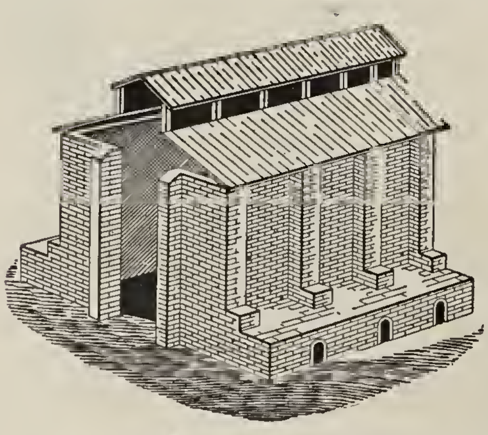
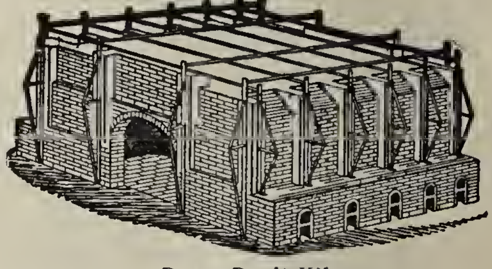


Up-Draft Kiln.

LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

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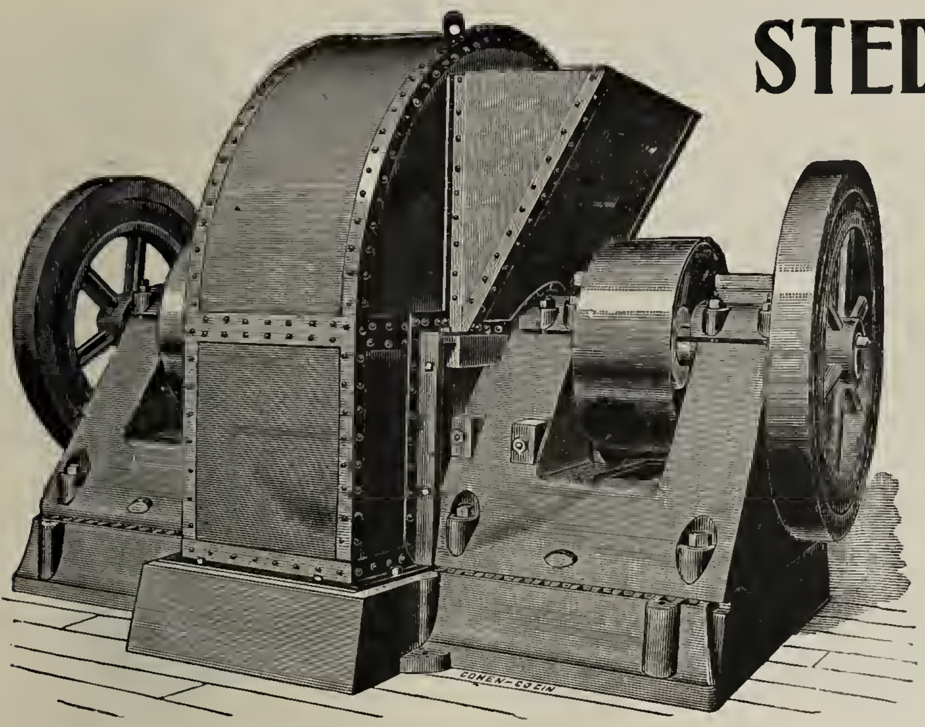

STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

There. Are... Others

But If you want the Best, the most Modern, the most Scientific, the most Profitable Equipment for Brickmaking, you will patronize

W. D. Richardson & Co.,
Engineers,
809 Cuyahoga Building,
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Manufacturers of....
The RICHARDSON DOUBLE-PRESSURE REPRESS, The RICHARDSON AUTOMATIC HOPPER and FEEDER, The RICHARDSON SHAKING SCREEN.

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BRICK CARS.

THE BEST. NO EXPERIMENT.

Thirty styles of our cars in use in all parts of the United States and Canada. Nearly 2000 of our cars are in use in Cleveland alone by the following Brickmakers:

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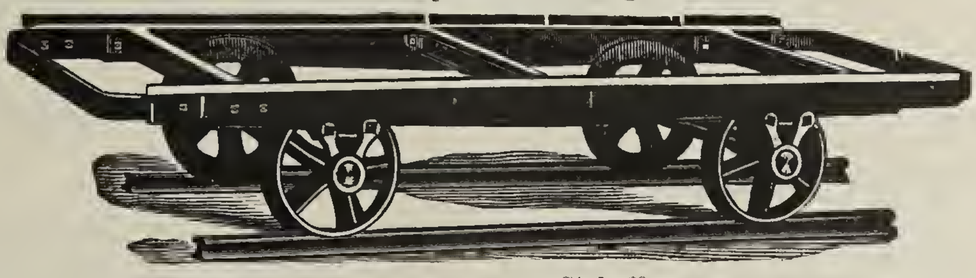
Standard Brick Co.,
Peter Cullen,
Collinwood Brick Co.,
Cleveland Brick Co.,
Canadian Copper Co.,
George Gynn,
Warren Farr,
John Cullen.

Write Them,
Then Us.



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Catalogue and Price List sent on application.

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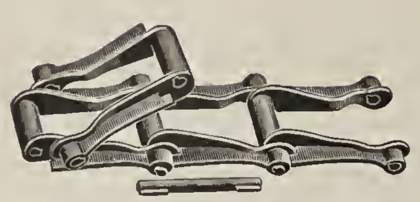

Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

F. H. C. MEY,

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Approved Appliances for

Elevating, Conveying and Transmission of Power.

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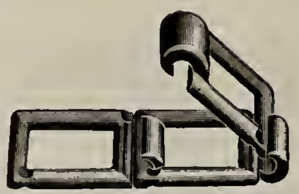
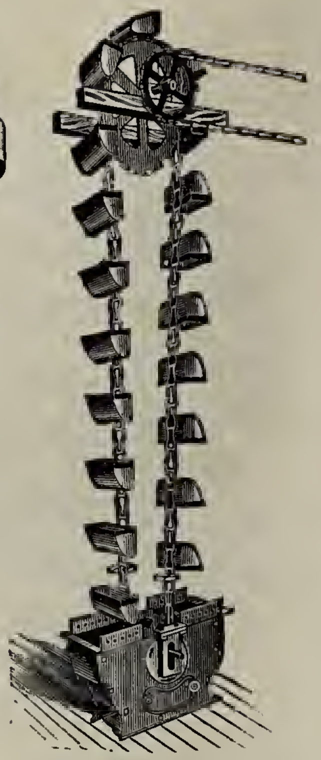
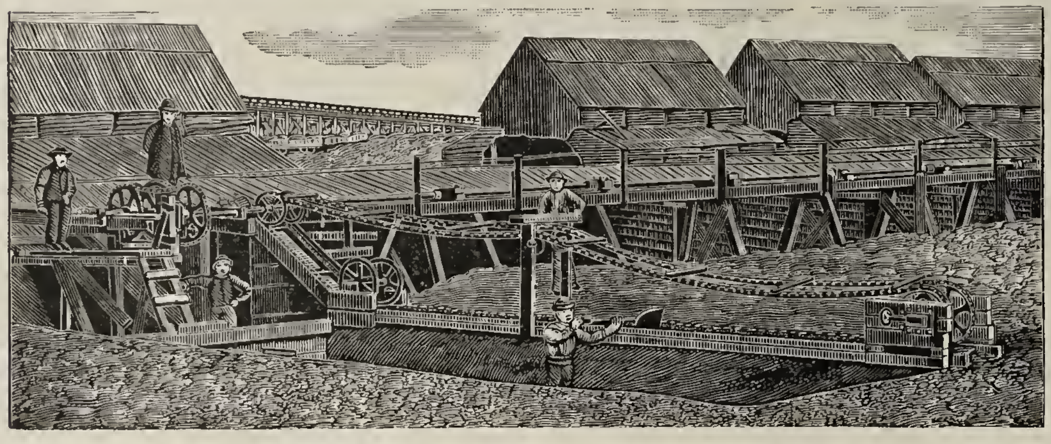




THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.



MEY PATENT CLAY ELEVATOR.

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Fire and Red Brick Presses all sizes.

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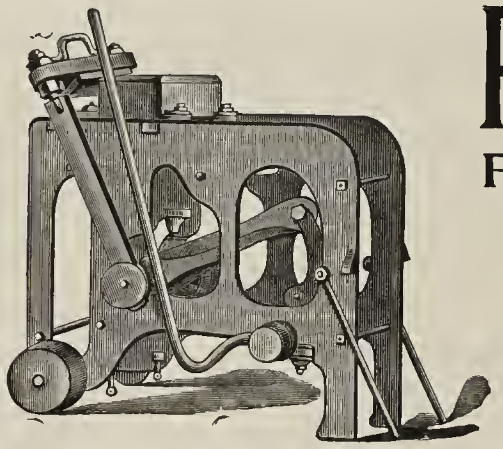
Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

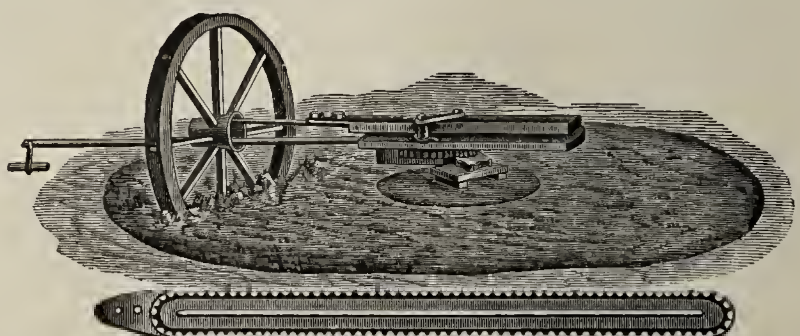


RED BRICK PRESS.

GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

☞ Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

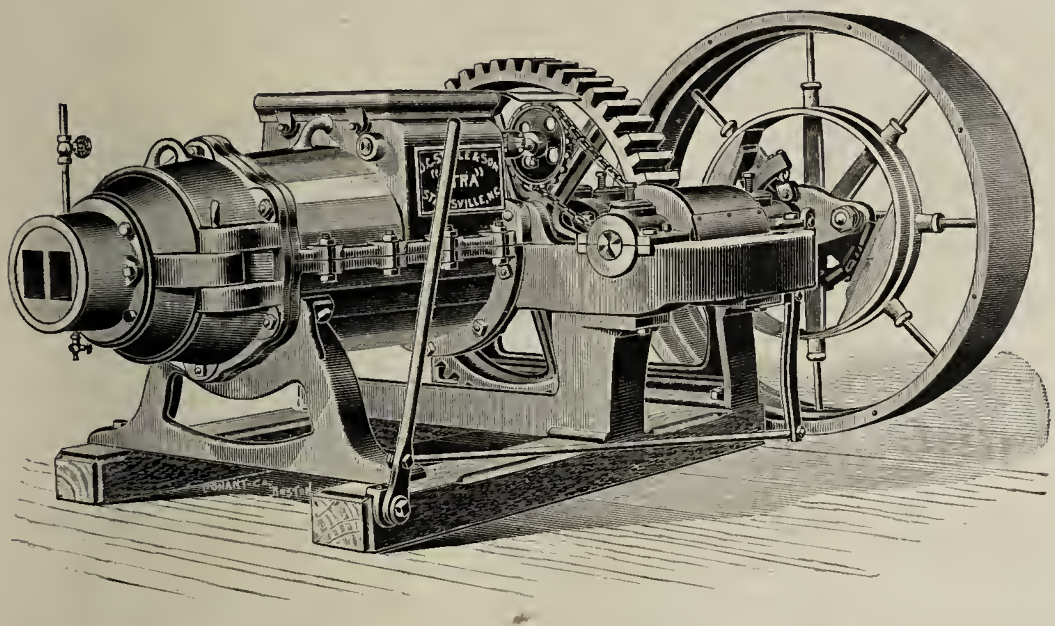
These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

The New South Brick Machinery



X-tra Machine. Capacity 25,000.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with indigestion or constipation. No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

Denmark, S. C., May 28, 1896.
J. C. Steele & Son, Statesville, N. C.

Gentlemen:—I have just started the X-tra machine and it works finely, I think the Automatic Cutter perfect.

I have just closed my first kiln of brick.

Yours truly,
H. G. Drigg.

Strictly modern machinery at the lowest price.

Send for Catalogue.

J. C. STEELE & SON,
Statesville, N. C.

15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

• • •

12 Second Hand Machines.

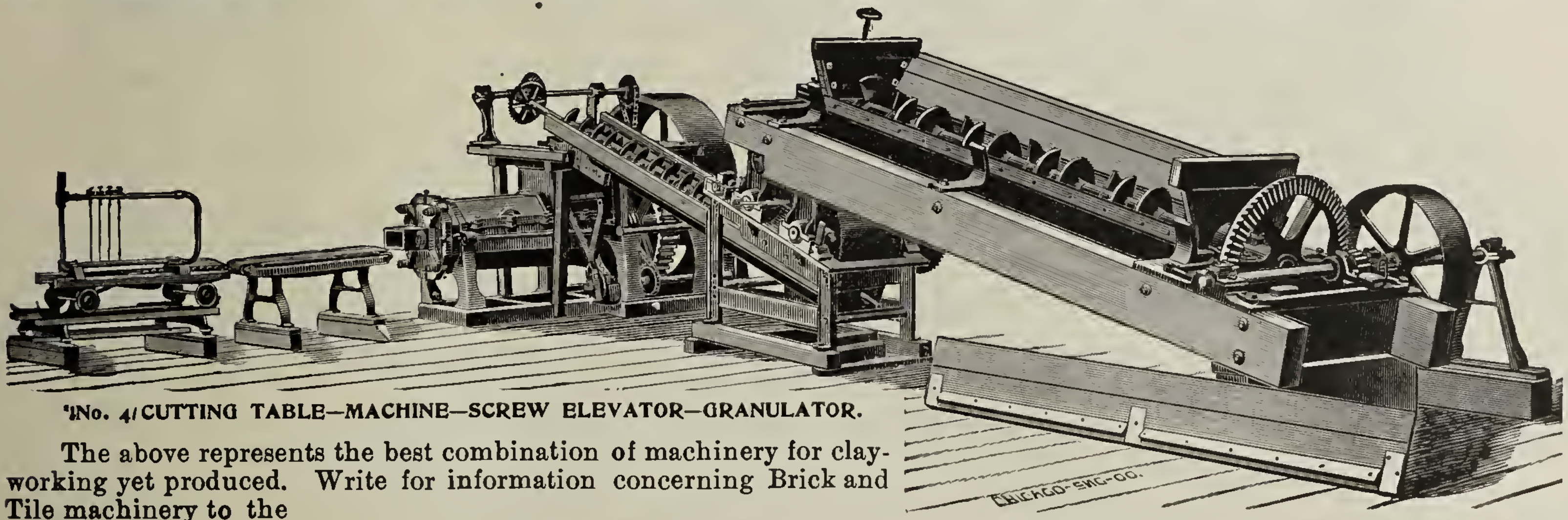
Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER MANUFACTURING CO

DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.

SEND FOR PRINTED MATTER.

ADRIAN BRICK AND TILE MACHINE CO.



No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

Would You Buy

A BRICK MACHINE
.....A DRY PAN
....A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King

A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

The Woolley Pug Mill,

All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
...AND...
SLIP PRESSES

For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

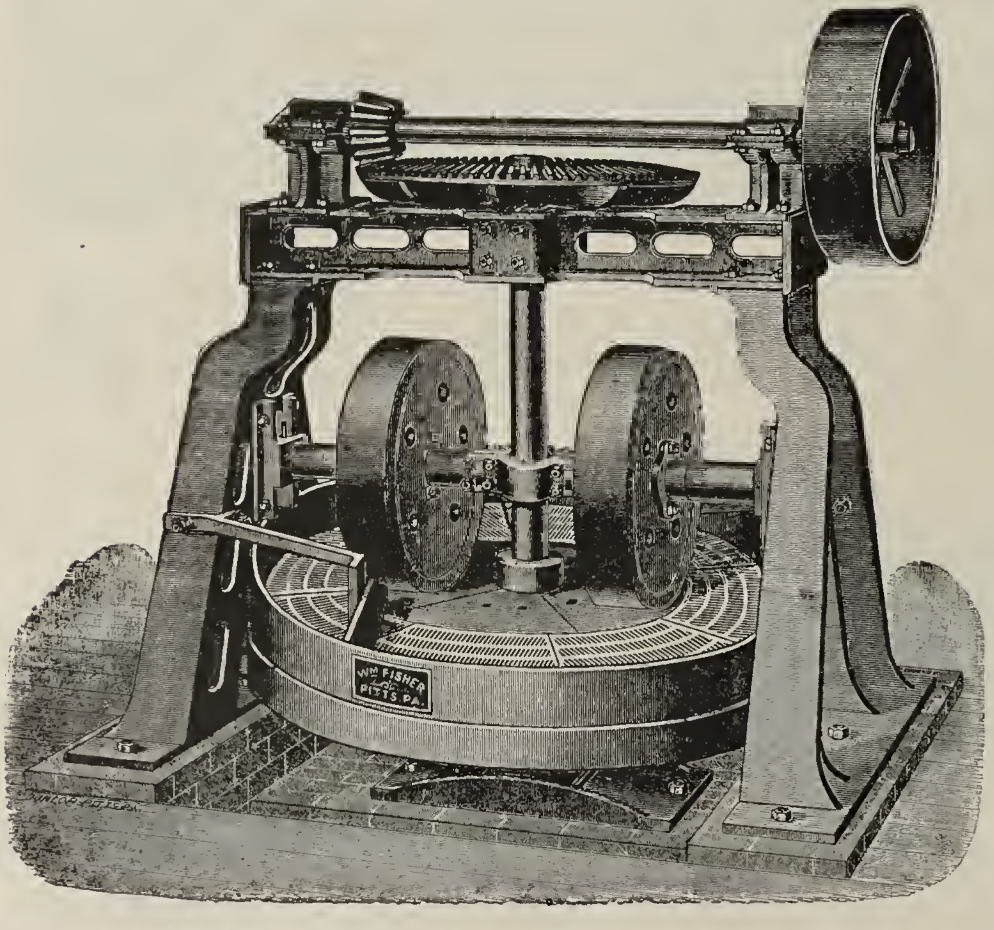
Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Proprietors,

23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

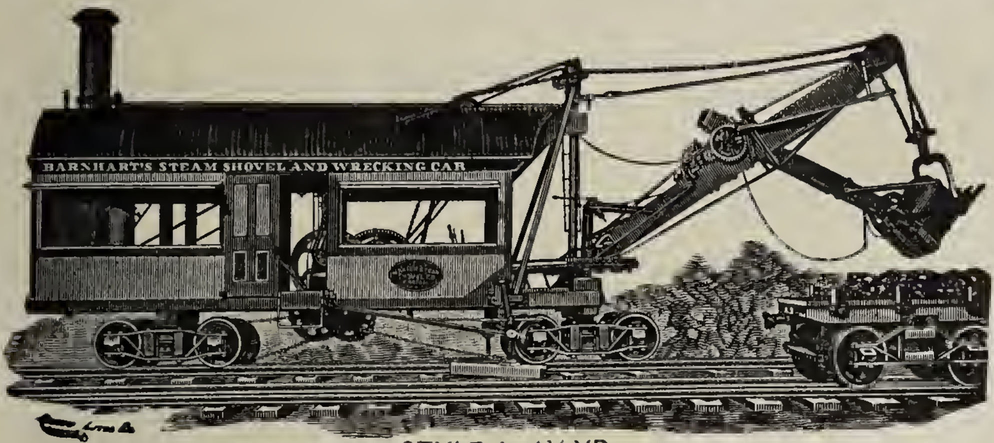
FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers. Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

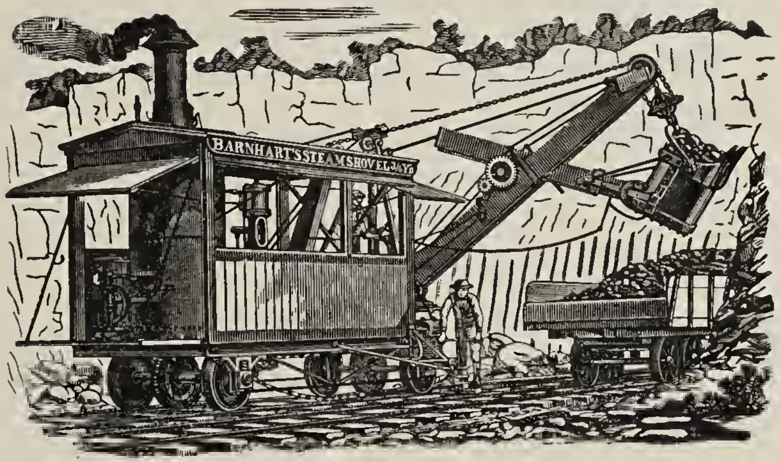
Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.



STYLE C—¾ YD.

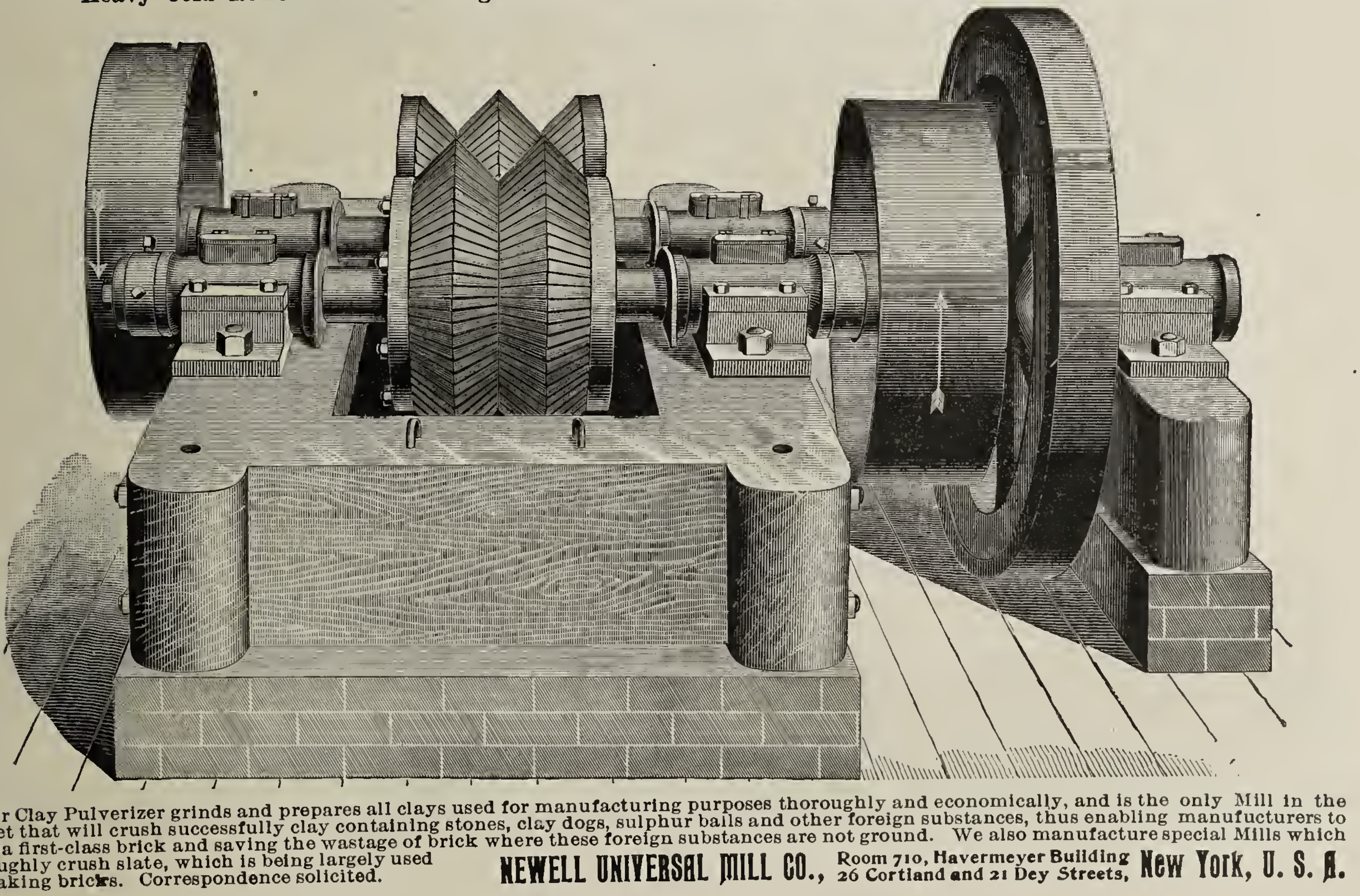
Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

603 West Center Street, - **MARION, OHIO.**

NEWELL IMPROVED CLAY PULVERIZER

Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.



Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
26 Cortland and 21 Dey Streets, **New York, U. S. A.**

ALSIP'S LATEST IMPROVED Down and Up-draft Kiln.

The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.

The Alsip Kiln can be built with one small smoke stack.

The Alsip Kiln can be built with chimneys on the side of kiln.

The Alsip Kiln can watersmoke with the Up-draft.

The Alsip Kiln can watersmoke with the Down-draft.

The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.

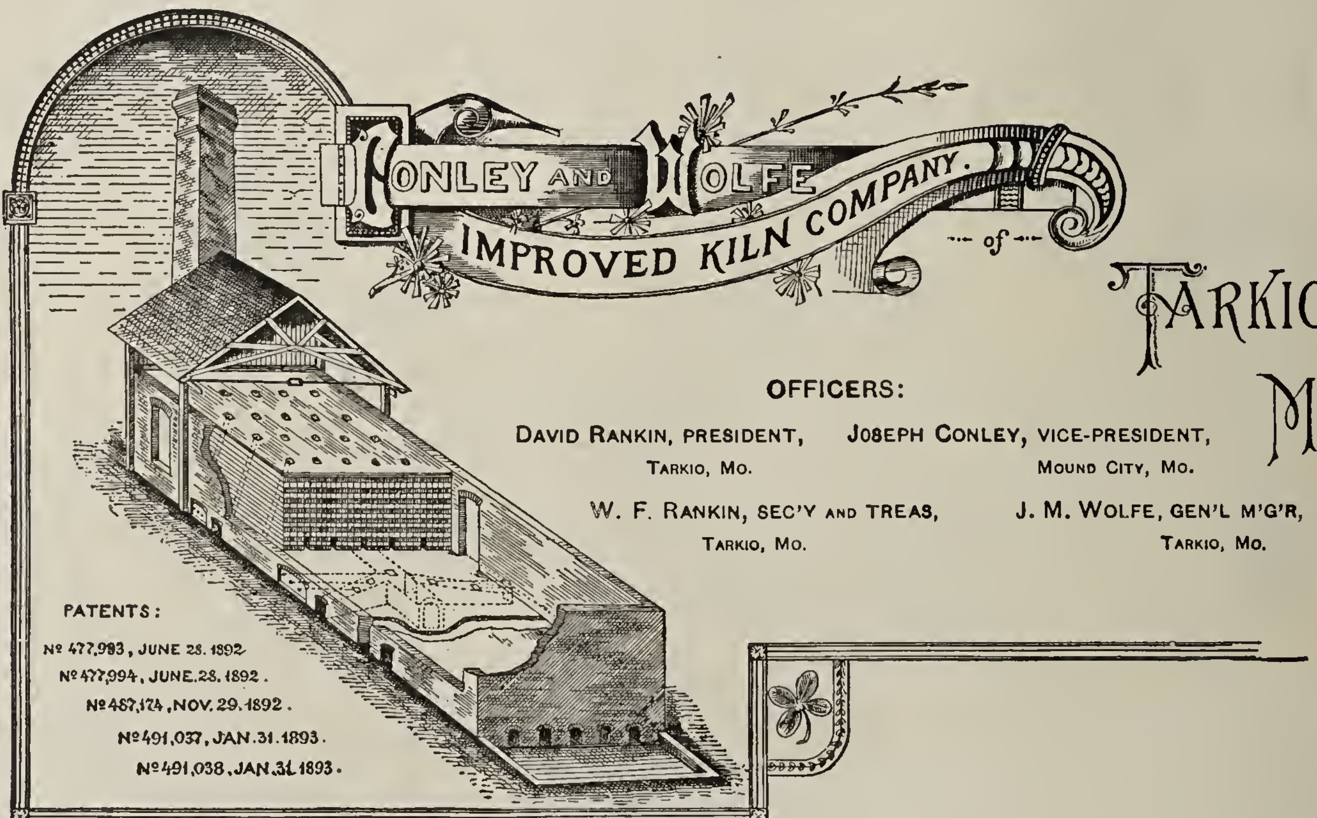
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**



TARKIO, MO.

OFFICERS:

DAVID RANKIN, PRESIDENT, TARKIO, MO.

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W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.

J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

PATENTS:

№ 477,993, JUNE 28. 1892.
№ 477,994, JUNE. 28. 1892.
№ 487,174, NOV. 29. 1892.
№ 491,037, JAN. 31. 1893.
№ 491,038, JAN. 31. 1893.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✢ YOU NEED THIS KILN. ✢ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

Morrison's Latest Improved Kiln,

FOR BURNING BUILDING BRICK.

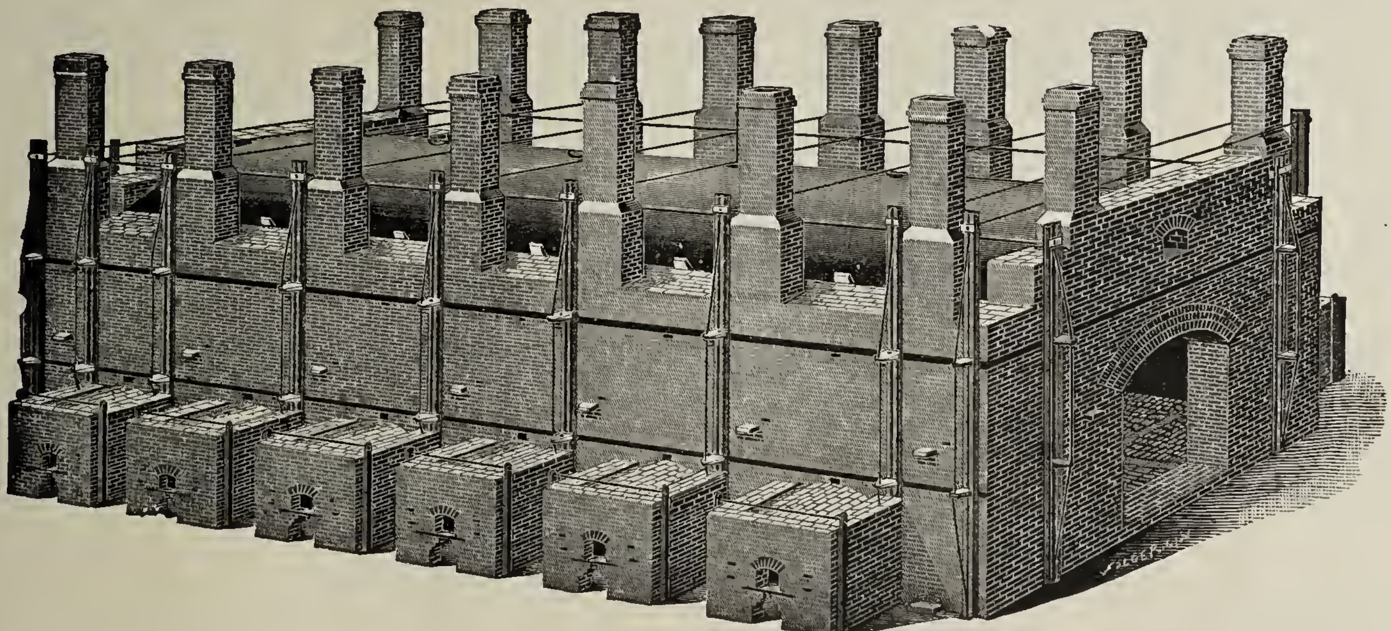
IT has no rival. Some of the largest brick plants in the country use it exclusively. Cost of construction within reach of every brickmaker. Price for license to use so reasonable that no one can object.

Write us for descriptive pamphlet, prices, etc., address

R. B. MORRISON & CO.,

P. O. Box 335. *ROME, GA., U. S. A.*

The EUDALY IMPROVED.... DOWN-DRAFT KILN.



A very large number of manufacturers are now using the EUDALY KILN for burning all kinds of clay wares, especially front, ornamental and paving brick. We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of large capacity on account of economy in cost of construction and space occupied on the plant; while the Round Kiln is better adapted to plants of small capacity, drain tile, sewer pipe and fire brick in small quantities. These Kilns have gained a reputation for burning all hard and uniform. This Kiln is easily controlled and is in every way practical and desirable. We will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

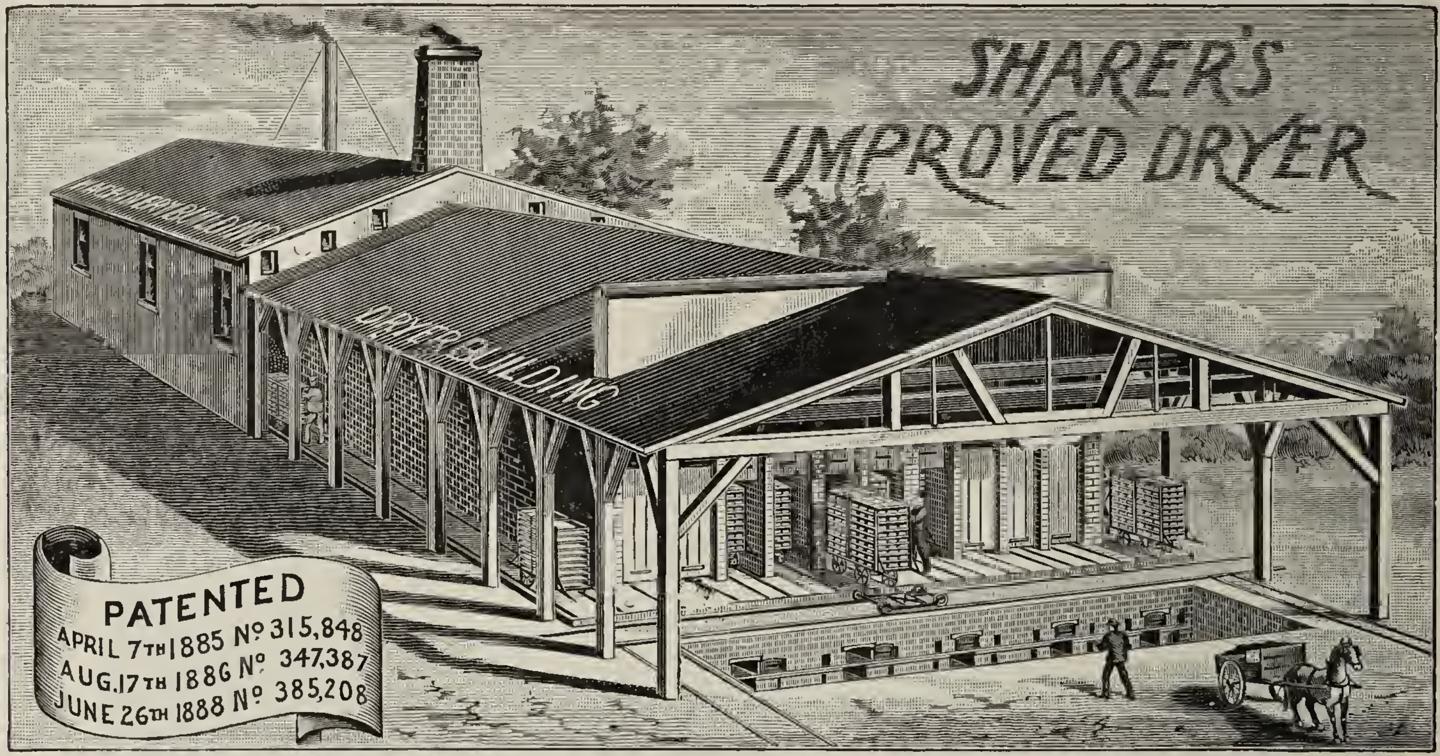
W. A. EUDALY, 509 Johnston Bldg. **Cincinnati, Ohio.**

Geo. W. Sharer,

Brick Manufacturing Expert,
Constructing Engineer,
Contractor and Builder.

Sharer's Improved Dryer Saves Fuel, Saves Brick, Saves Time, Saves Money.

Sharer's Improved Calorific Kiln Burns the Largest Per Cent of Hard Brick at the Lowest Cost for Fuel.


SHARER'S IMPROVED DRYER
DRYER BUILDING
PATENTED
APRIL 7TH 1885 No 315,848
AUG. 17TH 1886 No 347,387
JUNE 26TH 1888 No 385,208

ECONOMY is the Road to Success in all manufacturing lines particularly in brick-making. To insure the highest measure of success clayworkers must use the best and most economical appliances, for therein lies the key to a profitable business. Many years experience enables me to build and equip new brick plants or remodel old ones on practical lines that insures the largest and best output at the least expense.

Complete plants a specialty.

Clays tested and estimates furnished free of charge.

Address, **GEO. W. SHARER,**
2224 Tioga Street, PHILADELPHIA, PENN.

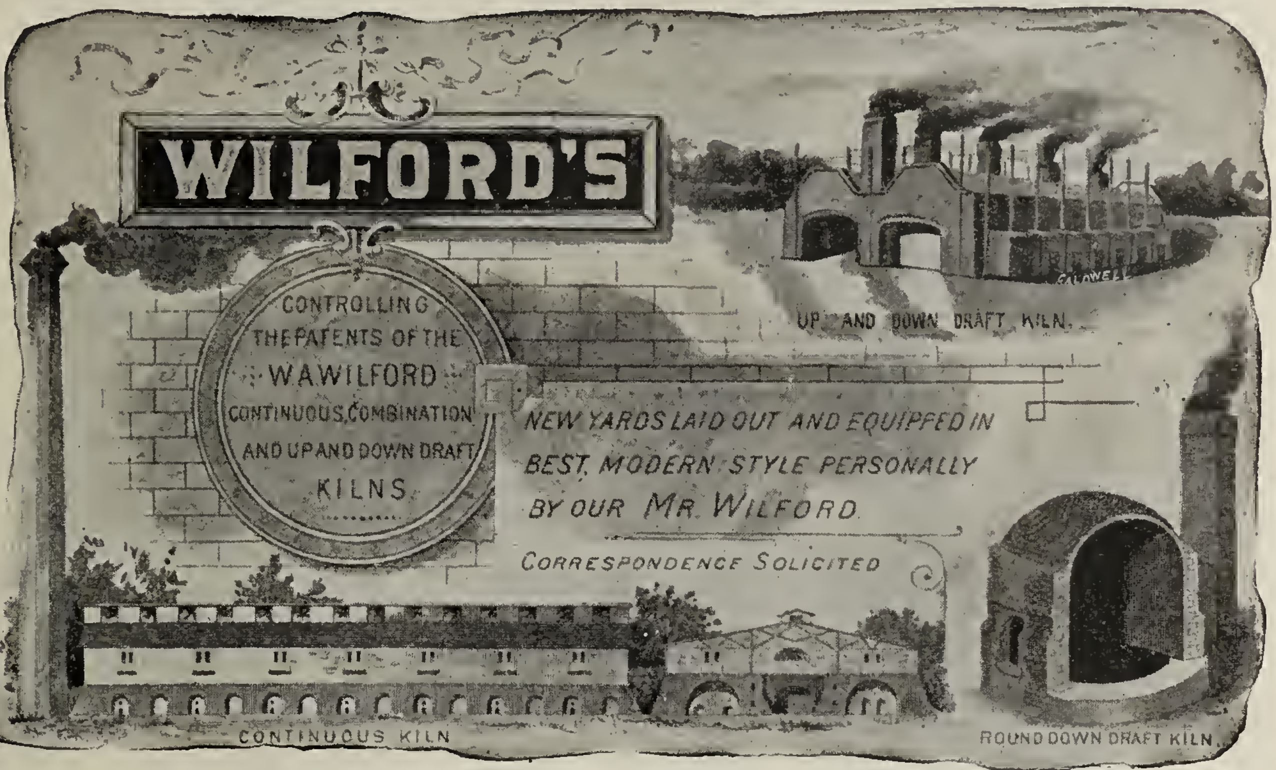
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD.
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

ROCHESTER BRICK & TILE M'F'G. CO.,
Brick and Drain Tiles, Hollow Brick, Etc.
213 *Power's Block.*

Rochester, N. Y., June 19, 1896.

Wilford Patent Kiln Co.

Dear Sir:—In answer to your inquiry as to what we can say in reference to your kiln recently constructed on our yard, we are very much pleased with it.

At the present time we have burned once and a half round, and we not only find it to be very economical in fuel, but the brick are coming out well burned, in first-class condition and very little waste.

After a little longer use we hope to make a still better showing.

Truly yours,
ROCHESTER BRICK & TILE M'F'G. CO.,
Per Ira L. Otis, Pres.

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

Toronto, July 21st, 1895.

Wilford Patent Kiln Co.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety)

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

Toronto, August 7th, 1895.

W. A. Wilford, Esq.,
Wilford Patent Kiln Co.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

Elmira, N. Y., August 30th, 1895.

Wilford Patent Kiln Co.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and 2 Builders Exchange.*

Wilford Patent Kiln Co.

Buffalo, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

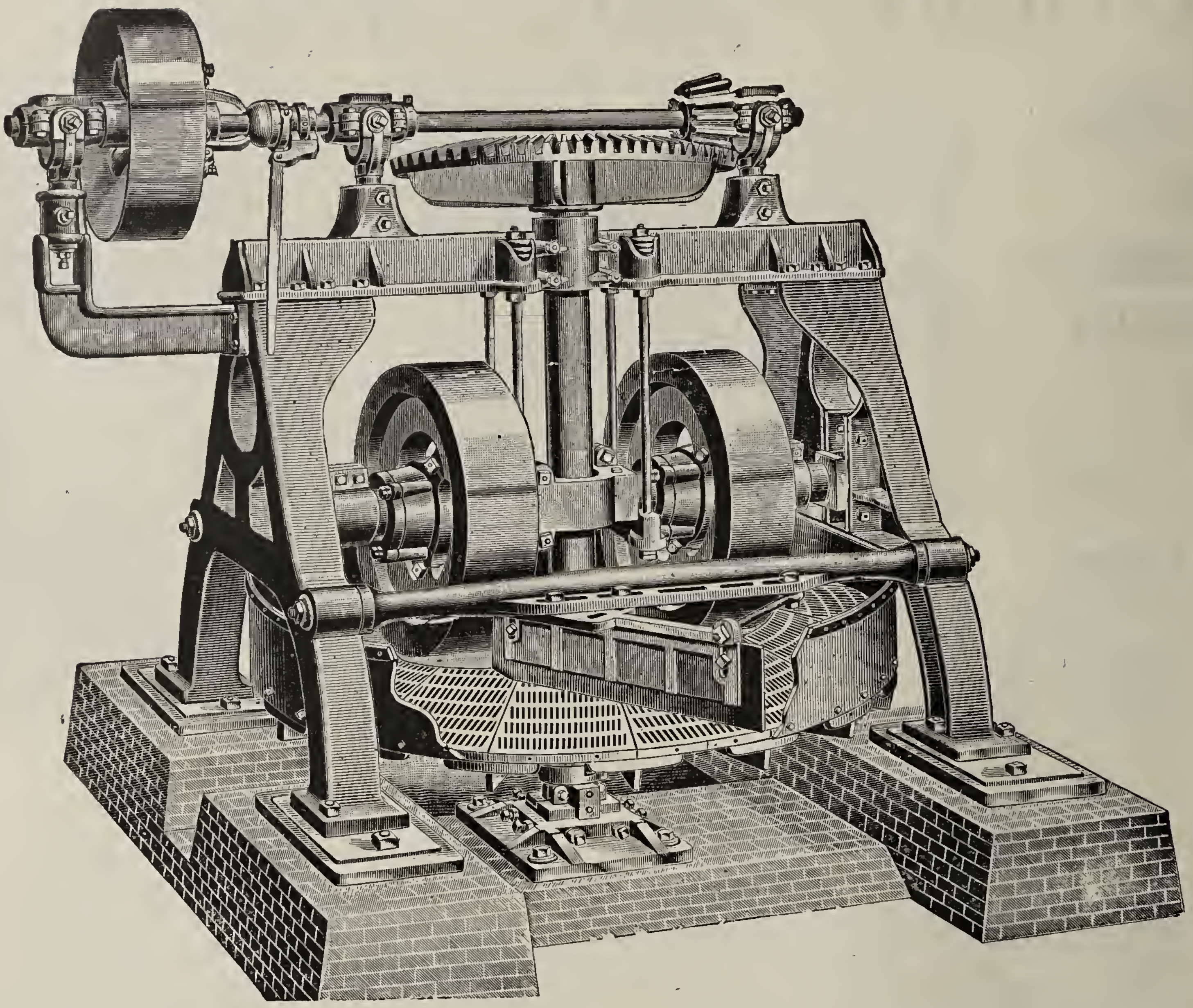
Yours very truly,
BRUSH BROS.

Let us give you full Particulars.

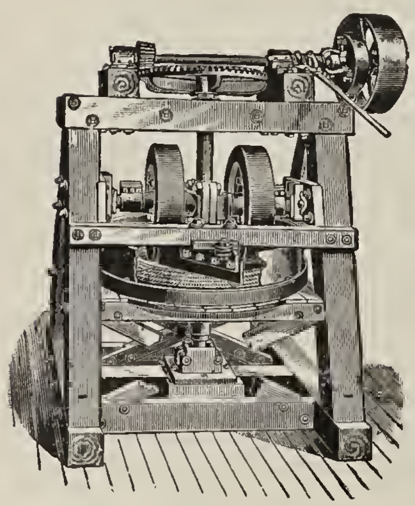
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.



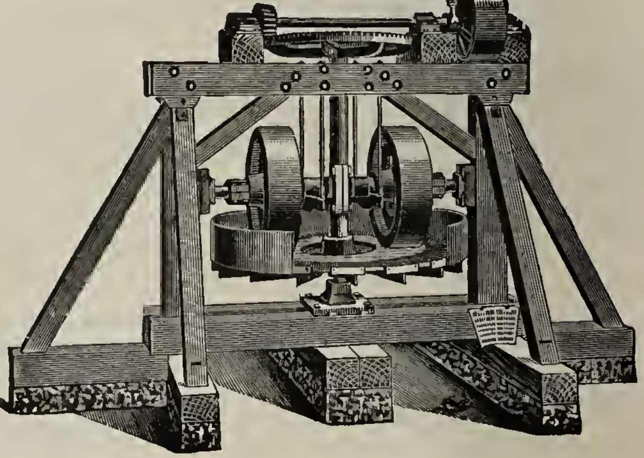
OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,

WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



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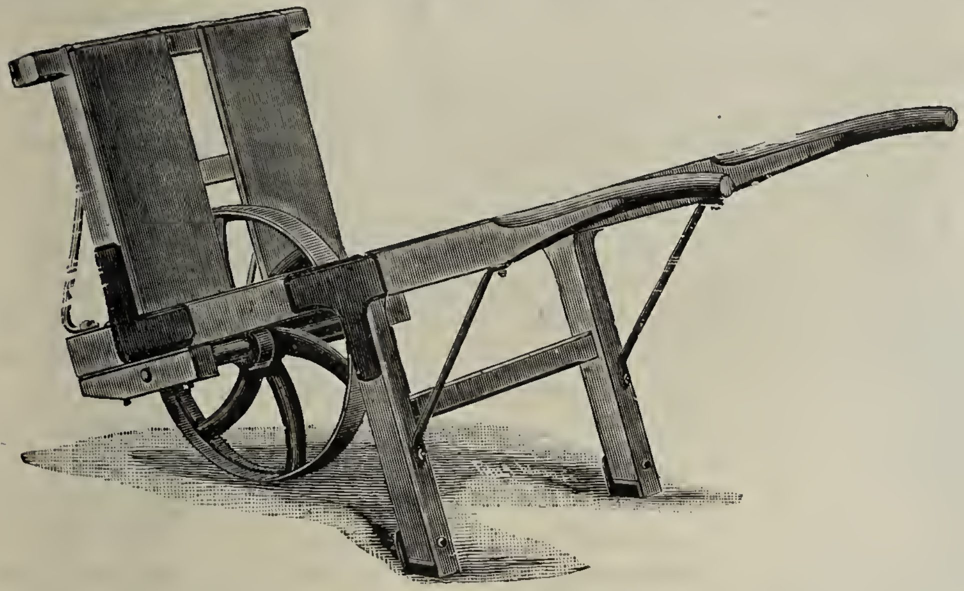
FROST ENGINE CO., Galesburg, Ill.,
U. S. A.

Use "Martin's" White Oak

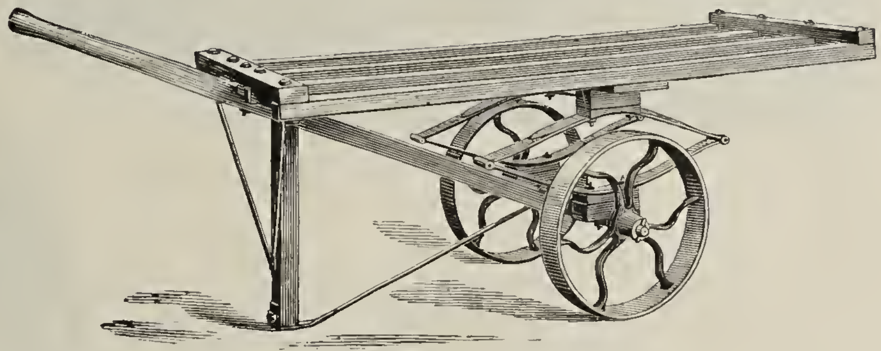


Barrows

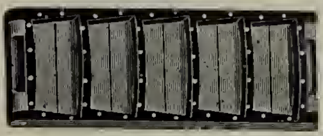
..and..

Trucks.

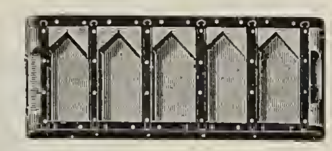
We respectfully solicit a trial order. . . . . . .

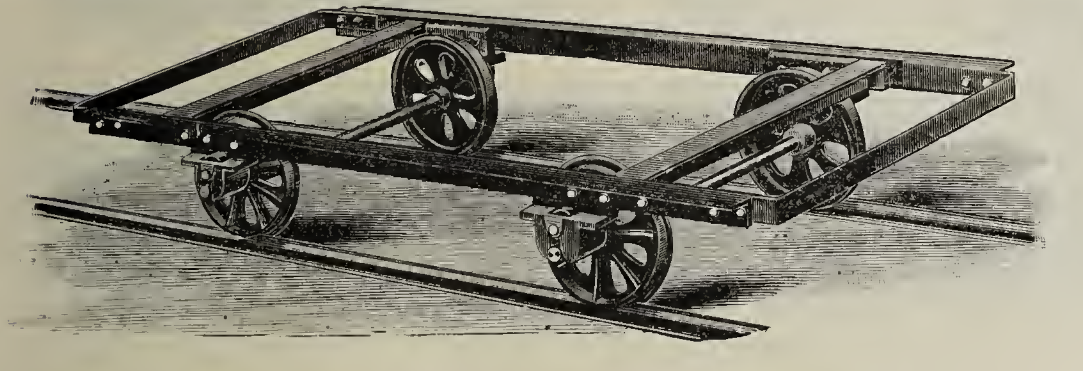


BRICK MOULDS.



ALL SHAPES AND SIZES,
With or without Panel Bottoms and Name Plates.





DRYER CARS

Of all Kinds

A Specialty.

The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

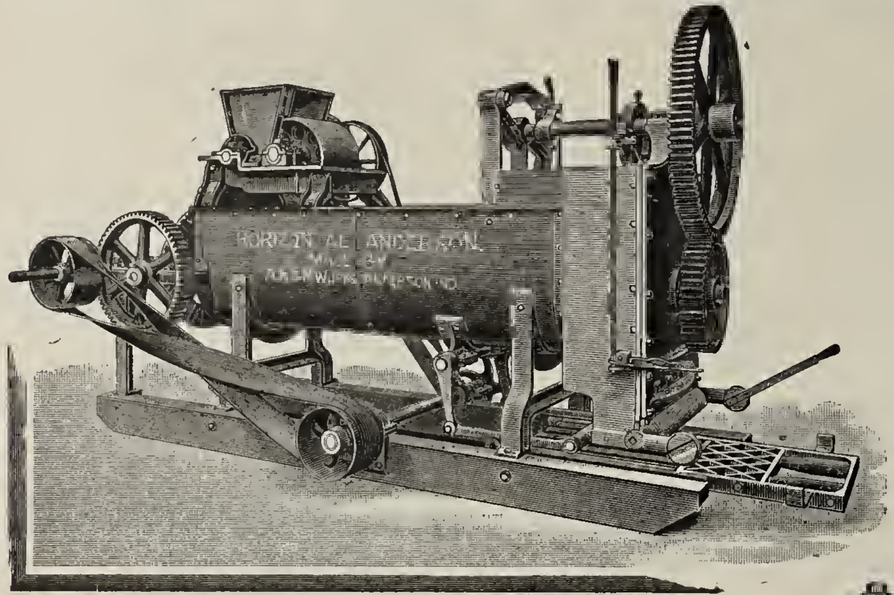
Manufacturers of the Famous "Henry Martin"
Brick Machines and Brickyard Supplies. . .

Lancaster, Penna., U. S. A.

A New Departure in Brick Machinery

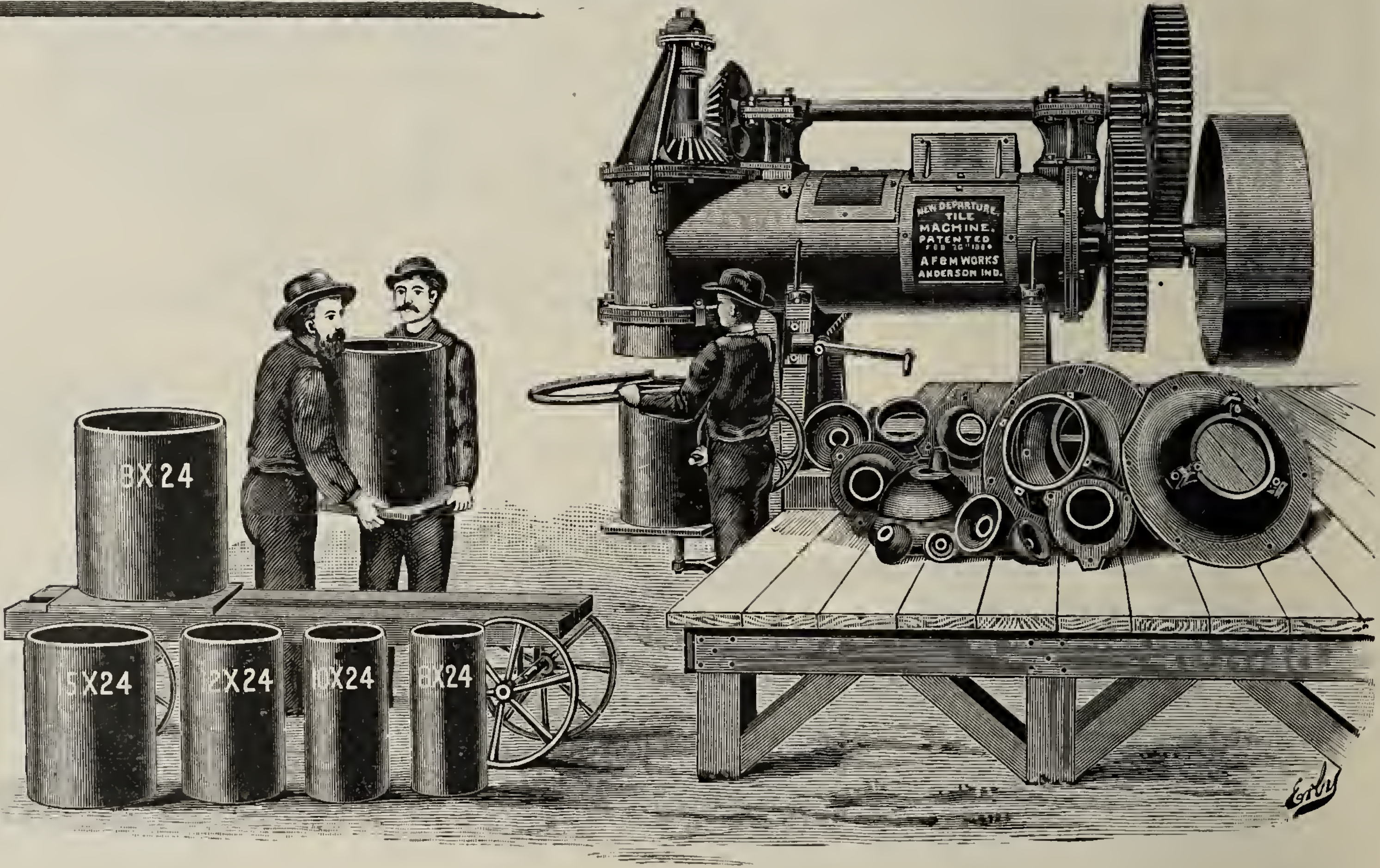
THE HORIZONTAL ANDERSON

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.



This Machine is self-contained and requires no other Shafting, Pulleys, Hangers or even Foundation, other than that shown in cut. Manufacturers of Brick by the soft mud process will find it to their interest to investigate this Machine before making their contracts for new Machinery. Write for descriptive circular, price, etc. We can save you money in the beginning, and make you happy in the end. Capacity equal to any other Machine on the market. We extend a cordial invitation to all prospective purchasers to pay us a visit and allow us to show them the Machine in operation.

* * *


NEW DEPARTURE TILE MACHINE. PATENTED
A F&M WORKS ANDERSON IND.
18X24
15X24
12X24
10X24
8X24

THE GREATEST ON EARTH.

We have imitators but no competitors. The **NEW DEPARTURE** makes all sizes of tile from 3 inches to 24 inches in diameter in a manner that defies competition.

DOWN DELIVERY FOR LARGE TILE. SIDE DELIVERY FOR SMALL TILE.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.

THE above is a photograph of four cars loaded with Clayworking Machinery, manufactured by **C. & A. Potts & Co., Indianapolis, Ind.,** for the National Brick and Terra Cotta Co. at Passaic, N. J., this was shipped July 18th, and consisted of

One Iron Horizontal Stock Brick Machine, Disintegrators, Granulators, Winding Drum, Wire Rope Mould Sanders, Clay Cars, Barrows, Trucks, Moulds, "T" Rails, Switches, Shafting, Hangers, Pulleys, Belting, 100 H. P. Engine, Two 100 H. P. Boilers. Making a Complete Plant.

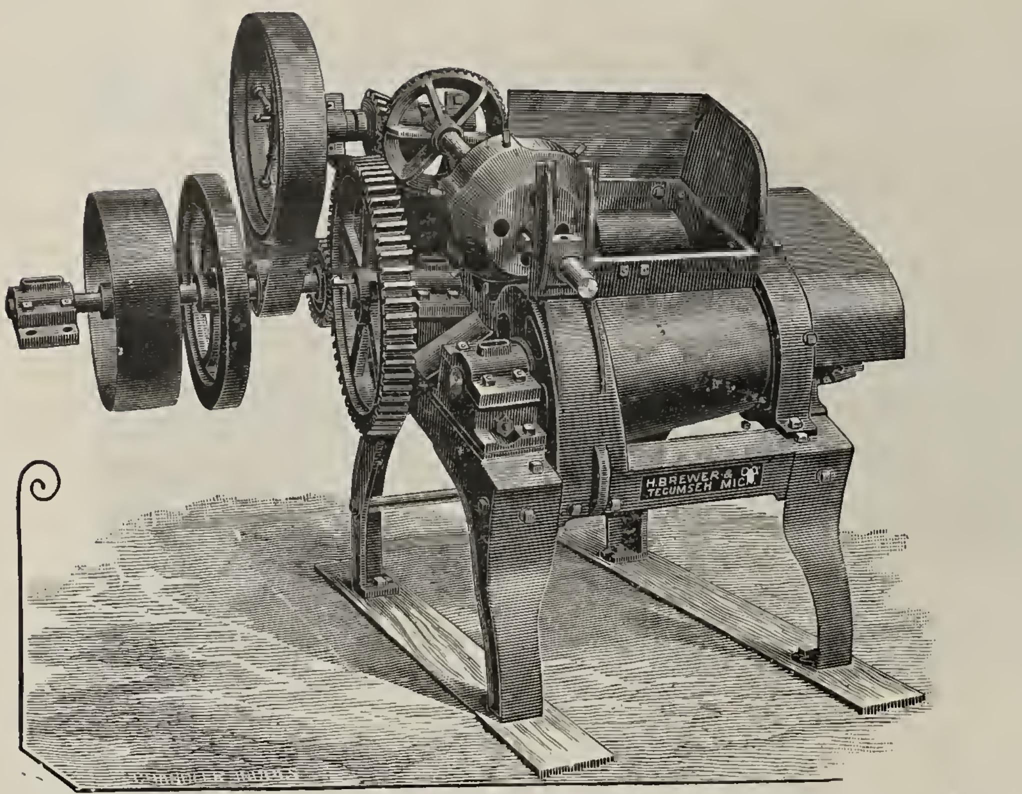
We are prepared to make estimates on complete plants of any desired capacity. We being manufacturers can save you money, as there are no commissions to pay.

We guarantee results and erect subject to guarantee and trial. It will pay to have our Catalogue and Prices. We are always pleased to quote prices on anything you need.

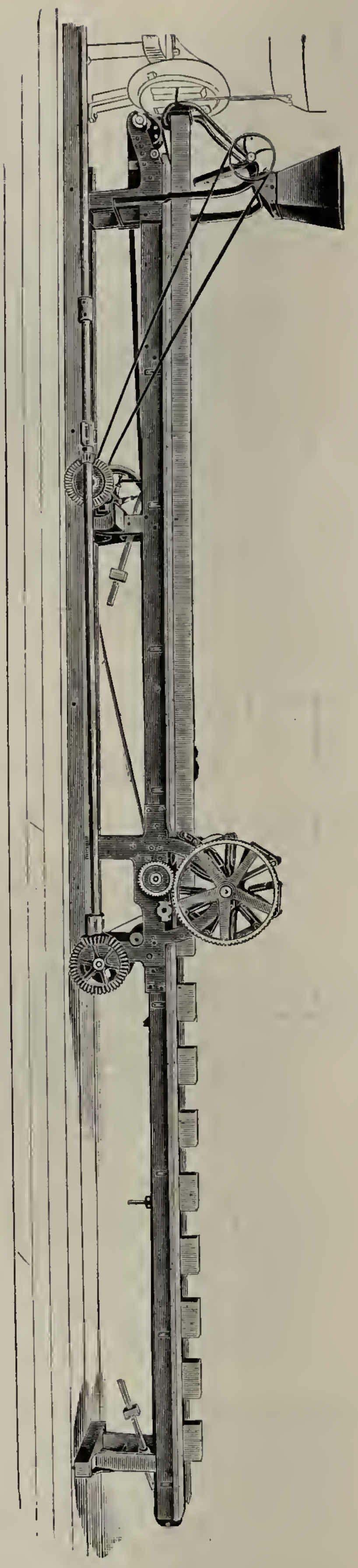
* * *

C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.


H. BREWER & CO.
TECUMSEH MICH.

STONE EXTRACTING CLAY CRUSHER.

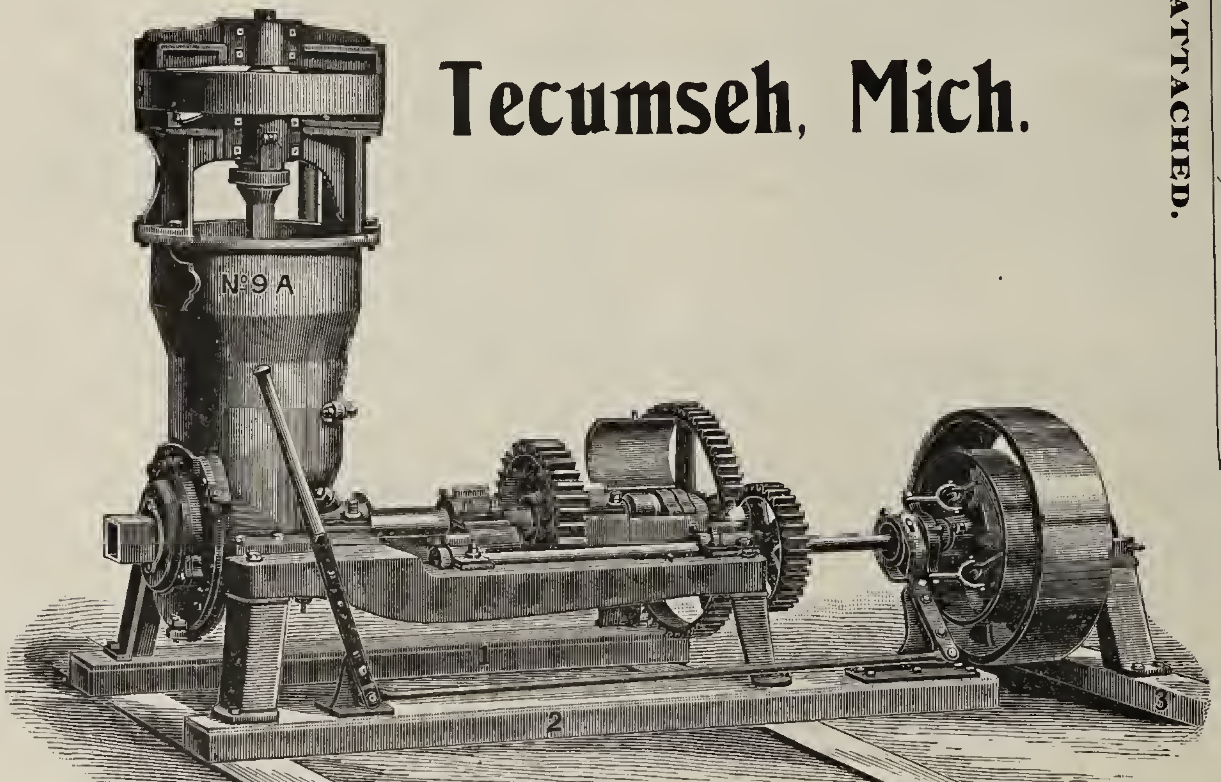


AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

Manufactured by

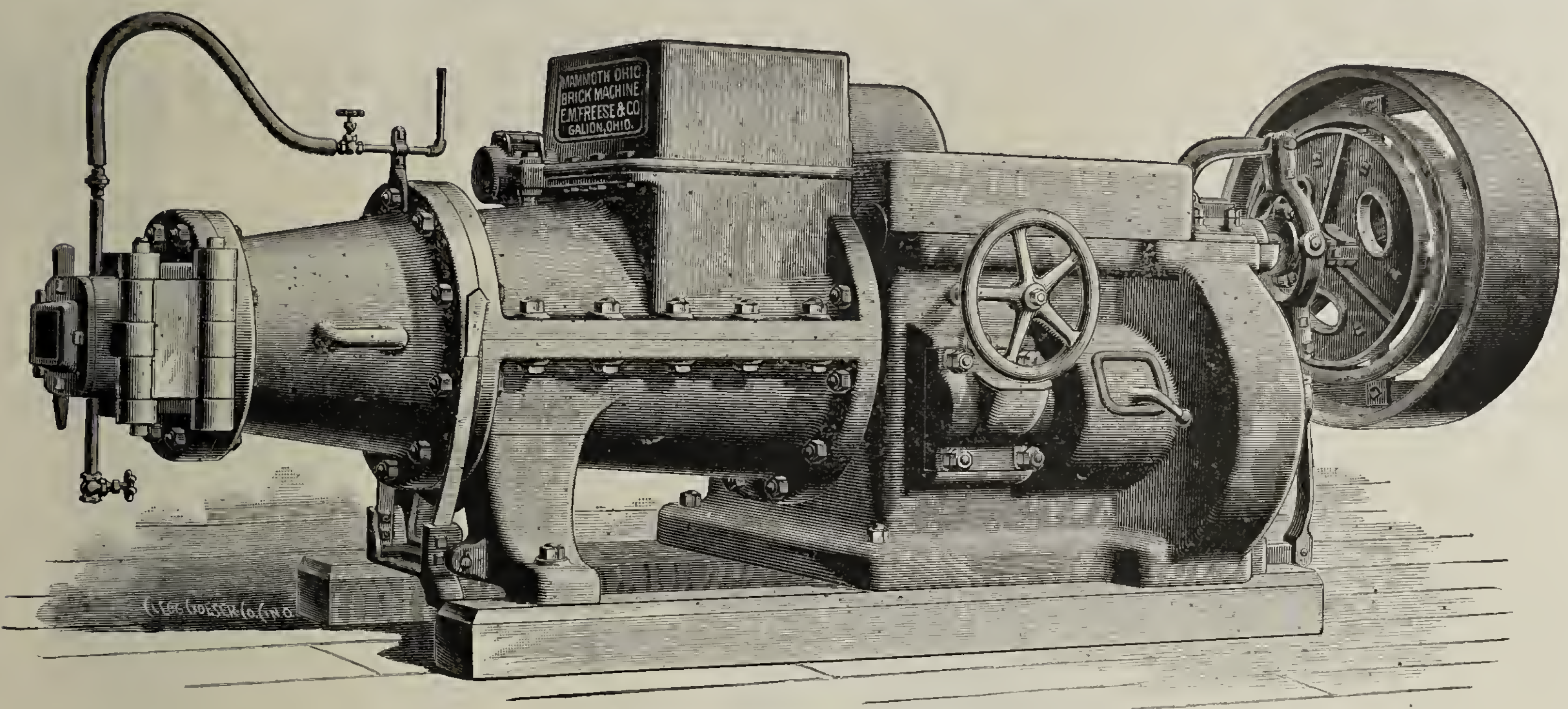
H. Brewer & Co.,

Tecumseh, Mich.

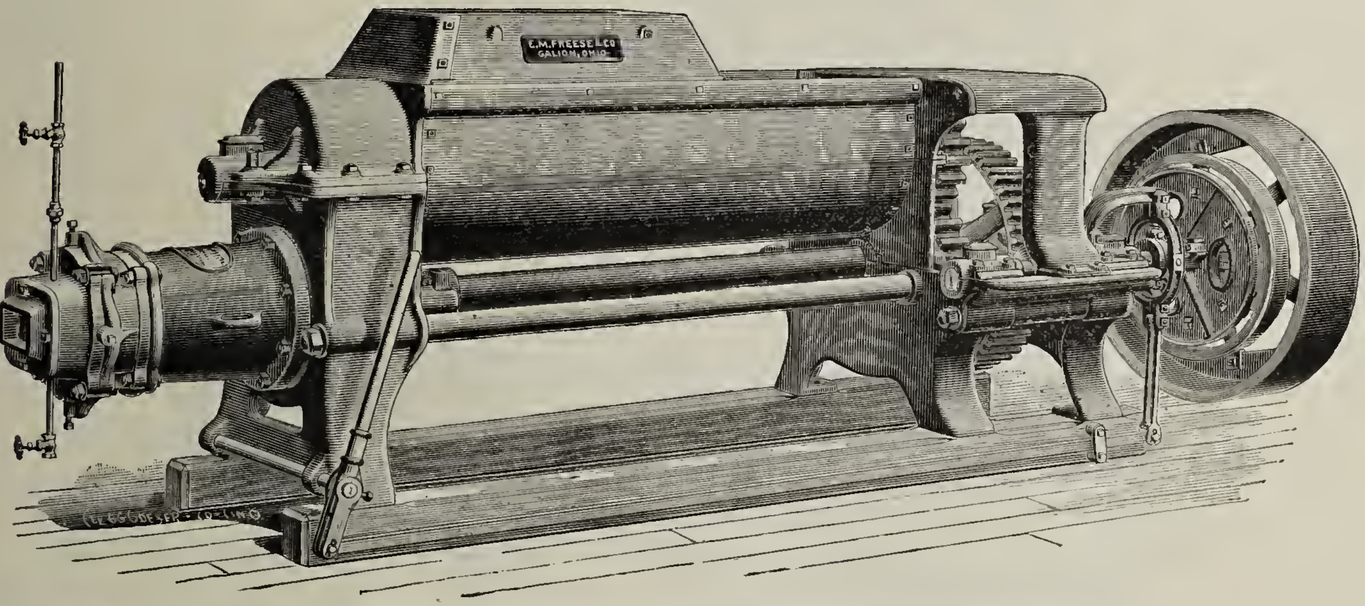


No. 9 "A" BRICK MACHINE.

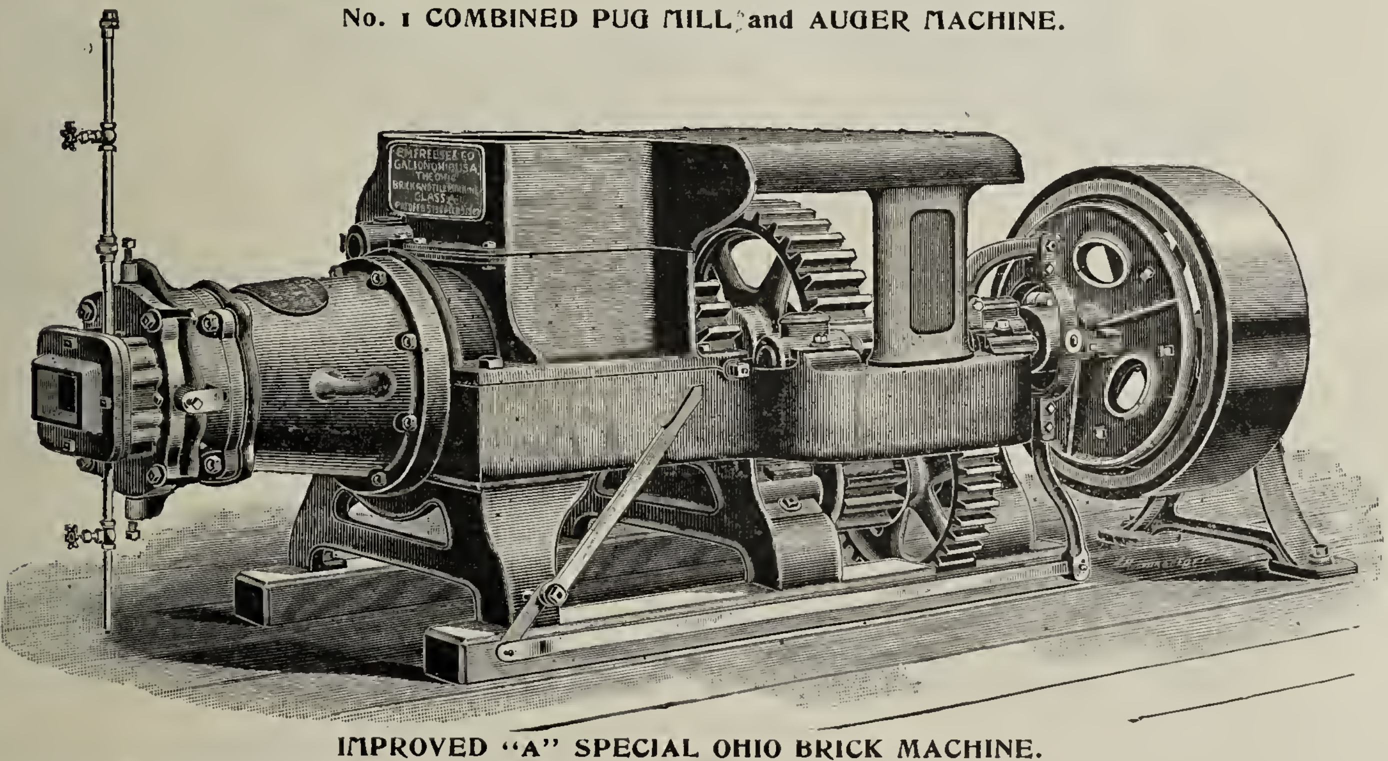
E. M. FREESE & CO., GALION, OHIO.



MAMMOTH BRICK MACHINE.



No. 1 COMBINED PUG MILL and AUGER MACHINE.

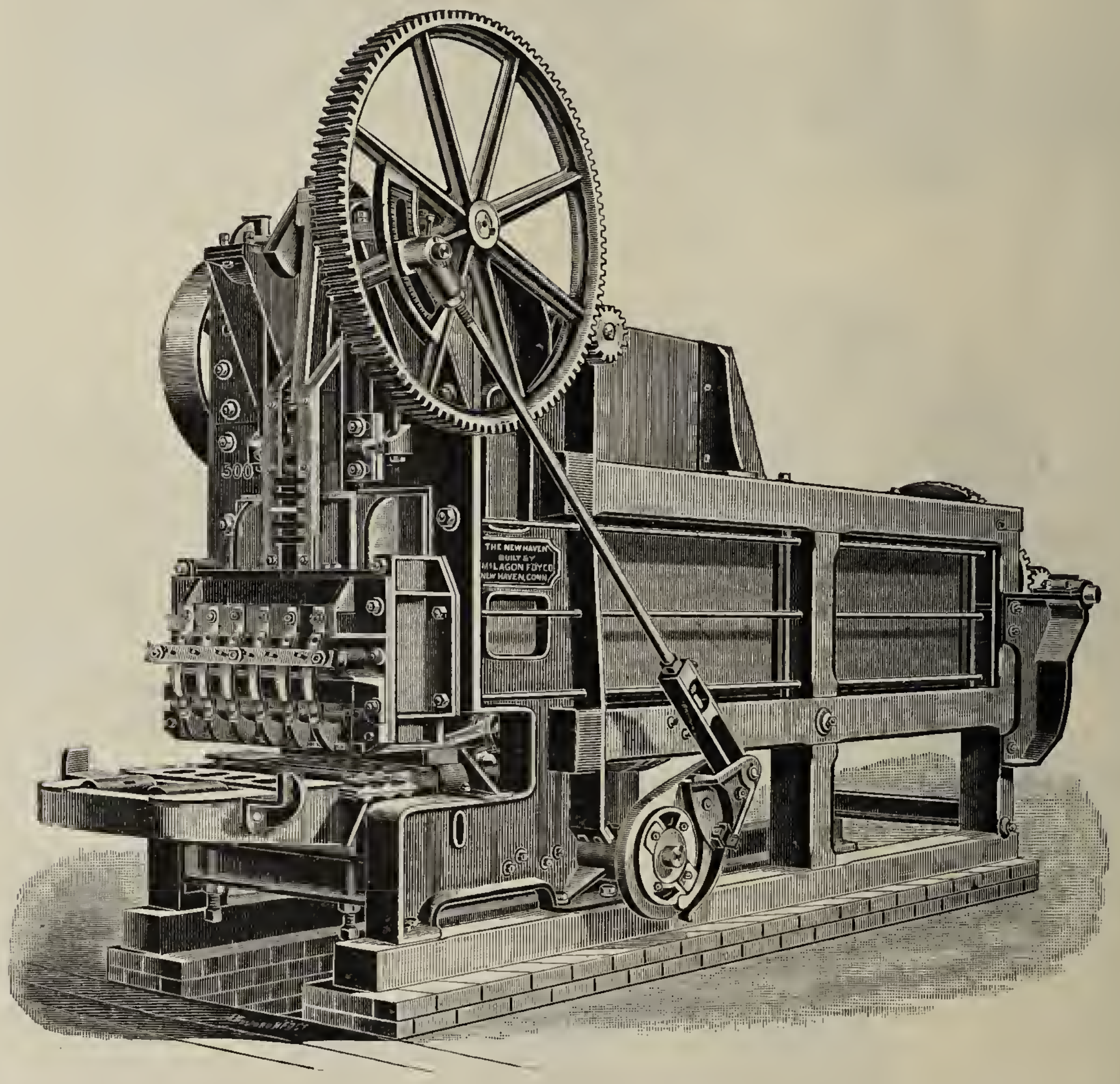


IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.

More "New Haven" Brick Machines

In use in New England than any other kind. This shows the approval of our Home Trade.



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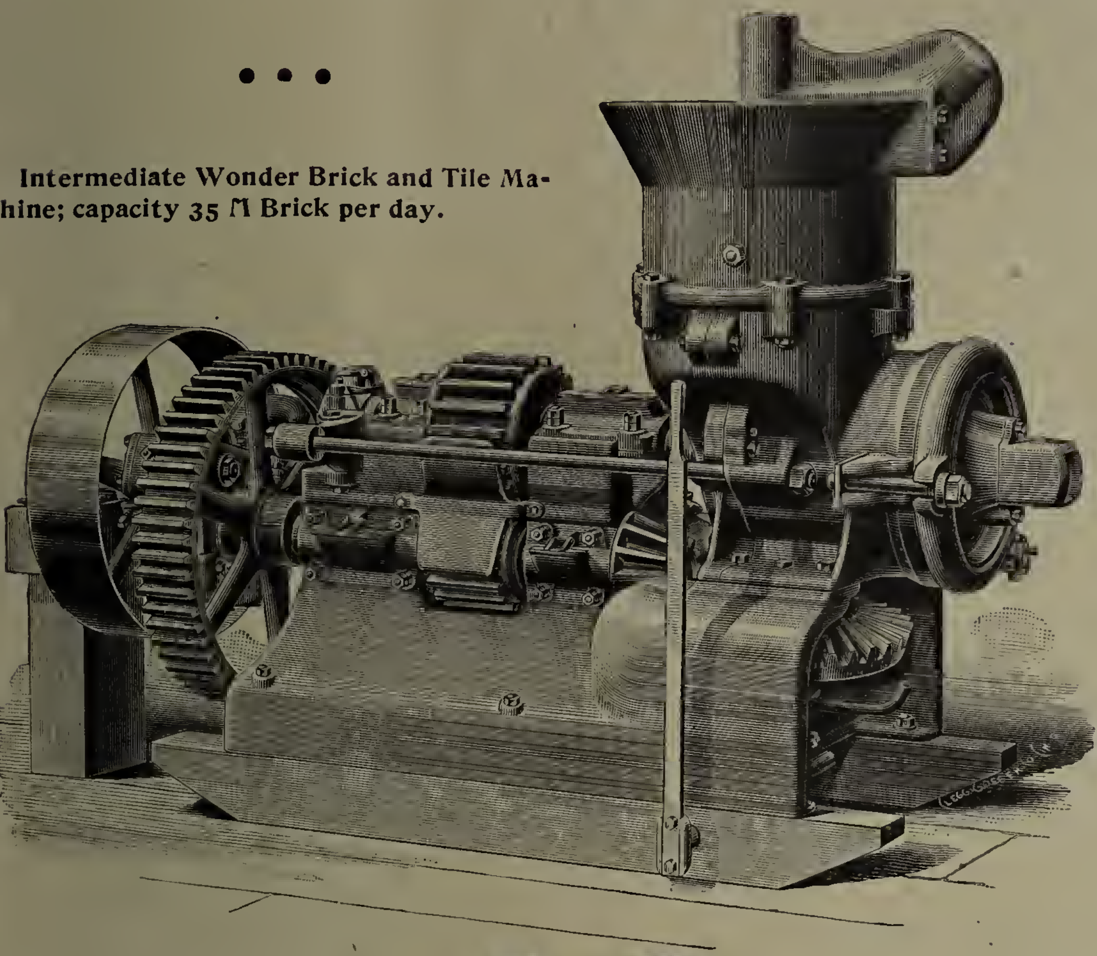

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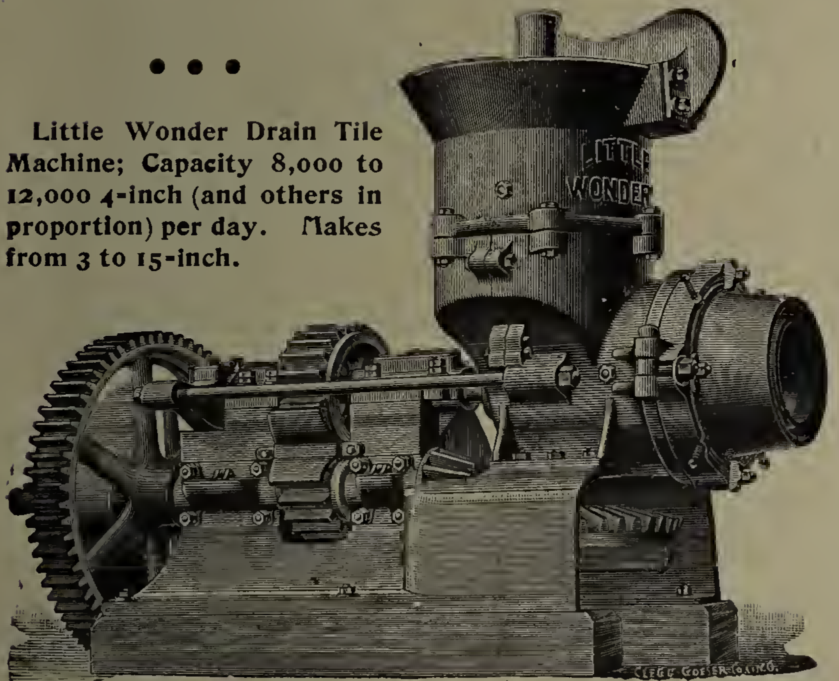

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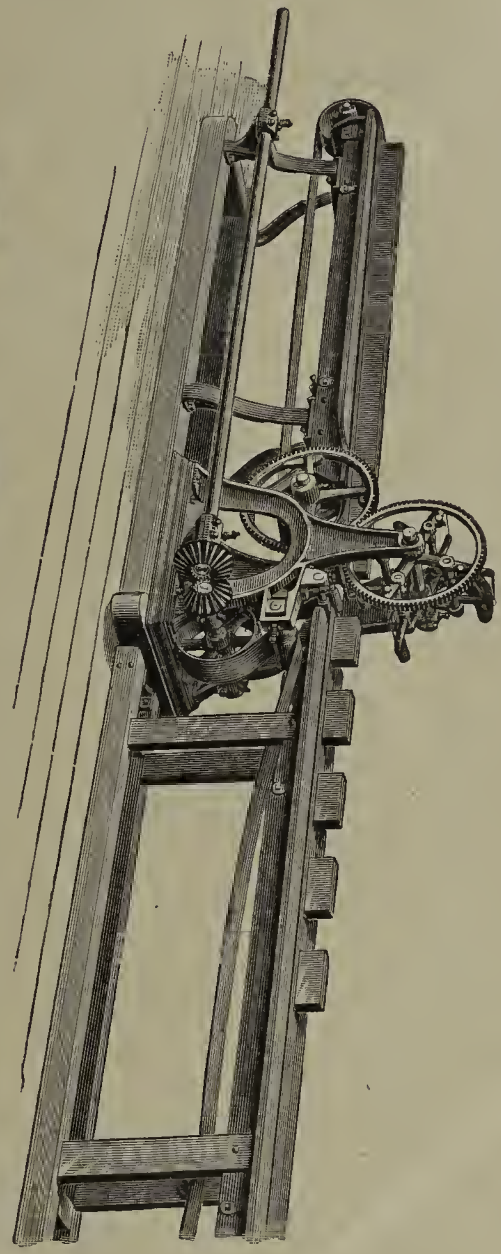

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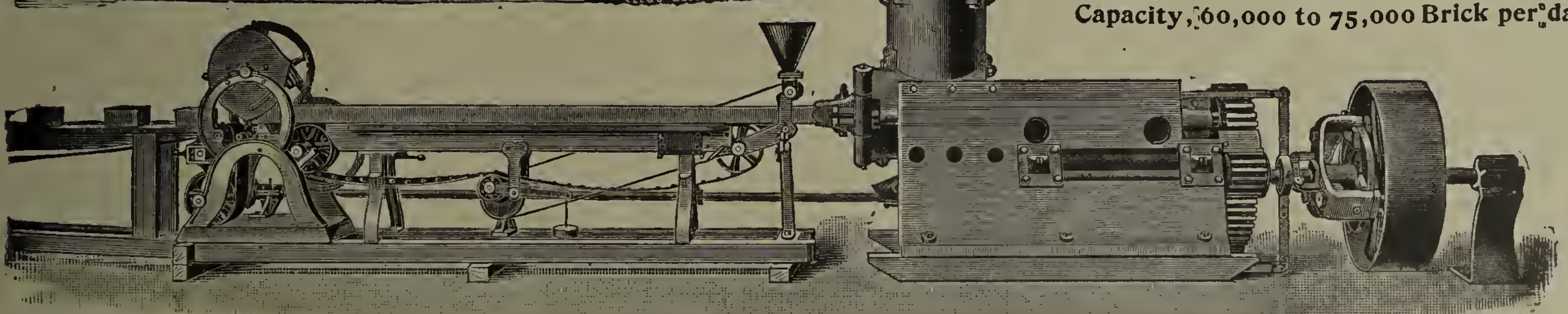

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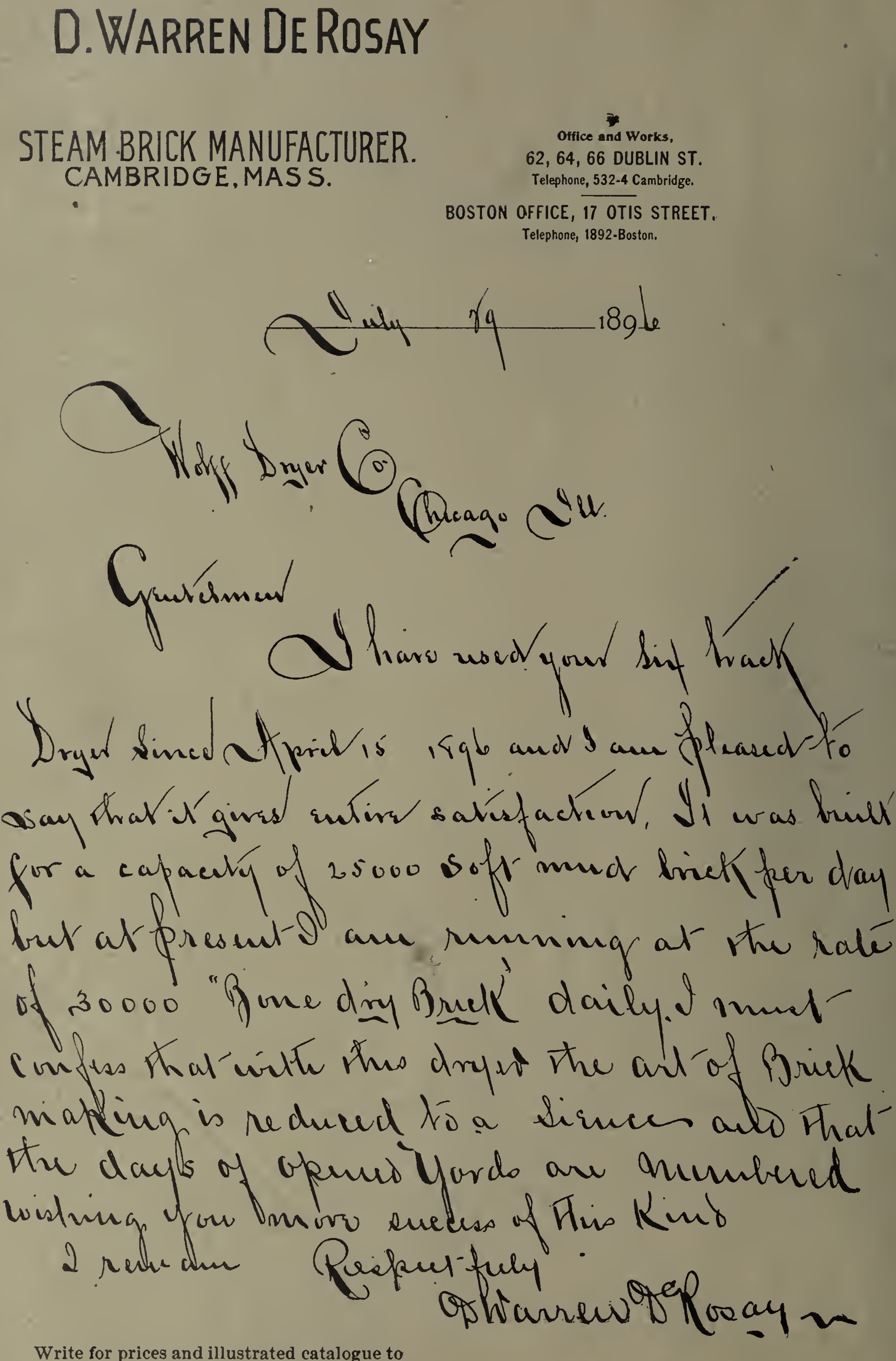

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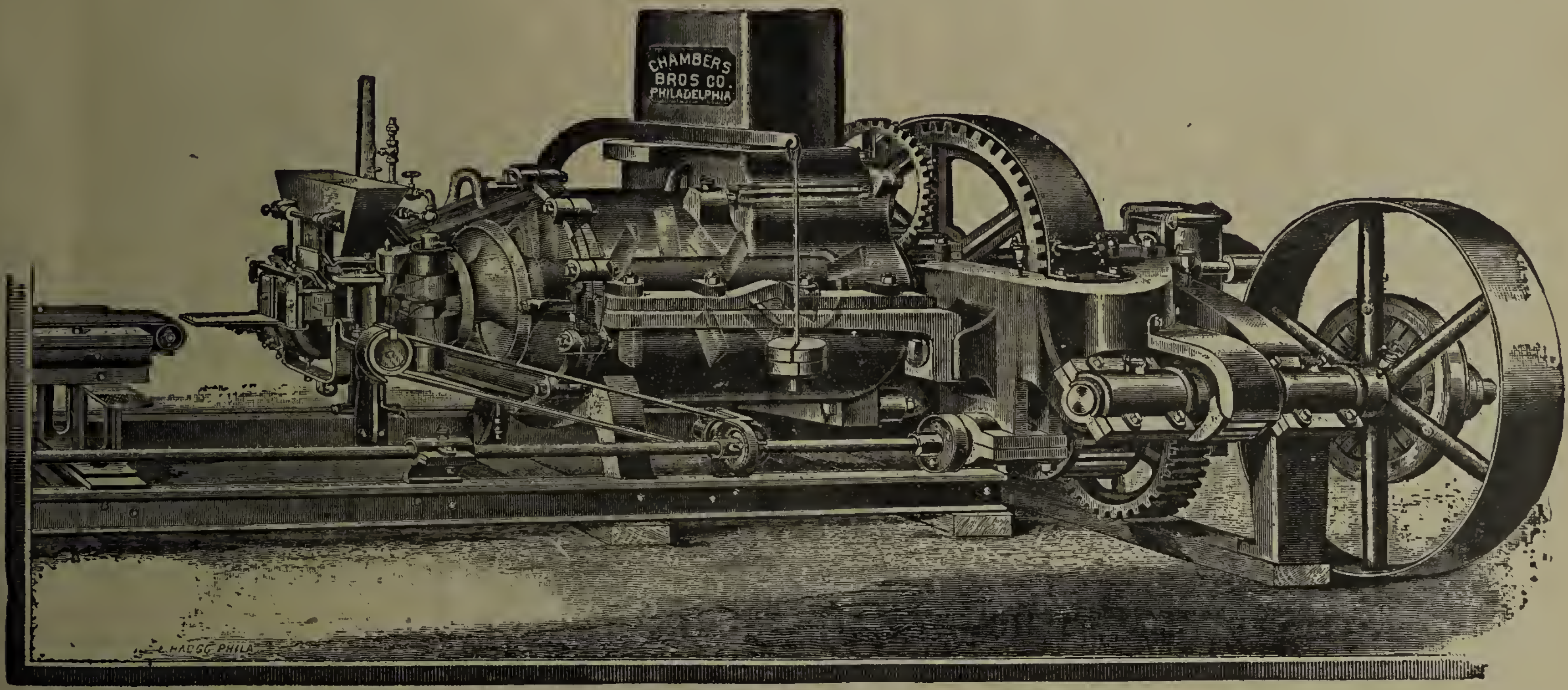

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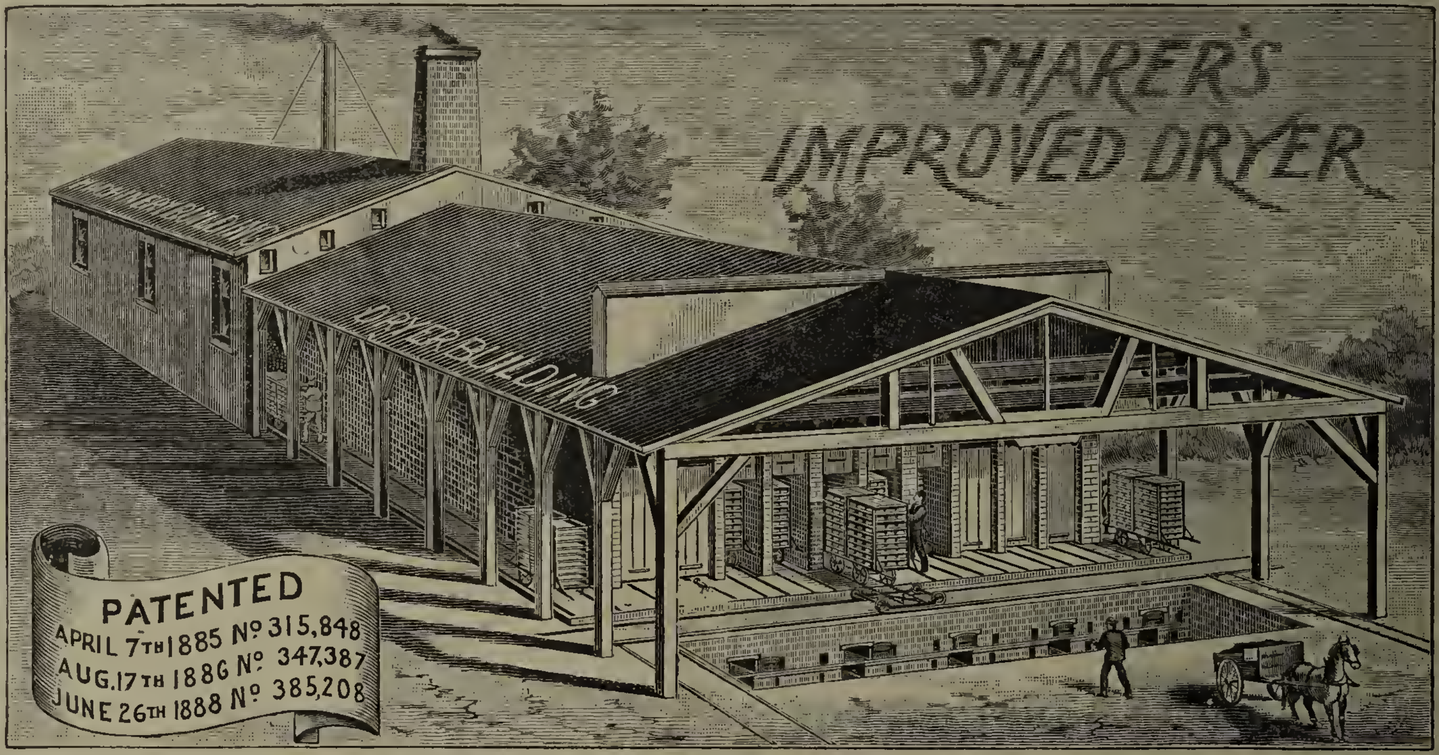
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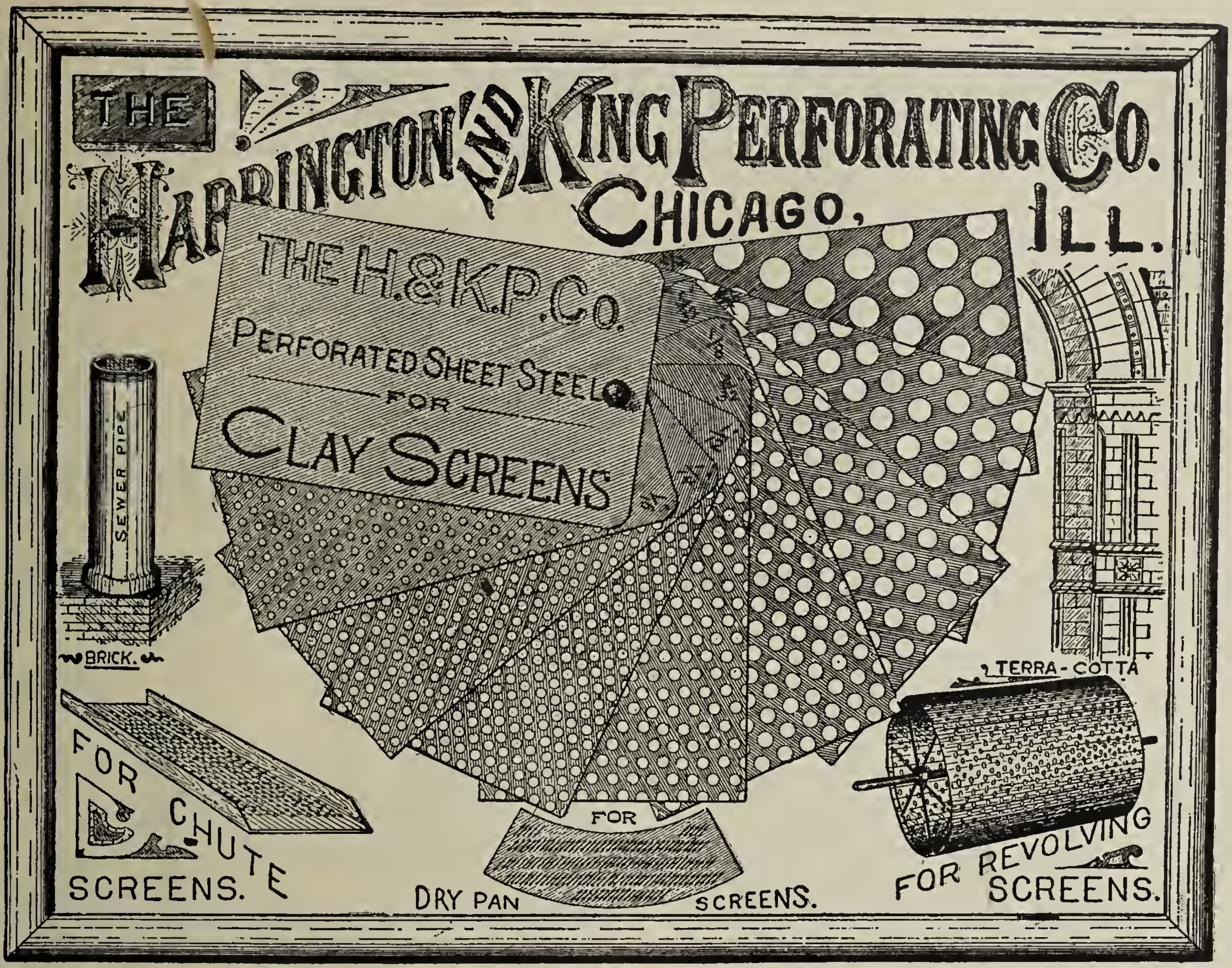
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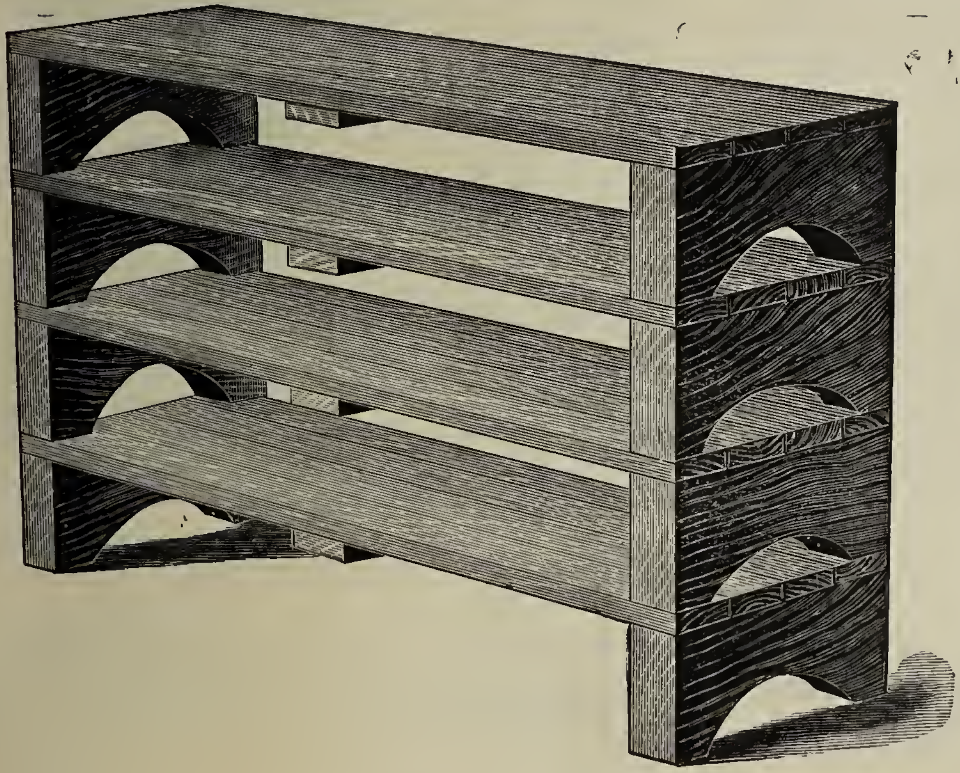

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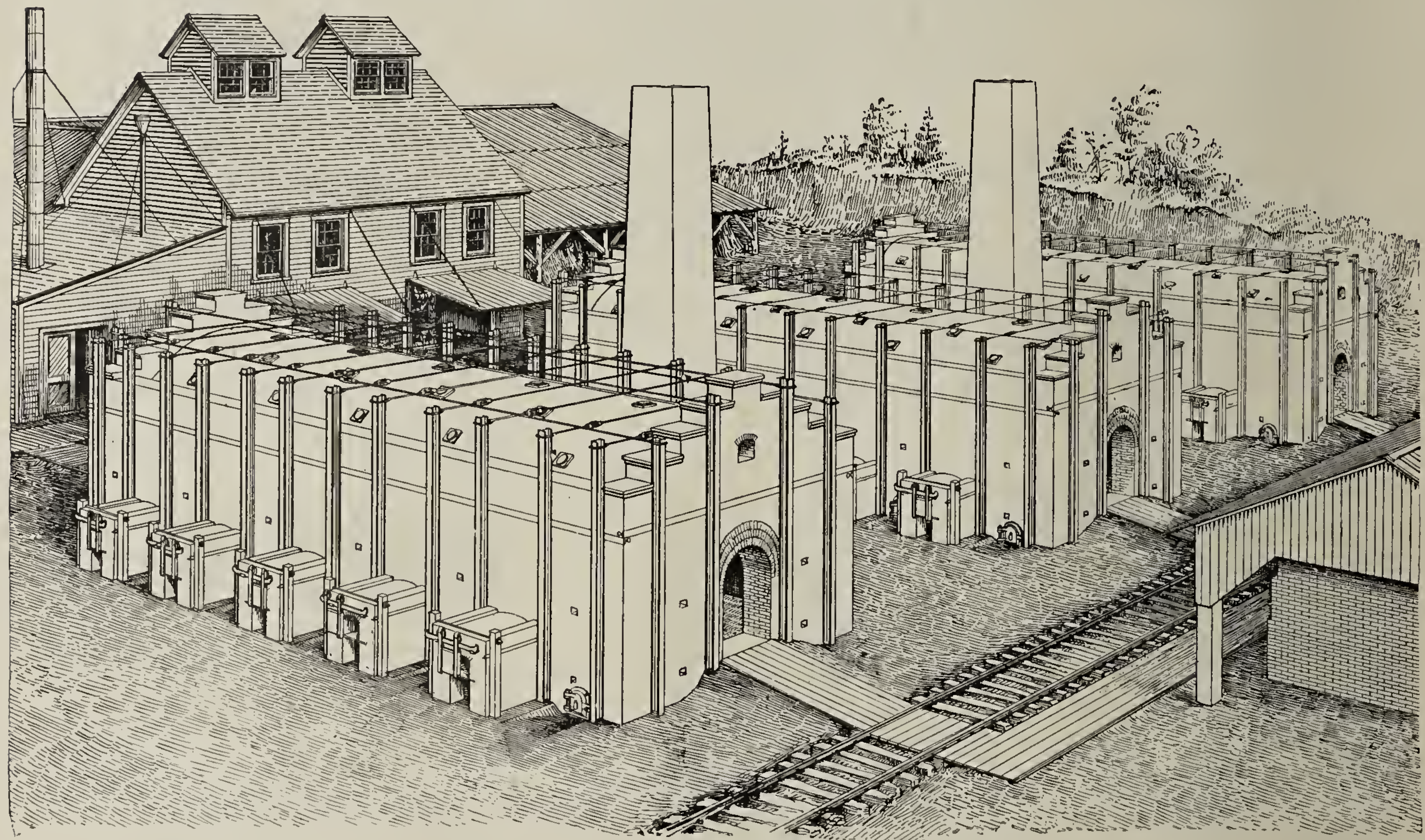

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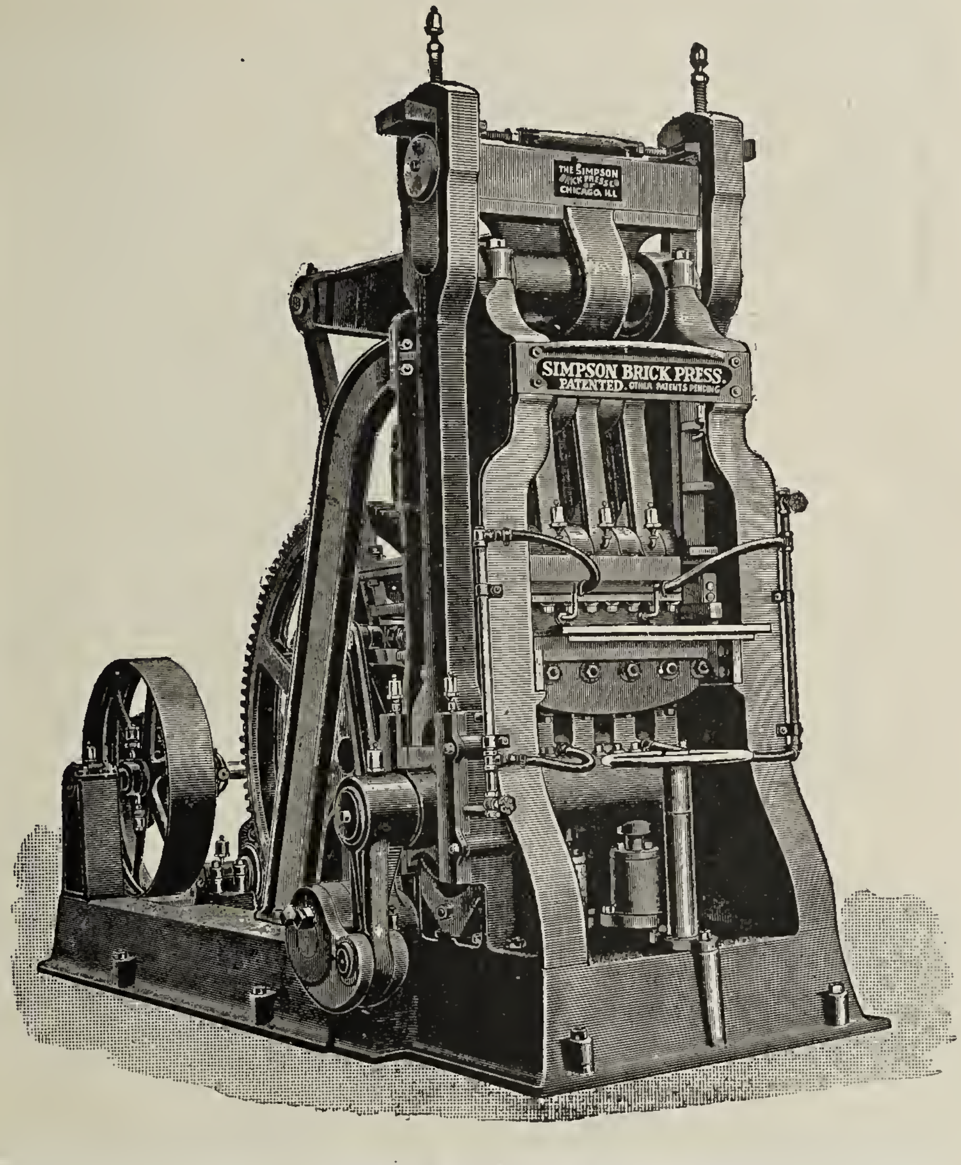
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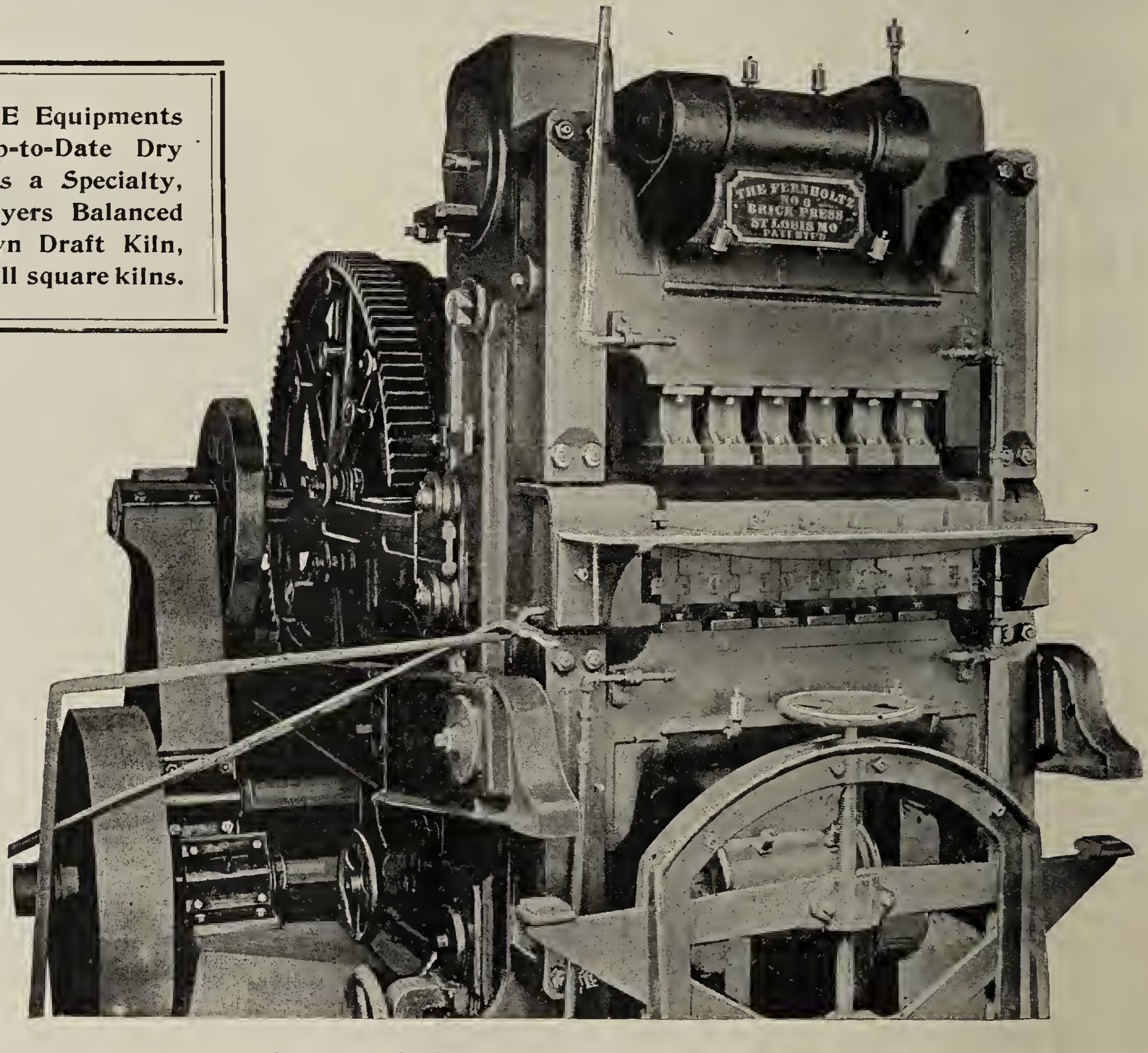

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We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

The opinion of those using our press and full information on application.

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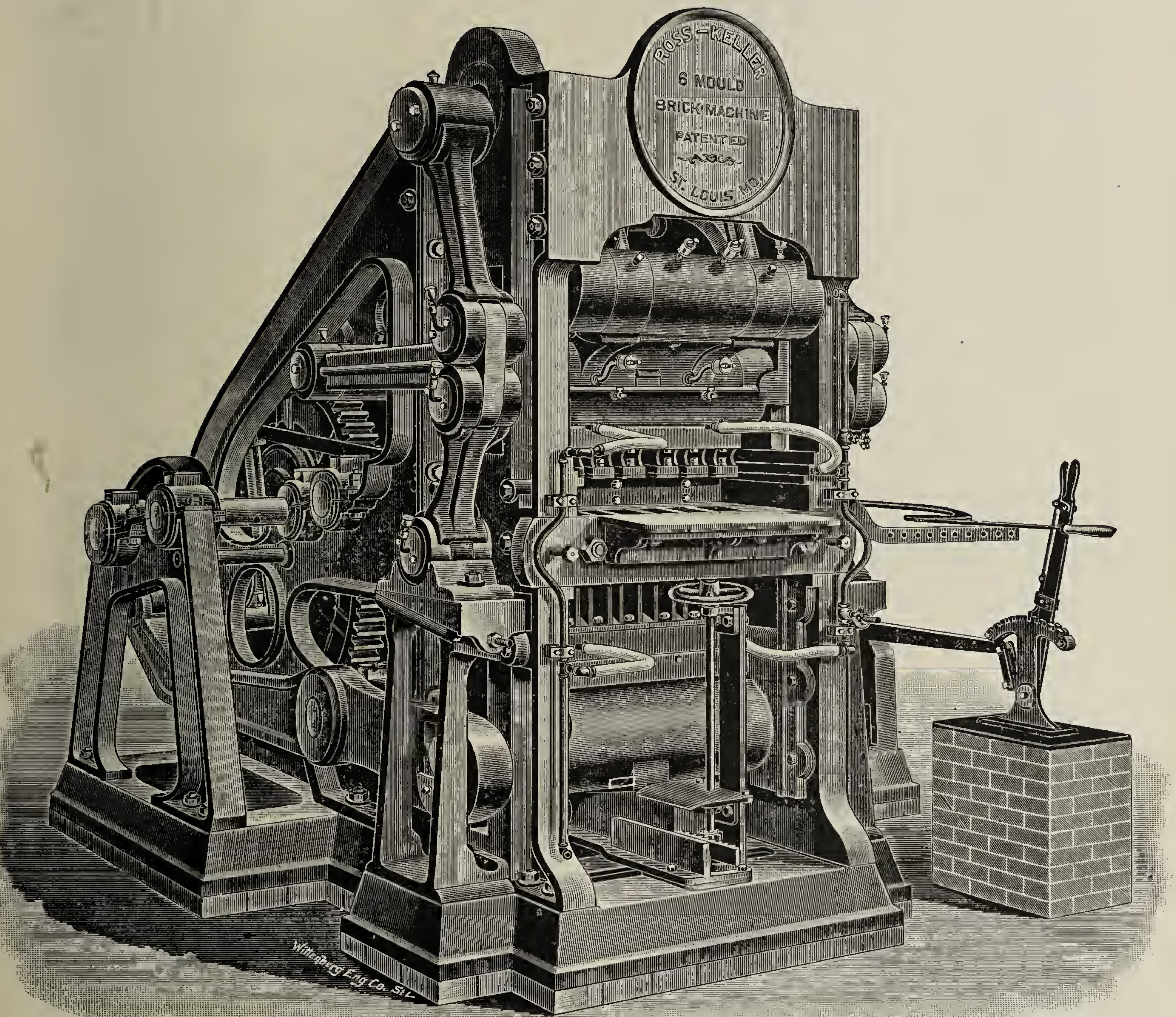

The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Requires but one minute to change the brick from one thickness to another. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

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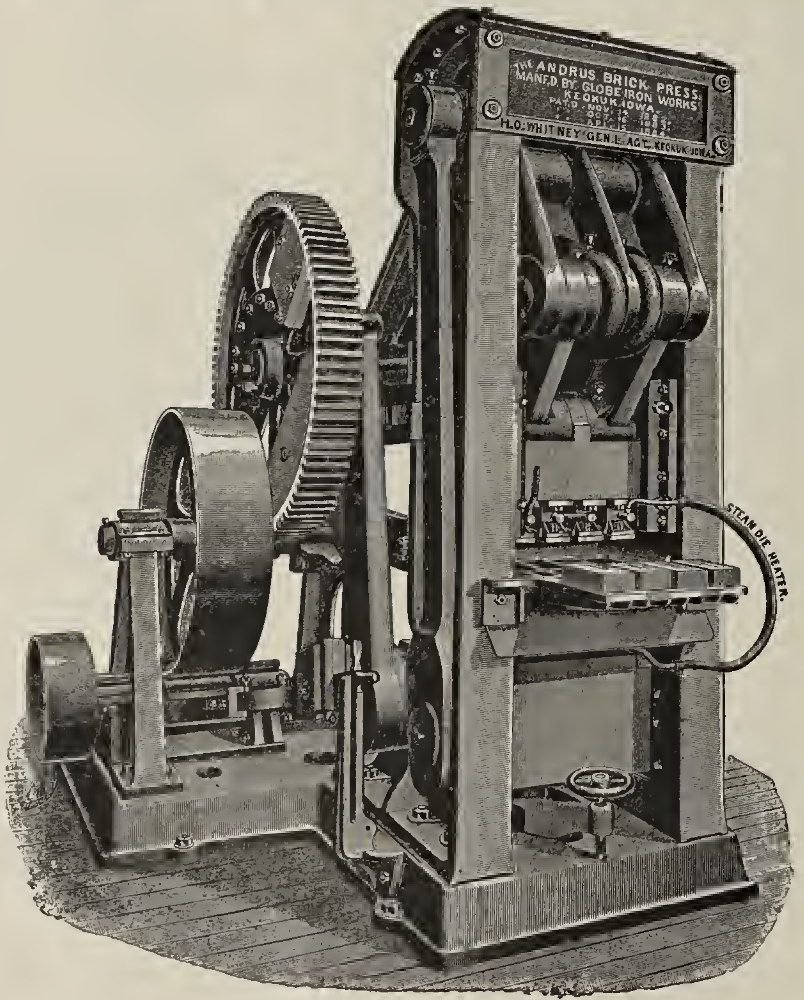
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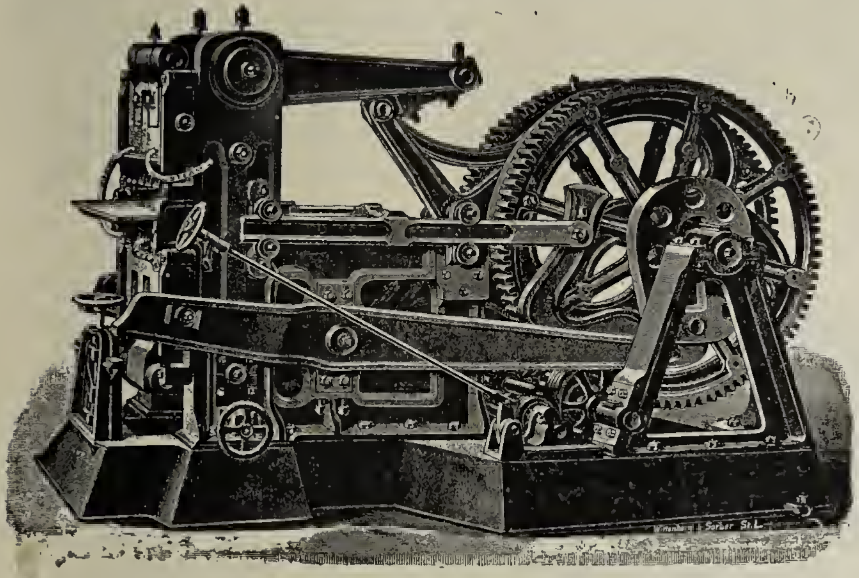

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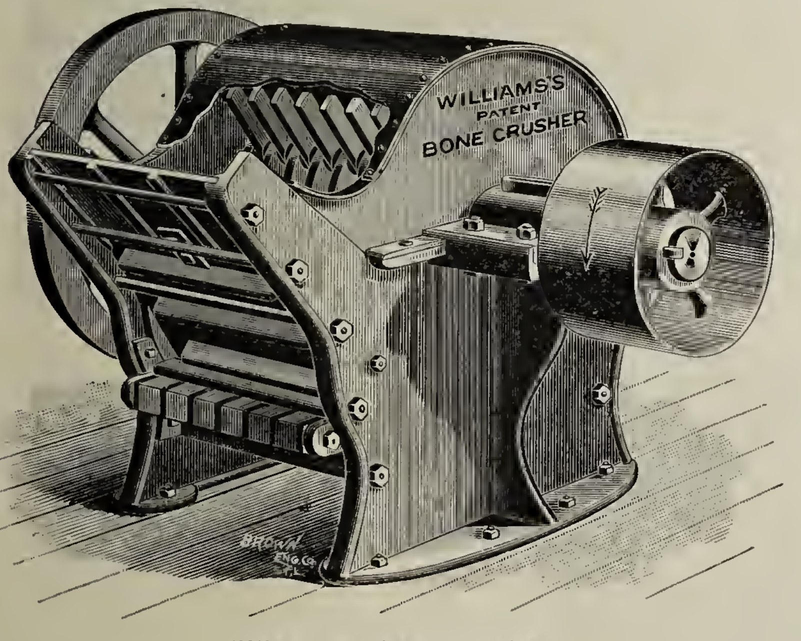

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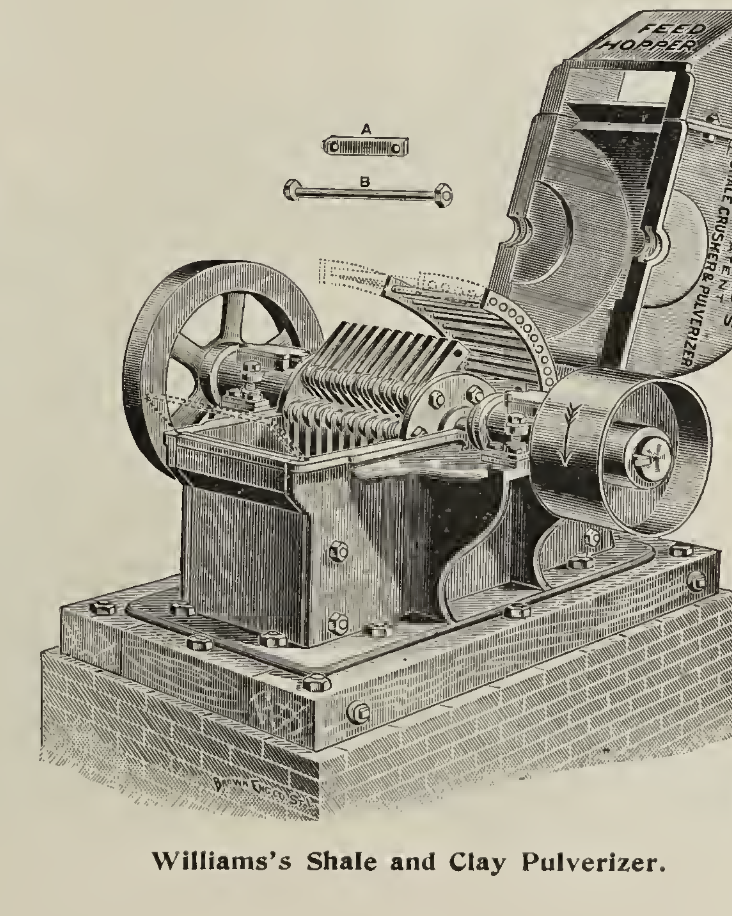
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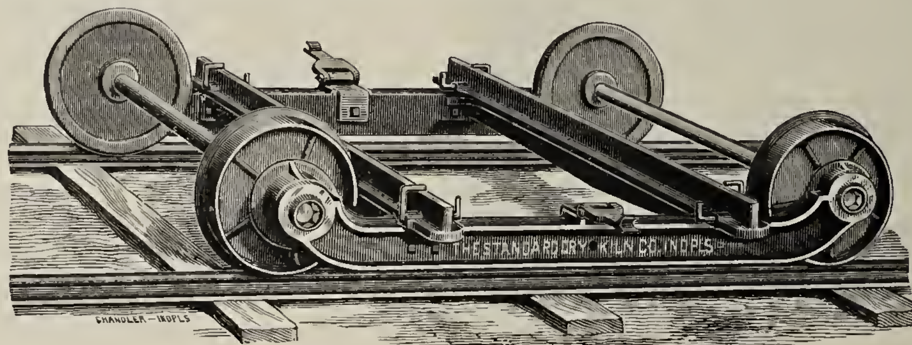
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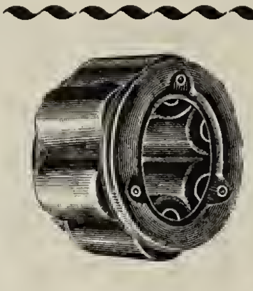
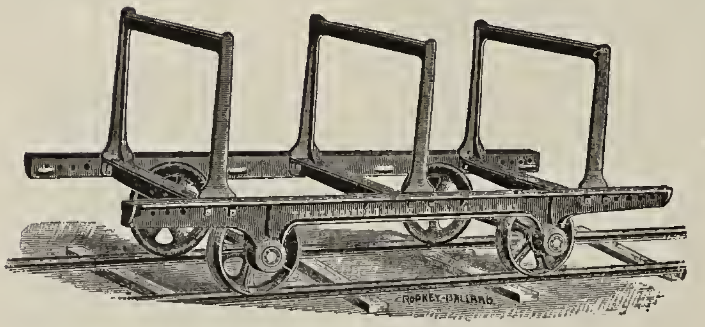
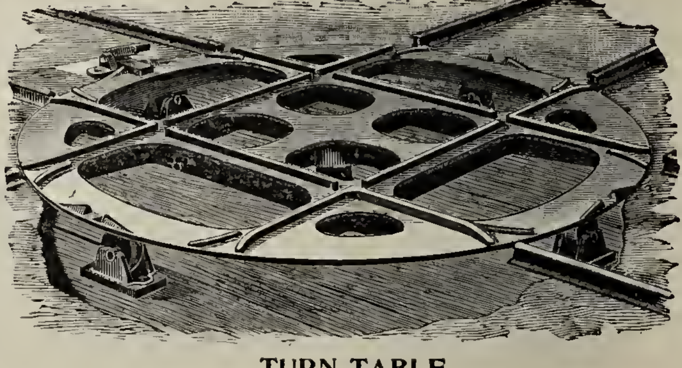


Roller Bearing



DOUBLE DECK CAR.



TURN TABLE.

You'll Make no Mistake

In your choice if you select our Equipment for either an old or new Drying Plant; and if in need of the latter, don't fail to investigate the merits of

**The Standard
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It has stood the test of time and has been found to wear well. It's no experiment, but a recorded success, as our patrons cheerfully testify.

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THE CLAY-WORKER

THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

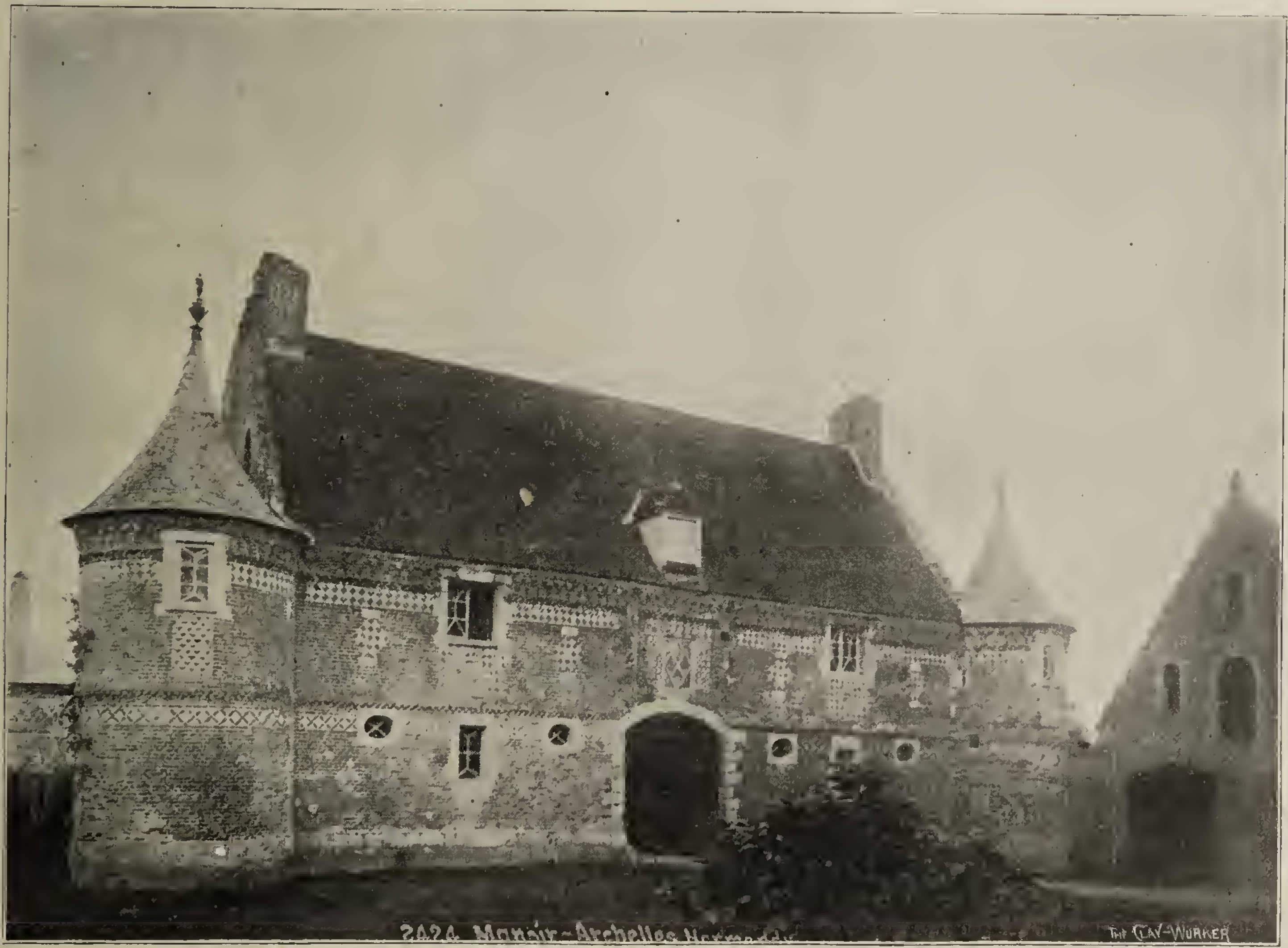
VOL. XXVI. INDIANAPOLIS, IND., OCTOBER, 1896. No. 4.

Written for the CLAY-WORKER.

BRICK ARCHITECTURE OF OLDEN TIMES.

THESE STRUCTURES, built by the untitled gentlemen of France, represent to us a great deal that is beautiful, always that which is picturesque, much that is to be emulated in spirit, but little that is to be copied in detail. The architects and builders of recent years have made the mistake of allowing former generations to do their thinking. In literature, in painting, in architecture or sculpture, this is always a mistake. Yet in architecture this has been very largely done. Edison, as an inventor, has not thought in terms of the fourteenth, fifteenth or earlier centuries. He is a man of to-day. Art and architecture, to be successful, must not be the art of earlier centuries. It must be of the thought and requirements of to-day. Successful brick architecture must reflect the spirit of this time. Is not this old manor house beautiful? may be asked. Is it not very interesting and picturesque? Does it not serve its purpose? Certainly it is very beautiful and has served a useful purpose, but it reflects the spirit and manners of another time, and does it fully and well. The successful architecture of our own times must express our characteristics, our thought and our time. The copying of a design like this for this period would be misplacing good work.

In many of the towns and cities of France, those of the



A FRENCH MANOR HOUSE.

olden time, we see few structures which are positively ugly. They were built by people of artistic instincts. In general forms, as well as in detail, there was very little that was actually duplicated, but running through all of their work there was the spirit of artistic feeling and appreciation. We find many of these beautiful manor houses in Normandy and Brittany. The Brittany of to-day has preserved its original character much better than have other sections of France. Building in Brittany during recent years has not been greatly different from what it was during earlier centuries of its development and growth. That section of France known as Normandy formerly possessed the same spirit of individuality and distinctiveness of character which now belongs to Brittany. Brittany, which is the northwest of France, has been unaffected by railroads, telegraphs or modern methods, and building is continued in a way not greatly different from that of former times.

The characteristic of the architecture of Normandy and Brittany is that it is always picturesque. No matter how simple the general composition, nor how restrained the apparent resources, one always sees the hand of the artist. If there be a profusion of details and decoration in the more elaborate structures, one is never disturbed by the unrest which so frequently goes with profuse work of this kind in our own time. Their designs are always tempered by a spirit of refinement which will take a most startling outline or a profusion of decoration and yet handle it in a perfectly satisfactory manner. In this design we see different patterns of brick work. We see an unusual outline. Yet, withal, there is nothing that is crude, nothing common or disturbing. While there are variations of color in the patterns of brick work, one must, at the same time, recognize that there is a harmony of color which admits of the use of this variation without being startling or annoying. Most of the decorative brick work of our own time, that which has relied upon variations of color, has been deprived of its artistic effect by strong contrasts. We have in mind a pattern of brick work in a schoolhouse not far removed from this city, which, in general design, is like the middle band of brick work in this building. Yet the dark brick are violently red and the light brick the extreme of yellow. It is the failure to realize fine distinctions of color which makes so much of our polycromc brick work a failure. The differences in shades of red work out very beautiful patterns; or, if buff or yellow brick be used, the differences of shade here will result in beautiful effects without violent distinctions of color.

If we could examine the moldings, the carvings and other decorative details of a building of this kind, independent of color, we should find the forms very carefully considered, the details very considerately worked out, and that same fineness of feeling expressed which we must expect of all successful work. Thus, in the successful building we must first expect a pleasing outline, carefully considered detail, harmonious color, all arranged in a way to express the function of that structure and the spirit of its time. All successful architecture meets these requirements.

A great deal of work is being done at this time in this country which is practically the reproduction of the work of earlier centuries. A firm of New York architects has been particularly zealous in work of this kind. In so far as it has been an imitation it is well and carefully done; in so far as it has expressed the spirit of our times or the function of the structure of this time it has been entirely wanting and absolutely unsuccessful. The future historian of the architecture of America will not give the work of this firm or their weaker followers credit for anything which is helpful in the development of our architecture. The work which they have copied stands as greater than their copies of to-day, and in that sense the modern work is a relative failure. It is pleasing to look back upon the early architecture as being great because of its originality and expressiveness. A design is never original but once. Never expressive but once. LOUIS H. GIBSON.

Written for the CLAY-WORKER.

IN DEUTSCHLAND. No. 8.

The Continuous Kiln—Its Modifications.

THE CONTINUOUS KILN was at first considered fit only for burning common brick, but gradually, owing to the experience acquired by the brickmakers in operating it and to the improvements added to it by kiln builders, it became possible to burn in the continuous kiln wares of all kinds. The greatest disadvantage under which many of the first kilns suffered was the fact that some clays would become discolored—whitewashed—in the burning process. This phenomenon is partly due to the fact that the gases of combustion, passing through the chambers filled with green brick, become saturated with water vapors and are often cooled down below 212 degrees before reaching the outlet into the smoke flue. Thus condensation must take place and the brick are covered with moisture. Owing to the sulphurous acid vapors which the gases contain a chemical action is bound to take place when these come in contact with water. Sulphuric acid is formed, which combines with the bases, especially with lime, to form sulphates, these giving rise to the various kinds of efflorescence. On investigating the primary cause of the whole action it is found that not the continuous system is at fault, but only the method of watersmoking peculiar to it. The gases and vapors being compelled to pass off through an outlet on a level with the kiln floor, the liability of cooling and condensing is very great, as the floor is the coldest part of the kiln. Another troublesome feature of watersmoking by this method is that fine ashes, carried along by the strong draft, cling to the wet surfaces of the brick and are eventually burned on to them. Now, the only remedy for this state of affairs is to heat the newly set brick to some extent before permitting them to come in contact with the combustion gases, so that condensation cannot take place. Mr. Hoffman has made several improvements in this respect. In one he uses the heat of the cooling chambers for the purpose of heating the green brick sufficiently. He effects this by closing up the last chamber filled with green brick by means of large sheet-iron dampers, thus throwing it out of the circuit, and conducting into it heat from cooling chambers by means of specially constructed flues. The heat used in this way is, of course, taken away at the expense of the air for combustion, which, according to the continuous principle, should absorb all the heat of the cooling ware.

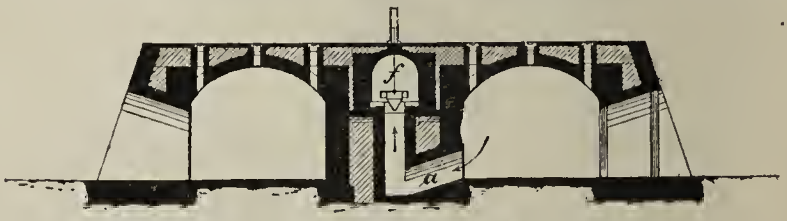


Figure 1. Continuous Kiln with Downward Draft.

Condensation of the aqueous vapors carried along by the gases of combustion is also much lessened by permitting the gases to escape at the top of the kiln instead of near the bottom, the upper portions of a kiln being naturally the warmest. This arrangement of drawing off the products of combustion has been successfully employed by Hoffmann and others. The accompanying cut (Fig. 2) shows a very efficient and simple upward draft construction—the Liehmon and Rost system. Here the smoke is drawn off through the fire holes and movable iron pipes into the central smoke flue leading to the stack. In connection with this upward draft system there is a peculiar and ingenious method of watersmoking which is worth mentioning. The latter might properly be called return watersmoking, for it is a reversal of the ordinary way; the watery vapors, instead of flowing into cooler regions, progress into warmer portions of the kiln, thus making condensation out of question. The smoke is drawn off through the iron pipes about three chambers ahead of the paper partition P (Fig. 3), so that it does not come in contact with the newly set brick. Usually one pipe is sufficient to take care of the combustion gases, leaving the others for the watersmoke, which comes from the opposite direction. In tracing the drying process we find that air flows in through the chamber being set, travels around the paper partition P, through the pipes c, into the chambers filled with newly set brick, and escapes through the pipes r. It is not necessary to have the pipes c. Often a number of small holes are made into the partition through which the air enters. The only advantage offered by using the pipes is that the inflow of air can be regulated by means of dampers. Now it is readily seen that under pipes r there is a neutral zone between the two streams of combustion gases and water vapors, respectively. The question arises, Where does the air get heated sufficiently in order to produce any drying effect? There are several sources of heat available. A good portion of it is furnished by direct radiation from the glowing ware, the green brick being practically in the same space with the highly heated ones. For, although the gases might have been cooled down to 212 degrees Fahr. under the pipes, yet the temperature in the kiln body at that place is a good deal higher. Another source is the heat stored up in the kiln walls, which, in continuous kilns, is always at least 140 degrees Fahr. The air drawing from the chambers which are being emptied and set towards the partition has never a temperature of less than 70 degrees Fahr. Gradually, as the air progresses into the kiln, its temperature is raised, and with it the capacity of absorbing moisture, and when, as the fire advances, the smoke is led through the next chambers, it finds warm, dry brick. The rate of progress is usually one pipe per every six hours, if one chamber has to be burned every twenty-four hours. If the gases escaping through the first pipe have a temperature of over 212 degrees it is moved over the other three to serve as the last; the same is done with the second, third and fourth after every six hours. Thus the kiln does not progress by chambers like in the ordinary systems, but by rows of fire holes, which is a more gradual progression, and, it seems, a more rational one. In kilns with downward draft, often a kiln filled with cold green brick is at once put in contact with warm gases saturated with moisture. The pipes being provided with dampers, it is very convenient to regulate the draft of the kiln by their use. It is of importance that the partition is not put up too close to the pipes, as the large quantities of steam are liable to collect in too cramped a space and soften all the brick. For kilns with upward draft it is not necessary to keep the paper partitions tight as we have seen, but for the downward system it is essential to do so, because leaky ones impair the draft of the kiln.

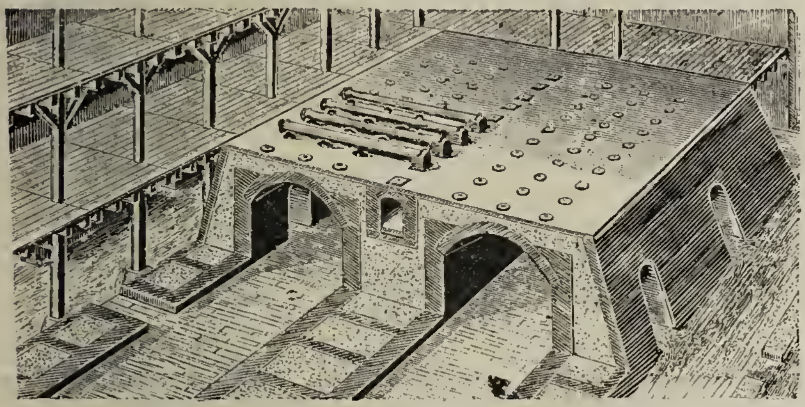


Figure 2 Continuous Kiln with Upward Draft.

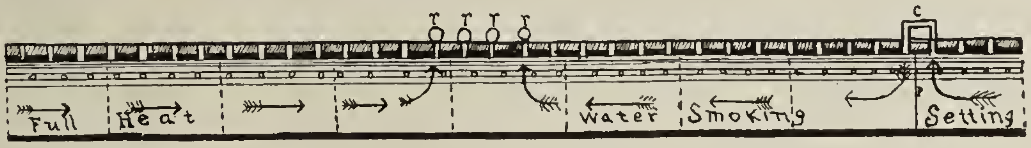


Figure 3. Continuous Kiln with Upward Draft and return Watersmoking.

The burning of up-draft kilns, excepting the modifications suggested by the pipe system, follows the methods of operation common to all continuous kilns, but it is claimed that the corner chambers are burned more satisfactorily in the former than in the others, owing to the more perfect control offered by the manipulation of the pipes. In turning around the corners the outside holes alone are allowed draft for some distance, till the fire approaches quite near to the first row of pipes. In doing this the fire is compelled to strike the corners, in this manner insuring a more uniform burn. In reviewing the peculiarities of both systems we cannot refrain from commending the simplicity of the up-draft system. It has no complicated valves and dampers to cause constant annoyance, and it seems to be the simplest form of the continuous principle. In practical use it seems to be giving perfect satisfaction, at least as far as our investigations went. However, we do not mean to imply that all the downward-draft kilns are failures for producing the finer grades of ware, for we have seen such turning out goods of high excellence, but we repeat that we regard the former system the safer one.

In the evolution of the continuous kiln from the early circular shape it has been found best by the most experienced builders to construct it with two straight parallel tunnels, connecting at the ends at right angles, doing away with the curved walls, which cause so much inconvenience. The total length of the kiln tunnel varies from 140 feet for small kilns to 190 feet for ordinary sized and 300 feet or large kilns. The number of chambers differs with the kind of the kiln and the nature of the clay, but always lies between twelve and eighteen, except for very small kilns.

Much attention is paid to the construction of smoke stacks. Nearly always they are fine specimens of good workmanship. There seem to be no special rules for placing them, for we have seen them built sometimes at the middle of the kiln, sometimes at the end. A subject which our kiln builders are somewhat inclined to neglect is carefully studied by the Germans—that of keeping the moisture of wet ground from being absorbed by the kiln bottom. This is accomplished by layers of cement and asphalt or by constructing a sort of drainage system, a network of small flues, covered with brick, upon which layers of sand and clay and the courses of floor brick follow in succession.

The older kilns are generally provided with half-circle arches, but flat arches seem to be more in favor now, as they require fewer shape brick in their construction and possess almost equal stability. Specially designed fire-clay blocks are used for the firing flues, thus saving much labor in putting up this complicated part of the kiln. For large arches arch brick are used almost exclusively.

In building round stacks perforated radius brick are always used, and many yards keep such brick in stock, doing quite a business in handling them. Round or octagon stacks take less material to build than square ones and resist the wind much better. There is no reason why we should not build more round stacks, and if our brickmakers would engage in the manufacture of such radius brick a brisk demand for them could certainly be developed.

In the following it will be endeavored to show the cost of building continuous kilns in Germany, according to dimensions and capacities, as estimated by a reputable builder: A kiln of a daily capacity of 15,000 brick (10x4.8x2.6 inches), having an outside length of 144 feet, a width of 49 feet, with a tunnel 279 feet long, 11 feet wide and 9½ feet high, demands an investment of $4,900, including cost of stack 130 feet high. The same kiln, with a daily capacity of 20,000 brick, of the following dimensions: Outside length, 156 feet; outside width, 53½ feet; length of tunnel, 300 feet; width of tunnel, 13 feet; height, 9 feet 10 inches; height of stack, 146 feet, requires a building capital of $5,800. The wages of a bricklayer amount from 90 cents to $1.10; of a laborer, to 62 cents per day. The building capital is distributed in the average as follows: 35 per cent. for brick; 15 per cent. for mason work; 5 per cent. for cement, lime, sand, etc.; 20 per cent. for carpenter work and material; 10 per cent. for roofing, including labor; 7 per cent. for cast-iron furnishings; 1½ per cent. for excavating and filling up; 6½ per cent. for management and miscellaneous.

After the patent rights of the continuous kiln had expired many persons took up the business of building kilns, and, as a result, a good many modifications came into existence. We will not attempt to describe the multitude of constructions brought on the market, many of them being cheap imitations of the Hoffmann kiln, but will mention briefly only two of the most characteristic types. In the Buehrer kiln the tunnel is not built in two parallel lines, but is constructed in zigzag fashion. The specimen of this type we had the privilege of seeing seemed to be built with a special aim for inconvenience. Another brickyard engineer—Loeff—has simplified the construction of the Hoffmann kiln by using only one middle wall and by arranging the main smoke flue on top, between the two arches. Some other builder did away with the expensive stack and used mechanical means for producing draft.

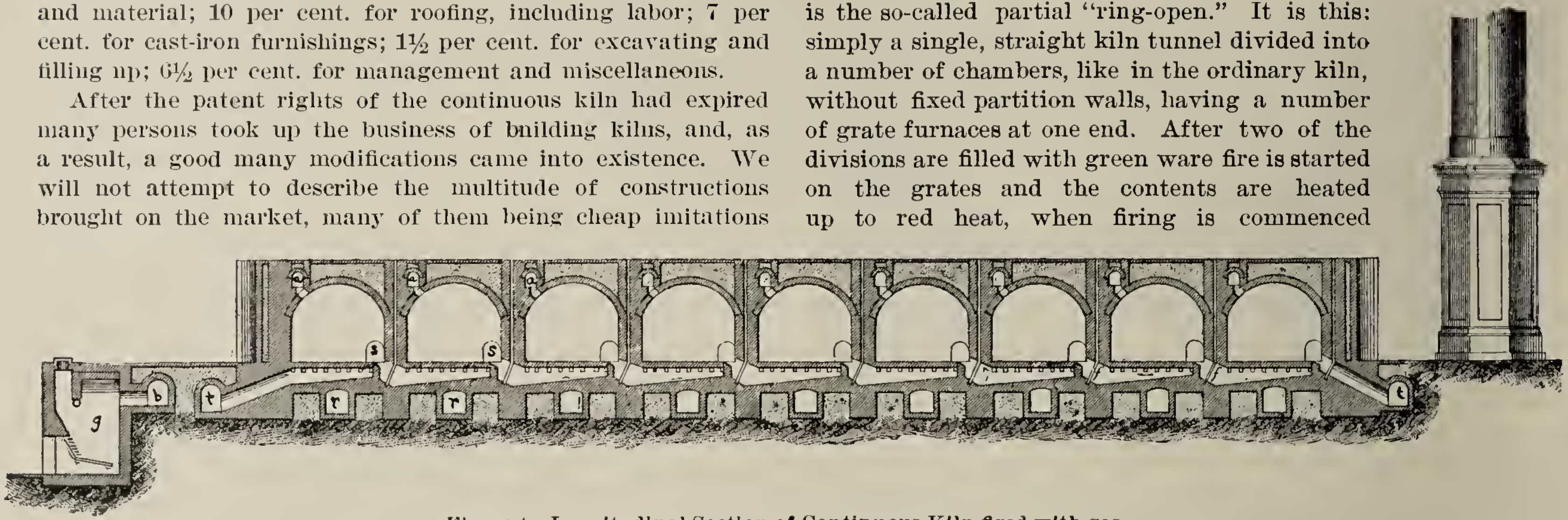


Figure 4. Longitudinal Section of Continuous Kiln fired with gas.

The method of firing peculiar to the continuous kiln is not very suitable for burning glazed ware or goods of similar character, for, although such wares are burned in Hoffmann kilns, special provisions must be made for setting them in such a way as to protect them from the direct flame and the contamination with ashes. In this manner it becomes necessary to handle a considerable number of common brick, which is equivalent to an extra expenditure of time and money where common brick are not desired. Where, for instance, glazed roofing tiles are burnt, and it is desired to derive at least some of the benefits of the continuous system, kilns are built differing from the common type by the method of firing, which is done in ordinary grate furnaces, constructed beneath a perforated kiln floor. Otherwise the burning proceeds as usual. As soon as one chamber is burned the furnace holes are closed up and full fire is started in the furnaces beneath the next chamber, and so on. As a matter of course, the consumption of fuel is in such cases greater, about twice the amount burned in the regular continuous kiln, due to the use of cold air for combustion. Lately, however, a kiln has been designed in which the fuel is fired into fireplaces contrived along the walls within the kiln. The fire holes are arranged along the sides of the arch. Otherwise the continuous principle is carried out entirely.

In the manufacture of refractory ware and vitrified products, such as paving tiles, the ordinary Hoffmann kiln does not fill the requirements of these industries. These goods require a high temperature, and a slow cooling or annealing process is indispensable for developing their peculiar properties. It is impossible to fill the last requirement in the ordinary continuous kiln, for there active cooling commences directly after the burning has been finished. A kiln adapted specially for vitrified and refractory ware has chambers in the true meaning of the word—compartments divided from each other by a wall, communicating with each other only through a number of openings in the partition walls, each of them being controlled by a damper, a fire-clay slab. Such chamber kilns are usually provided with grate furnaces, constructed outside of the kiln space. Naturally the benefits derived from the continuous system in this kiln are very limited, the only application of it consisting in making use of the heat of the combustion gases.

Another type of the continuous kiln which we will consider is the so-called partial "ring-open." It is this: simply a single, straight kiln tunnel divided into a number of chambers, like in the ordinary kiln, without fixed partition walls, having a number of grate furnaces at one end. After two of the divisions are filled with green ware fire is started on the grates and the contents are heated up to red heat, when firing is commenced from the top and the furnaces are closed up. The burning proceeds in the usual manner until the end of the tunnel is reached, when the fire is allowed to die out, and burning is again commenced at the other end. Partial continuous kilns are largely used on very small agricultural yards, such as are connected with a great number of estates in Germany, on account of their cheapness of construction, the regular continuous kilns requiring too large a building capital for yards of that sort. The consumption of fuel is, of course, greater in this semi-continuous kiln than in the regular one.

—Gas-Fired Kilns.—

Stveckmann, a German metallurgist, in his treatise on "The Gases of Blast Furnaces and the Siemens Generator," says that firing with gaseous fuel is the ideal way of firing; that technology always endeavors to reduce the operation of furnaces to a few turns of valves and dampers, for then only have we absolute control of processes, and that firing with gaseous fuel offers the only means for attaining this object. This can be said with equal truth respecting the pyrotechnics of clayworking. In our present system of firing we have to deal with too much uncertainty, with too many objectionable influences which we cannot control in a positive way. That this is the case is shown by the enormous quantities of coal consumed in our kilns, by the clouds of smoke pouring out of our stacks, and most emphatically by the waste caused by either too soft or too hard burning. With the adoption of gas firing kilns could be developed into apparatus absolutely in our control, and this, it seems, should be our ultimate aim. A well-designed gas-fired kiln will use no more coal than a rational grate furnace, and it must be remembered that rational furnaces are the exception rather than the rule, and that the advantages of the gas system are represented chiefly by the superior results obtained in burning.

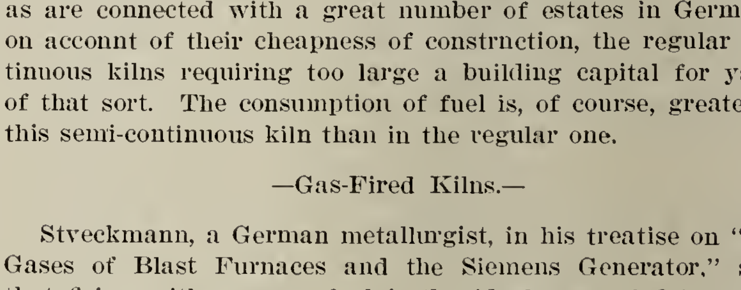
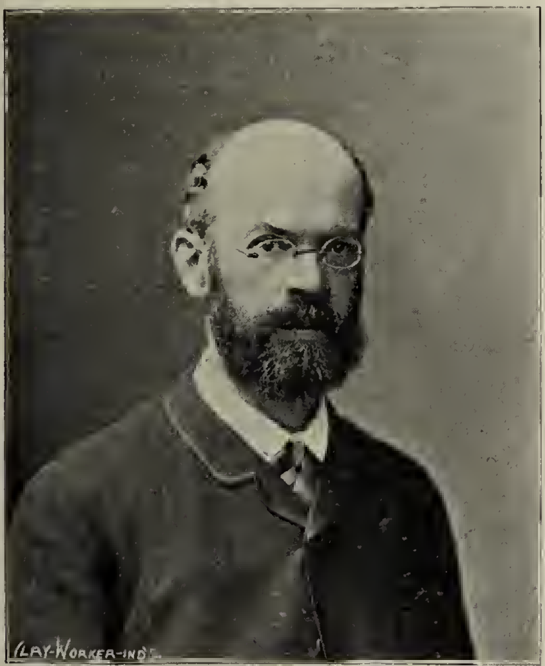


Figure 5. Cross section of Continuous Kiln fired with gas.

Germany has taken the initiative steps in adopting the gas-firing system for the clay industries, and, if we are not mistaken, the Germans have two hundred gas kilns or over in successful operation. We are convinced that the adoption of this mode of firing is making rapid progress, which is in some degree due to new inventions in generator construction, by which it is possible to produce gas on a more economical and rational basis than it has been done before. One of the men whose energies are directed in that direction is Mr. G. Mendheim, a technologist, who has been engaged in this field ever since 1867, and whose gas-fired continuous kiln has given him a wide reputation. We had the pleasure of seeing a number of his kilns in operation.

In the following we will consider one of his kilns, the so-called chamber kiln, consisting of separated compartments, working exactly like the continuous chamber kiln made mention of above. The kiln may be divided into three parts—the generator, the kiln and the stacks. The generator consists of a round or square shaft, whose height and shape vary with the kind of fuel used, it being usually between eight and fifteen feet high. At the bottom there is an ordinary grate. After a good fire has been started fuel is introduced till a thick layer is formed and gas is given off. This gas differs widely from illuminating gas, which contains only the dried and purified products of dry distillation of fuel. In the manufacture of the latter coke is produced, while in the generator under discussion no coke is obtained, but the fuel is converted into combustible gases, of which the main ingredient is carbonous oxide.


Clay-Worker-Ind.

G. Mendheim, Munchen, Germany.

According to Mr. Mendheim's description of his kiln, the latter is operated as follows: The gases, leaving the generator, g, enter the flue b (Fig. 4), and are supplied to two flues (F, Fig. 5), which run along each side of the kiln, according to demand. From the longitudinal flue the gas flows into flue r (Fig. 4), communicating with a space below the floor of the chamber to be fired, the inlet being controlled by a valve, v (Fig. 5). In the space mentioned the gas meets a stream of air, which has been made to pass through several cooling chambers, connected by flues f (Fig. 4), and which is consequently heated to a high degree. Ignition takes place immediately, and the flames enter the kiln proper through the apertures of the floor. After leaving the compartment the flames pass through the flue f (Fig. 4), controlled by a damper, into the next chamber, and from this one into two more, when, at last, the combustion gases enter flue s (Fig. 4) and the main smoke flue i (Fig. 5), which communicates with the stack. The flues t (Fig. 4) establish communication between the two parallel lines of compartments at the ends. In this manner the continuous principle is carried out as much as possible. Where much steam is developed a flue (Fig. 5) is constructed which is connected with each chamber through branch flues a (Fig. 4). These flues conduct heated air from a cooling chamber into a newly set one, so that its temperature is raised to 212 degrees before the combustion gases come into contact with the green ware. In doing this the damper at f is slightly opened. This kiln has generally eighteen chambers, nine on each side. Its operation is very simple and positive, as we had occasion to observe in different cases. But it cannot be claimed for it that it is the climax of perfection in this line, and improvements will be sure to follow.

Mr. Mendheim also builds a gas-fired kiln corresponding to the common continuous kiln without partition walls, which is, of course, simpler in construction.

Written for the CLAY-WORKER.

FIRE BRICK AND THEIR MAXIMUM EFFICIENCY.

We have read many excellent papers in the Clay-Worker upon the different methods of determining the absolute and comparative refractoriness of fire brick and fire clays. Discussions have also appeared laying bare the real value of a chemical analysis of these refractory silicates as a means for judging of the ability of any given specimen to withstand severe heat tests. Both are equally advantageous and achieve results which, though not of absolutely practical value, furnish a way of detecting specimens that would be entirely inadequate. This is one point in favor of the use of Seger cones for determining the heat resisting power of a given clay or brick, and is surely instructive. It brings the whole subject of refractory tests down to the comparison of the behavior of a given sample with that of a known standard, and thus its record can be reported according to a certain scale, embracing all the different varieties of fire clays. It is well to give due credit to all the numerous methods for determining the refractory nature of clays, and I believe we need every one of them for executing our work along these lines of investigation. But, while in the midst of our work and enthusiasm for any particular method, chemical analysis, Seger cone tests or practical tests, we must not allow ourselves to believe that one series of experiments is any more useful than the other; or, even worse, to say that one is the only accurate and true way of estimating the value of a refractory brick or clay and its adaptability to a given purpose. To illustrate how perfectly absurd such an assumption would be, suppose the fire brick manufacturer has tested every grade of fire clay from his clay beds with the Seger cones, and finds that some of them will endure a sufficiently high heat to be safely employed in the fire brick mixture, while others yield results which are a little below the standard. What data has he for knowing why these poorer varieties of fire clays have succumbed at less than the required temperature? Does he lay the blame to the presence of lime, magnesia, iron or the alkalies? If so, what percentage, by weight, do the specimens contain of these substances. Perhaps such an expert, who regards the Seger cones as the only necessary and possible way of gathering knowledge in relation to refractory silicates, would suggest that the manufacturer should draw one sharp and decided line here, viz.: that all the clays failing to stand the Seger test should be thrown upon the dump and the balance utilized in the brick mixtures. It is not necessary for me to explain the folly of such a plan to the intelligent fire brick manufacturer, and especially to those who have been using chemical analyses for instruction in regard to the actual composition of their clays, and those who have taken great pains in watching the behavior of their various grades of brick when in actual service. We will say that a fire brick manufacturer has found half a dozen fire clays that would not give satisfactory results in the laboratory tests. We will assume, too, that he has an accurate chemical analysis of each of them. If this brickmaker has informed himself sufficiently upon the proper application of fire clays for giving the best practical results, and can interpret his analyses intelligently, you will find that some of what were supposed to be inferior clays he has been able to introduce into the fire brick mixture in limited quantities, and in a way which materially improves the service of the ware. Such effects are not altogether apparent to the eye when the bricks are taken from the kiln, but the addition of these clay constituents have wrought a chemical change in the mixture and a combination of elements better suited to the conditions of the work than brick made of any other assortment of materials which could have been derived exclusively from the list of high refractory clays.

We still have many scientists who claim that chemical analysis of fire clays is able to teach us nothing of their refractory nature and adaptability to a given class of furnace work. To such men I can only say that their statements are totally wrong and not in harmony with the investigation of many chemists who are studying the subject very closely. Thus far I have had little to say upon the subject of practical tests and the manner in which they are apt to modify and almost defy theory. It cannot be said, however, that every theoretical development handed down from the laboratory in advance of its actual application in practice has failed to produce the effectual result which was expected of it. The practical application of theory in the fire brick business is the same as it is in any other pursuit. If failure comes, it is due to our own ignorance; but when the truth is learned, theory and practice work hand in hand, and will continue to do so till the law which controls this harmony is ignored and broken.

There are problems to be solved and demonstrations formulated where the Seger cone test or chemical analysis are perfectly helpless. Take, for instance, fire brick manufactured from a plastic fire clay containing only a small percentage of total fluxing impurities. We will assume that the fire brick mixture is composed merely of crude and calcined fire clay. The "biscuit" is crushed moderately fine, screened to a uniform size, and two batches of brick made from this same mixture. So far as the chemical or physical conditions of these constituents which enter into the composition of both mixtures are concerned they must be absolutely identical.

We will burn one lot of green fire brick in the top of an up-draft kiln where the heat is not very intense, yet the ware will be taken from the kiln in a perfectly sound condition. The other lot of green brick we will burn near the bottom of a similar kiln at a very intense heat, enough to effect a complete shrinkage of the material, depriving it of hydroscopic and combined water and eliminating almost all of its porosity. If the two specimens of brick are tested in a particular part of a puddling furnace we will find a material difference in their durability. I am not going into details in relation to this matter, but it is quite evident that these facts could not have been learned and a correct explanation of them given if we were to rely wholly upon chemical analysis and the Seger cone tests to tell us everything in regard to the nature of the mixture. Just here I mean to emphasize a point which must be appreciated and recognized by fire brick manufacturers to a greater or less extent. Aside from the refractory property of any given fire clays, as it appears in the laboratory tests, there are other important considerations in factory operations; the manner of preparing and manipulating the stock and its treatment in the kiln, which, if not properly arranged for, will prove to be a mistake quite as serious as an error in the choice of the stock.

In my own practical experience I have seen excellent specimens of fire clays made up into fire brick in such a way that they were utterly incapable of giving the results expected of them. The physical condition of the materials employed in a fire brick mixture and the manner in which they are put together controls its fluxing tendencies almost as much as the total percentages of fusible silicates present; it is the chief means by which we impart to fire brick their ability to expand and contract without disintegration.

It is a great satisfaction for the fire brick manufacturer to know that his clay materials will stand high degrees of heat according to Seger test and that analysis has pronounced these samples free from any serious contamination of impurities, but proceeding on from this point, there are many possibilities of the manufacturer spoiling his wares, and without his knowledge, too.

He is not altogether "out of the woods" until his brick are taken from the kiln. The Seger test or the chemical analysis does not define in any absolute language what sort of ware the fire brick manufacturer will produce if they are made from a certain grade of clay, nor does it say how such fire brick should be made in order to yield the most effective product. To assert that we are able to learn from laboratory research the best method of procedure in the factory for producing brick of the maximum efficiency from any assortment of refractories is expecting a little too much. When these same substances are mixed in their different physical condition, in all their various combinations and by the many methods of converting these mixtures into fire brick, we will find that these miscellaneous lots of brick will give varying practical results; therefore, among the processes for manufacturing brick from a definite mixture and for a given purpose, there is always a choice. If it were practicable to make brick from a single mixture according to all possible methods and subject them to the required practical test, then we would derive data representing the comparative efficiency of their output for this mixture with regard to each mode of factory treatment. I think, at this point of our discussion, we are able to see and offer a reason for a strong line of demarkation which exists between the good and the bad fire brick of the present age apparently of the same composition. The relation which chemical analysis or any other laboratory tests bear to this problem is not direct and absolute, but does furnish reliable data in the selection of adequate constituents.

It is not true that chemical principles may be ignored after we have chosen the clays best suited to the mixture, yet practical experience takes up the work where theoretical data leaves it and guides the manufacturer through a field of possible errors where he might be misled, and brick mixture placed at a great disadvantage.

Theoretically, then, each fire brick mixture has a maximum efficiency or a perfect physical state in which the burned ware will do its work through the longest period of time. It is that exact condition and arrangement of molecular structure that permits the chemical combination of elements in a fire brick to resist the heat effects and outward contact with these harmful fluxing agencies existing in the fuel gases and molten metals and so intimately associated with the brick when in service. If it were possible for us to determine from any experiments the precise manner for treating the green mixture in order to convert it into the highest and best physical state, then, perhaps, we might form an idea of how far short we fall of the desired mark. There are many manufacturers, no doubt, who have a more exact plan they desire to follow out along these lines than some of the practical contingencies will admit. The preliminary work of preparing biscuit, mixing the clays and burning the kiln are in the hands of men who cannot appreciate the importance of these matters of detail to be observed and are apt to forget their instructions; however, we must allow them a license, and especially the kiln burner.

The possibility of producing precisely uniform ware in every kiln is bringing the subject down to a state of perfection which, between certain limits, is impracticable. Now it is easy for us to see that all the problems which appertain to the manufacture of fire brick naturally divide themselves into two distinct classes:

First—Those relative to the choice of the best crude materials.

Second—A description of the most reliable method for producing refractory ware of the highest efficiency.

CHAS. FERRY.

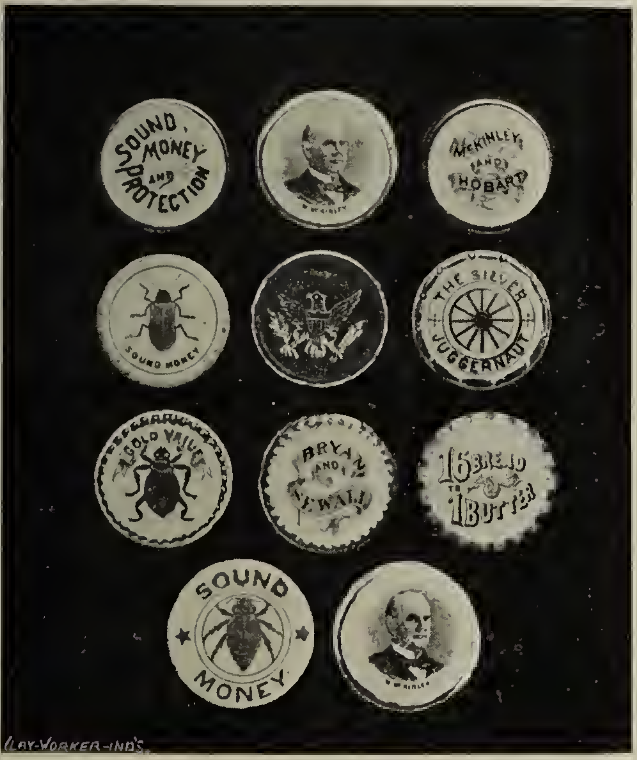
Written for the CLAY-WORKER.

POLITICS IN POTTERY.

BY EDWIN ATLEE BARBER.

DURING SOME OF OUR more recent presidential campaigns American potters and professional decorators have ventured to put upon the market ceramic portraits of the several candidates, or other devices of political significance, but we doubt if there has ever been a campaign so prolific in such designs as the present. At no time within the past half century have such important issues arisen for settlement by the people, and not since 1840 has the political situation aroused so much enthusiasm and created so much excitement among the masses as the campaign of 1896. Foreseeing this state of affairs, several of our enterprising manufacturers entered the field early by preparing such appropriate designs as the exigencies of the time might demand, and we already have an abundance of plates, jugs, cuspidores, cups and saucers and campaign buttons in china bearing printed portraits of several of the nominees, busts, pitchers and tobacco pipes, modeled in relief, and various other articles too numerous to mention. We shall not here attempt to describe any of the campaign souvenirs illustrative of other American industries which have appeared, such as handkerchiefs, flags and other textiles embellished with the likenesses of our standard-bearers; toy tops, corn-cob pipes, McKinley tin-plate canes, metal, celluloid and enameled badges; glassware in great profusion, with etched heads, such as tumblers, pitchers and paper weights, lamp chimneys and shades, etc., but shall confine ourselves to the products of the potteries, in order that those who care to preserve these ephemeral examples of American ceramic art may be enabled to find them, for there is no doubt that they will some day possess considerable interest, after the smoke of battle has cleared away and the important campaign of 1896 shall have passed into history.

It is fitting that the pottery industry, which has grown to such enormous proportions in the United States, largely through the instrumentality of the Republican nominee, Maj. William McKinley, should be foremost in promoting his election through the dissemination of his likeness by means of ceramic prints and modeled portraits; and it is equally fitting that the candidates of those parties whose efforts have been openly aimed at the destruction of American manufactures should be ignored by the potters. We find that McKinley and Hobart devices are largely in the majority. A few designs of the first installment of Popocratic candidates, Bryan and Sewall, have appeared, but we look in vain for the physiognomy of the second tail to the same ticket, for the reason, perhaps, that his nomination is not seriously considered.



Campaign Buttons. Decorated by the O'Hara Waltham Dial Co.

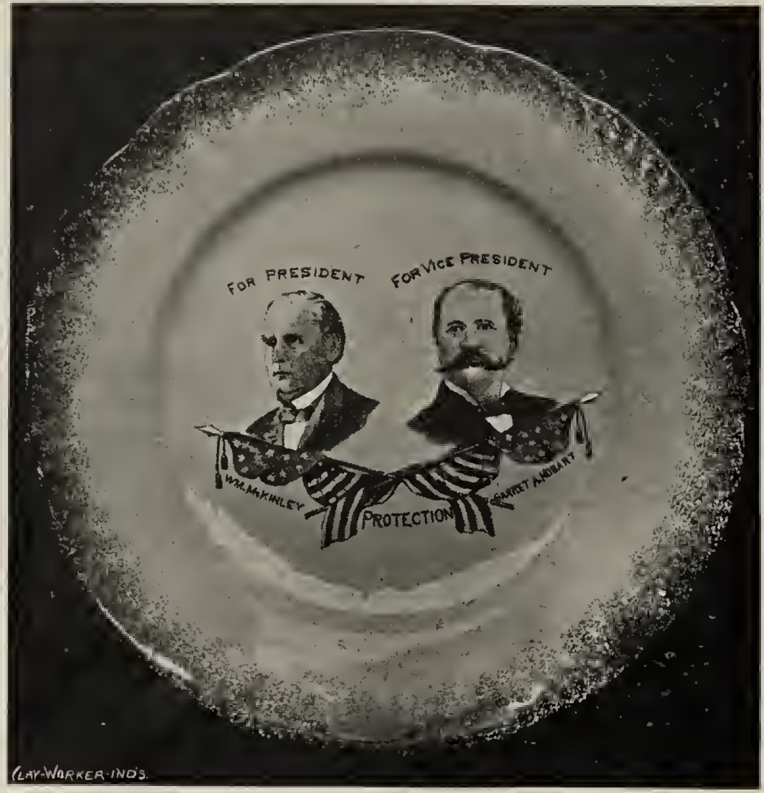
SIX INCH TILE. Relief Portrait of Hon. Wm. McKinley. Trent Tile Co , Trenton, N. J.

—Campaign Buttons.—

For the first time in our history the present campaign has brought out a great variety of American porcelain lapel buttons, decorated with political devices, such as portraits, mottoes and appropriate emblems. A card of these, containing eleven examples, is here shown. The six at the top are of Belleek china, and were made by the Ceramic Art Company, of Trenton. Those on the third row were produced by the Imperial Porcelain Works, Trenton, while those at the bottom are from the factory of Messrs. Swaine & Co., of Huttensteinach, Germany. With the exception of the middle example in the second row, which was decorated at the works of the Ceramic Art Company, the design being a gold eagle on a dark blue ground, emblematic of sound money, these buttons were decorated by the O'Hara Waltham Dial Company, of Waltham, Mass., in colors over the glaze, being purchased from the manufacturers in large lots in an undecorated condition. The imported examples, being furnished with a slender, round shank, are not so satisfactory as those made in this country, which are provided with a flat shank that prevents their rotating in the buttonhole. Among the designs are representations of insects in gold and colors, bearing the words, "Sound Money," "Gold Value," etc.; a printed portrait of Mr. McKinley; numerous mottoes, such as "Sound Money and Protection," "McKinley and Hobart," "16 Bread to 1 Butter," "Silver Fiddlesticks," "The Silver Juggernaut," and other sentiments calculated to suit all tastes. Porcelain buttons of American workmanship and decoration, bearing patriotic American devices, are among the most appropriate and effective objects for political campaigning.

—Relief Tiles.—

It is not to be supposed that our larger tile works, which, in some of the previous campaigns, issued relief portraits of past candidates, should neglect to take advantage of the present opportunity, and we therefore find that the American Encaustic Tiling Company, of Zanesville, O., issued, even previous to the Republican Convention, on the certainty of Mr. McKinley's nomination, a three-inch intaglio-modeled tile portrait of Ohio's favorite son, in a beautiful blue enamel, the different depths of the colored glaze producing the effect of shading, as in a photograph. On the back of the tile is a printed sketch of his life and public services, and these are being sold in large numbers throughout the country at a nominal price.



McKinley and Hobart Plate. Dresden Pottery Works, East Liverpool, Ohio.

Recently the same company has issued a companion design of Williom J. Bryan, and still more recently of Garret A. Hobart.

Among other portrait tiles prepared for the present campaign is a six-inch piece, with relief portrait, modeled by Mr. William W. Gallimore, of Trenton. This is made by the Trent Tile Company, and is finished in several colors.

—Plates, Etc.—

Of campaign plates there is a great variety, but as these are issued in widely separated districts, and are usually seen more frequently in some localities than others, it may be well to describe the more important of these designs.

At Wheeling, W. Va., Messrs. Davison & Serig have executed a pair of plates, one of which is decorated entirely in gold, a solid bright gold border and large head of McKinley in the center. The second is a Bryan design in silver. The china on which this metallic decoration is placed is made by the Wheeling Pottery Company.

In East Liverpool the Dresden Pottery Works have issued a design showing heads of the Republican standard-bearers, side by side, and another of the Chicago nominees, the first with gold mottled border, the latter in silver. The central designs are printed in a number of different colors, on plates, fruit dishes, jugs, giant coffee cups and saucers, and, in fact, on any shapes of ware sufficiently large to take the prints. The engraving has been done by the engraver attached to the establishment, and, while the work is creditable, the ware is sold at a low price. Indeed, it is a matter of surprise how cheaply such ware can be manufactured and placed upon the market.

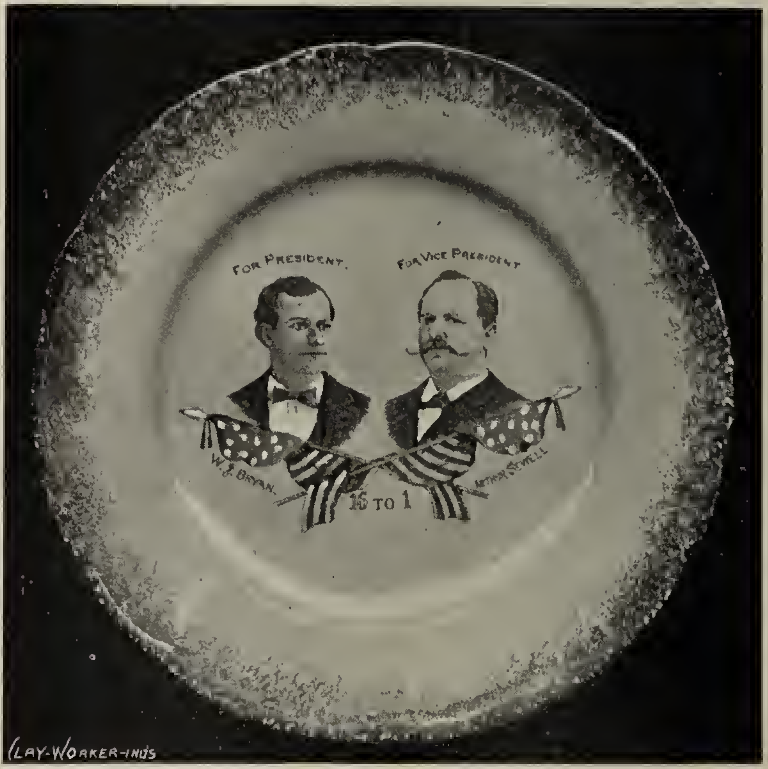
Some McKinley and Hobart designs have also been issued by the Chester Pottery Company, of Phoenixville, Pa., on pitchers and plates. The copper-plate engravings for these were prepared in Trenton, and they have been printed both over and under the glaze, in black and in brown. Unless one should be familiar with marks on china, it would be difficult to ascertain where these pieces originated, since the retail sellers, as a rule, can give no information regarding the wares which they handle. But the Phoenixville china may be recognized by the stamp of the arms of Pennsylvania, printed in black beneath the glaze. The pitcher here shown bears the portrait of Major McKinley on the opposite side. Another and taller style is also produced by the same company, and the plates, showing either the same portrait or that of Hon Garret A. Hobart, are made in several styles and sizes.

Thus far we have considered only American wares, decorated with political subjects for the present campaign. At least one English pottery has entered into competition with our home products in this field. Messrs. Maddock & Co., of New York, importers and agents for John Maddock & Sons, of Burslem, England, have had a series of plates and pitchers decorated with portraits of the candidates, one of which shows the birthplace of Mr. McKinley beneath his portrait. While this ware was made in England, the decoration was done in this country, by Mr. Jesse Dean, of Trenton, N. J., and the heads have been reproduced from actual photographs and transferred to the china by the half-tone process, which insures a life-like effect. Examples which we have seen are printed in brown, which produces a soft effect on the clear, white body that is most pleasing.

—Busts and Figures.—

Among the busts of McKinley is one which, with pedestal, measures eleven inches in height. This was modeled by Mr. W. W. Gallimore and produced by the Willets Manufacturing Company, of Trenton. The material is Belleek bisque, and the portrait is good.

Perhaps the most elaborate design in the campaign series is the McKinley pitcher or jug, in Belleek or opaque china, made by Messrs. Morris & Willmore, of the Columbian Art Pottery, of Trenton, for Mr. Alfred B. Evans, china merchant, of Philadelphia. This design represents Mr. McKinley as the Napoleon of American protection, an appellation which did not originate with himself, as falsely stated by Mr. Bryan, in his puerile and vindictive speech before the Chicago Convention, but was conferred upon him by his admirers and supporters after the passage of the McKinley bill in Congress. These



Bryan and Sewall Plate. Dresden Pottery Works, East Liverpool, Ohio.

jugs are manufactured in various sizes and colors, and have already become very popular throughout the country.

The American potters are doing a good work in this campaign of education, and their patriotic designs will live and be preserved long after the demagogues who are endeavoring to dupe the people by their false and pernicious teachings shall have been forgotten.

McKinley Bread Dish, Phœnixville Pottery, Pa.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 48.

I HAVE OFTEN referred to the vast amount of heat wasted at the point of exit from furnace and kiln, and the indifference manifested by so many to utilize this escaping heat. The interest, however, in this subject is gaining ground, even in the brickyard; for some few it has had an interest for thirty or forty years, perhaps longer. There could always be found some, very few, may be, who exercised their brains in the direction of saving fuel, and who consequently devised many ingenious methods of using up some of that escaping from the kiln, but it remained for Siemens to show us how to return waste heat to the furnace from which it emanated, there to be used over again, and again be returned, ad infinitum. This he called regeneration of heat. Iron and steel-workers were very slow in recognizing this beautiful and skillfully worked out theory. Some few perceived at once the great idea had a money value, and, of course, adopted it, and soon discovered that it was vastly more valuable than its inventors claimed for it, in that it saved metal as well as fuel. I may here observe that the Siemens brothers, C. W. and Frederick, were joint inventors of the regenerative furnaces now under consideration.

In the excellent papers contributed by Daniel W. Mead will be found a description and cuts of a gas producer and regenerative furnace. (Clay-Worker for April, 1896.) These, while they serve to illustrate the principles involved, will not, I think, convey favorable constructive impressions. For instance, a longitudinal section is given of the regenerative furnace, showing gas and air flues, with their reversing valves, etc. These flues, valves, etc., appear to be located immediately underneath the furnace and regenerative chambers, which is not the case, nor is it the impression Mr. Mead intended to convey. It is necessary, however, to inform the uninitiated that while the furnace and regenerative chambers are shown in section, the flues, etc., are in ground plan. It may be also necessary to remark that the Dauber gas producer, shown in the same article, is by no means the simplest form of gas producers. There appears to the writer much needless complication in many of the so-called improved producers, which are in no sense more efficient than the Siemens. The essential of a gas producer is a chamber about ten feet in depth, with a grate in the bottom; this chamber may be round, square or any other convenient shape and size. There must be a feed hole in the top for supplying the grate with fuel; also another hole in the top, or, preferably, in the side near the top, for the passage of the gas to where it is to be consumed. The arrangement of the hopper for dropping in the fuel and of the valve for controlling the outflow of the gas are details which must be settled by circumstances. The essentials are confined to the close-topped chamber, with a grate at the bottom. On this grate must be built a fire, which must be gradually coaled until the grate has a bed of fuel from twenty to thirty inches thick. When the lower ten or twelve inches is in a good glowing state the producer is producing gas. If the brick work has been thoroughly dried previously the gas will easily ignite, and is then ready for use. The conditions for gas production are that the fire on the grate be kept of sufficient depth and density to reduce all the carbonic acid made at the grate to carbonic oxide as it rises through the stratum of hot fuel above. Free air, of course, must not enter the producer at any point but at the grate.

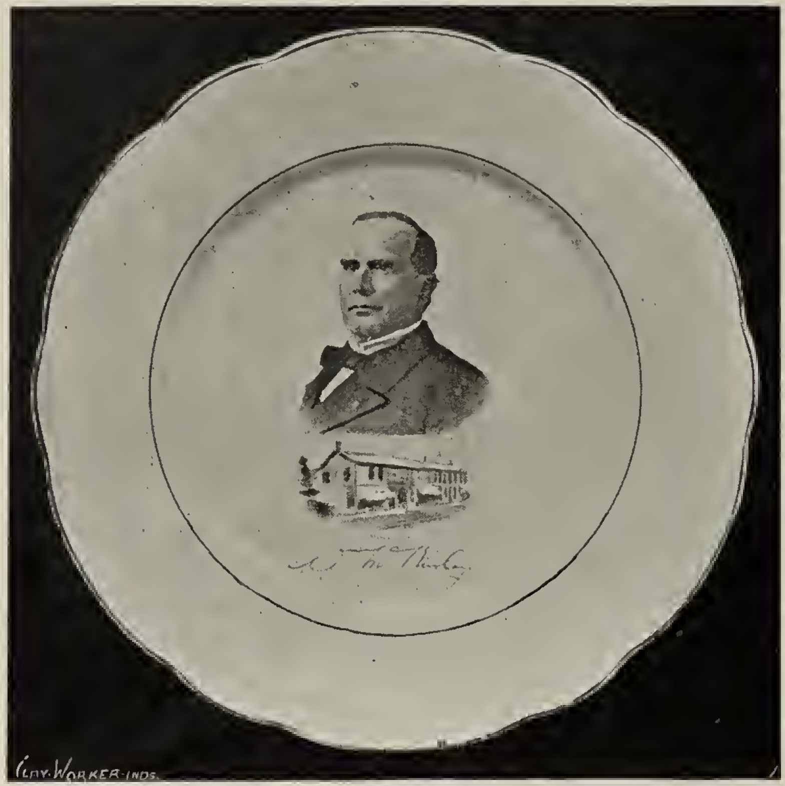
Now, this is the producer, pure and simple, as it came from the hands of its inventors. I may observe that the space between the top side of the fuel and the underside of crown, or top, of producer is the gas chamber, and, as such, is ample. When the gas is used for ordinary furnace or kiln work no gas holder is necessary; if it is used in a gas engine, then a small holder and scrubbers are necessary, as it is too impure to enter an engine cylinder as it comes from the producer.

I have, in this description of the fuel gas producer, avoided all complications in construction resulting from attempted improvements, most of which are, to say the least, questionable. The fuel used will depend on the locality, but when soft or bituminous coal is cheap and convenient it is the best, giving a richer gas than anthracite coal or coke. Of course, it is

McKinley and Hobart Pitcher, Phœnixville, Pa.

possible to produce gas from almost anything that will burn on an ordinary grate, consequently the composition of the gas varies accordingly.

In using bituminous coal the first result is a distillation of the hydro-carbon gases. This takes place at a low heat, and before the combination of the carbon with oxygen. We thus get in the producer a mixture of free hydrogen, hydro-carbons and carbonic oxide. These are the fuels or heat producers, but they are diluted with about 60 per cent. of nitrogen, hence only about 40 per cent. of our producer gas is available as fuel. However, wonderful results may be obtained with it, especially when used in connection with regenerative or recuperative chambers. These gave to the Siemens brothers that high standing in the metallurgical world, and revolutionized the steel, glass and other industries requiring high temperatures, and will, I feel confident, find their way into the clay industries.



McKinley Plate, with Photographic Portrait and view of Birth place. English China, decorated in Trenton. Page 277.

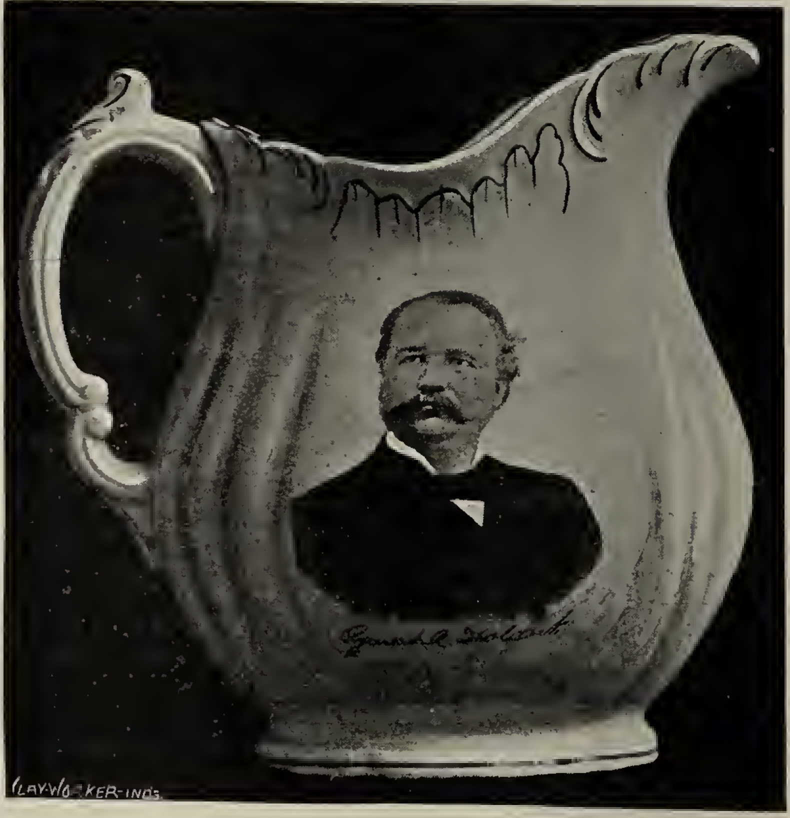
I have before mentioned the enormous waste of heat (fuel) that escapes at the top of furnace chimneys, at the top and bottom of brick and other kilns. I have also acknowledged many good devices for using up that heat. Many rolling mills conduct it under and through steam boilers, which would appear an effectual way of saving it. Clayworkers have got out devices for using it in the drier or in the next kiln of brick; how it answers in the last case I do not know, but in the case of rolling mills it has its drawbacks. For instance, steam may be low in the boiler and the furnace at some stage where it is necessary to lower the damper, and thus check the heat instead of urging it for the requirements of the boiler, or the reverse may take place; the steam may be blowing off at the safety valve, but the condition of the furnace requires the heat urging on. This is the least objectionable feature of the two, as there would only be some fuel wasted and an unpleasant racket raised by the roar of the escaping steam.

Siemens and others have found that independent firing of boilers was the most convenient and satisfactory. I may add that my experience in steel and iron works has led me to the same conclusion. There may be, no doubt, cases where the waste heat may be so used advantageously, but, generally speaking, the recuperative method is the best—that is, to turn the escaping heat into a chamber filled with bricks set loosely; in fact, open checker work. This chamber and its checker-work filling, I need scarcely say, must be fire brick, and of such capacity as will absorb pratically all the escaping waste heat, and then discharge the cooled waste gases into a flue leading to the chimney. This heat now is ready to be returned to the furnace from whence it came.

I must here warn my young readers against an erroneous impression which I find very prevalent—that of returning the waste gases and the heat altogether to the furnace. Such a scheme would defeat the object in view most effectively.

The readers of this journal have been told repeatedly that the products of combustion, or the waste gases from a furnace or fire of any description, are carbonic acid, steam, oxygen and nitrogen, a mixture which, if turned on a fire in sufficient quantity, would put it out as effectually as the water from a fireman's hose. You will at once perceive, then, that the recuperative or regenerative chamber is for the purpose of filtering, as it were, the heat from the waste gases, and then, by reversing the draft, return the heat by means of the air supply to the furnace. It will now become apparent that to keep up an operation of this kind two regenerative chambers are necessary, one for receiving the waste heat, while the other is returning what has already been caught. By referring to the cut of a Siemens melting furnace, in Mr. Mead's article before mentioned, you will see a double chamber at each end of the furnace. The inner half of each is for the gas, while the two outer halves are for air. It will be observed that these regenerators are shown below the floor line. This is where they are usually built, but not necessarily so. They may be above the floor line, or, for that matter, over the furnace if desirable.

Now that the principles and construction of gas producer and regenerative chambers have been briefly described, let us look into their merits and the advantages they offer to manufacturers who use large quantities of fuel and require very high temperatures. I have already set forth the saving in fuel and metal in the iron and steel industries. I omitted the gain in time, which, in most instances, is considerable, and consequently advantageous to both workman and master.



McKinley and Hobart Jug. English China, decorated in Trenton. Page 277.

To many clayworking establishments the system would be prohibited by the cost, just as it is in small iron works to-day. The advantages can only be secured by those who can afford $10,000 to $20,000 for a gas plant. As I have no data that will enable me to state precisely the advantages of a brick plant on the regenerative system, I can only draw inferences from steel and iron works using that system, where from 40 to 60 per cent. of the weight of fuel is saved and the difference in price between slack and lump coal. It is, I think, quite reasonable to presume that a well-equipped brick plant could do as well. I am led to this conclusion by my experience in burning fire brick with producer gas direct; that is, without regenerative chambers. As yet I have not seen nor heard of any one using a regenerative kiln. There are other advantages in the use of gas in kilns which ought not to be overlooked; uniformity of the heat and cleanliness of the product are not among the least.

BUST OF MAJOR MCKINLEY. Modeled by W. W. Gallimore. The Willets Mfg. Co., Trenton, N. J. Page 277.

As it is now no uncommon thing to find brick plants with batteries of boilers ranging from 200 to 800-horse-power, the raising of steam by gas may be interesting to some. Of course, regenerative chambers are out of the question here, and the same may be said of every other purpose where the escaping heat is low in temperature. For successfully raising steam by producer gas it is only necessary to erect a producer as close as convenient to the firing end of the boiler, and gas and air passages arranged for the intimate mixing of the two at the front end of the combustion chamber. With a producer so located the gas loses very little of its initial heat, and the condensation of the hydro-carbons is to a great extent prevented.

As the advantages of gas firing for the generation of steam have to some extent been questioned by correspondents in this journal, it may be interesting to present in detail the results of a test plant erected in Philadelphia, or, rather, in Camden, just across the Delaware. The tests were made by H. L. Gantt, A. B., M. E., and furnished to Cassier's Magazine, November, 1895, from which I quote:

"The boilers were erected for direct firing, and in taking the gas from the producer the conduits and other details were not arranged as they would have been in a plan specially designed for the purpose. * * * In this experimental plant two No. 7 producers are used—one of the ordinary brick-lined type, and the other water-jacketed, the jacket serving as a feed-water heater. The feed water enters the boiler at a temperature of 198 degrees Fahr. The coal used was anthracite buckwheat, containing about 25 per cent. of ashes and refuse, and the resulting gas contained about 4 per cent. of carbonic acid. The temperature of the air entering the boilers through ducts in the setting was 200 degrees and that of the chimney gases 415 degrees Fahr. The steam used to blow the producers was 6 2-3 per cent. of the water evaporated; the chimney gases contained 1 per cent. of CO, 13 7 per cent. of CO_2, and 4.7 per cent. of O.

"The test made under the above conditions gave the following results:

Water evaporated per pound of fuel	7 lbs
Water evaporated per pound of combustible	8.7 lbs
Water evaporated per pound of combustible from and at 212 degrees Fahr	10.5 lbs
Horse power of boiler with gas firing	91
Horse power of boiler with direct firing	65

THE MCKINLEY JUG. Made at Columbian Art Pottery, Trenton, N. J. Page 277.

"The most interesting fact to be noted in these results is an increase of nearly 50 per cent. in the capacity of the boiler."

WM. WAPLINGTON.

Written for the CLAY-WORKER.

REPRESSING PAVING BRICK.

IN SPEAKING of repressing brick it is to be understood that only stiff-mud brick and soft-mud brick that have been partially dried so as to allow them to stiffen are the only kinds to be considered. It is generally accepted now that repressing brick that have partially dried after being molded disturbs the bond and tends to weaken rather than strengthen them. As the surface dries faster than the interior it is very difficult, indeed, to have partially dried brick in good condition for repressing, and it is also difficult and inconvenient to repress them just at the time when they are in the best condition for repressing. In short, it probably is seldom found satisfactory or profitable to try to repress soft-mud brick after being allowed to dry for a time.

Many ideas are held and have been advanced as to the effects and benefits of repressing stiff-mud brick. The various ideas are largely due to varying conditions as met by different individuals. Some think that repressing disturbs the structure of the brick to the injury of its strength and cohesion, while others consider that there is no harm done by rearranging the particles in the mold of the repress.

It is probably true that all brick that are made on auger machines have a grain, as it is called. This grain is due to the arranging of the particles in the clay lengthwise of the stream by the action of the augers and die.

In the discussion at the Atlanta Convention the brick was compared to a bag of shot, and the opinion was expressed that in repressing "you change the shape of it, but the little shot all stand practically in the same relation as before." This may be true of some clays, but of others it certainly is not. Short, sandy clays that have little tendency to show grain might not have their internal structure very much modified by being repressed immediately after being cut off from the brick machine, but soapy, unctuous clays that slip readily and laminate would be materially changed in their internal structure by repressing.

A recent writer in the Clay-Worker advanced the idea that lamination occurs much more readily in smooth, slippery clays that are free from grit than in those more sandy, and that it is largely due to the slipping of the smooth surfaces of the clay upon each other after they leave the augers. These smooth, polished surfaces in soapy or slippery clays do not unite well when they are pressed together after leaving the augers, and, failing to make a perfect union, give rise to the so-called laminations. These laminations are, necessarily, from their nature and formation, weak places in the brick, and repressing might unite them more firmly or it might tend to slip them and thus break the already imperfect bond, depending upon the way in which the pressure came upon them and the direction in which the repress moved the clay of the brick under pressure. This course of reasoning is probably equally true and applies to cases where stiff-mud brick have been made of clay so dry and hard that it would not readily unite.

It hardly seems that the ends obtained are worth the cost when paving brick are repressed to give them round corners and make them look better.

While it may be true that the improved represses work very rapidly and are practically automatic, it must be remembered that each process in the manufacture of any article adds to its cost, and that each process or machine introduced into the line through which it passes is another hurdle through or over which it must pass in its race toward completion. Unfortunately, the modern brick plant is already a complicated train of mechanism through which the clay passes in a continuous stream from crusher to kiln. There exists so close an interdependence of parts that the failure of any one stops the whole train, and, by so doing, not only stops the profits, but starts the losses.

Observation and experience teach that with nearly all paving brick square corners and sharp edges do not remain long after being laid in the pavement, but soon chip off enough to satisfy the most exacting desire for rounded edges.

It is well, desirable and necessary to please those in authority over us and those who are our patrons, but the manufacturer who will meekly attempt to comply with all the fancies, fads and foibles that may be sprung upon him by exacting and visionary city officials will probably find that the more he will do the more they will ask of him.

The manufacturer who hopes to gain patronage over his competitors by repressing his brick, and thus making them look better, will only find that they, too, can repress theirs, and the result will be an additional expense without the hoped for benefits.

It might be better in some instances for paving brick manufacturers to occasionally make a stand and not allow themselves to be led on through a series of added expensive processes in the manufacture of their brick while the price is steadily moving downwards.

Paving brick have been made, and can be made, good enough for the price and for the requirements in the majority of places without the expensive processes which some plants employ. The one weak point in most paving brick is not form, but brittleness, or want of toughness. The objections that brick as a paving material has had to overcome have mainly been met by better burning and annealing. The country is dotted over with paving brick plants using clays that are well adapted to the manufacture of paving material.

The improved auger brick machines press the clay as closely as is necessary. Thorough preparation of the clay, careful manipulation of a modern stiff-mud machine, and patient, intelligent burning and annealing will result in the production of first-class paving brick from many clays that at present are being manufactured into only an inferior grade of goods.

D. W. STOOKEY.

Written for the CLAY-WORKER.

PHILADELPHIA BRICKMAKERS.

Frank J. and John Gunn's Trim Little Brickyard.

TWO YEARS AGO, and the old York pike running from Germantown through to Oak Lane, Ogontz, Jenkintown and Fort Washington had a somnolent air about it incidental to the make-up of Sleepy Hollow. Beyond the sharp rattle of the hoofs of a well-horsed buggy or village cart belonging to the well-fixed suburban residents, and the creaking and jolting of the heavily laden farmer's wagon, all seemed hazy and still. Just the atmosphere, you would say, for a brickyard. Aye, and you're right. To-day, however, it hums to the merry tune of three hundred trolley cars. On this line stand the Peerless Brick Company's plant, the Excelsior, mentioned in our letter of last month, and last, but not least, the plant of Frank J. and John Gunn, sons of the well-known Bernard Gunn, who first started at Broad and Cumberland along in the eighties, when Quaker City first began to feel the quickening throb and pulsation of a new life, awakening to the desires of her citizens and their vociferous demands for new homes and tenements for her workingmen and merchants. Bernard Gunn has since retired, but in his early days that portion of Broad and Cumberland streets seemed naught else but a stretch of waste grounds and here and there patches of truck land that was held lightly and cheaply, when a sharp-driven bargain could have bought an acre or so of ground for $1,500, bore such golden fruit that in 1892 an acre was sold for $15,000, and this year a parcel was sold for the generous sum of $17,000. There's profit for you! Egad! Verily, some of us buy gold and others lead.

In those days, however, before the Centennial of 1876 gave an impetus to building operations, a thousand bricks were sold against a million to-day. In 1876 Bernard Gunn started brickmaking, and business was considered fairly good if, by working six months straight, they could turn out two million, most of which were made by hand.

CLAY-WORKER-INDS.

Frank J. Gunn, Philadelphia.

Since the father's retirement, Frank J. and John, hardy examples of their sire, chose, in 1893, the spot above mentioned, covering about twenty-two acres, bearing a soft or loam clay, which is worked by a soft-mud machine of Carnell's make and one 60-horse-power engine of H. M. Sciple's (this city) make and two 80-horse-power boilers, turning out, on an average, 40,000 daily, including four hand gangs. Their output for last year run to about 6,000,000, consisting of salmon, stretcher and pressed. Meeting Frank Gunn near the driers, I seized the opportunity, and here present him to our readers, not in his purple and fine linen, but in characteristic brickyard garb and position, with a snap shot of the drying sheds.

To my inquiry, he informed me they had been working like troopers since the spring, doing their best to reach the century mark for a day's output, and closed one day as the whistle sounded with 98,000 for the day's work. How is that for two sons of a Gunn?

THOMAS H. GESNER & SON'S BRICKYARD.

Heigh ho! for Darby, the birthplace of the Clover Club's immortal "Ram"—a suburb of Philadelphia, a highway not to be despised; not rich in stately homes, but independent in the multitudinous homes for the workmen, clerks and junior assistants in many offices, who can find here snug little homes, fresh air and city conveniences, ranging in rentals from $12 to $25 per month, food, water supplies, and trains and trolleys to bear their tired extremities home at the close of a day's work with a speed that is both exhilarating and inexpensive. Away on the left is the slumbering Schuylkill, meandering away to its more energetic neighbor, the Delaware river; over on the right woodlands, copse and thickets, churning over the air to aid the jaded and wearied and helping the stronger, with the broad pike between, coyly inviting the speculating real-estate man or builder to open up and build in various forms, detached, semi-detached rows of three and two-story houses, of red stretcher and pressed brick, with roomy porches and granolithic sidewalks.

Dropping off the car at Sixty-fifth and Woodland avenue, I made my way into the yards of Thos. H. Gesner & Son.

The plant covers about eight acres, a Pennfield (strike-off) machine, a 45-horse-power Wetherall engine and boiler of 60-horse-power.

Henry Robinson, the foreman, told me, with native accents of pride, his father had been foreman for twenty years before him, when the old yard first started in 1866. The three kilns have a capacity of 200,000 each, and the well-stretched lines of racks have a capacity of 700,000, with a floor space for 160,000 more. At this plant all bricks are dried atmospherically. Their daily output runs to about 25,000, with a possibility under pressure of 32,000.

Except in the extreme cold or slack season thirty-eight to forty men are kept moving, and last year about 3,000,000 bricks were sent out. The output for this year will exceed that by about 1,000,000, and the prospects are good, considering that last year 3,000 or more two and three-story houses were built.

Sharon Hill, Darby and Lansdowne are the fields which will drain their resources. New streets and roads are being opened up, the trolley lines being extended. These are the moves which give encouragement to our brickmakers. No wonder Foreman Robinson responded with a smile, and when it was suggested that a setting gang and team be grouped for the camera's outlook there was a hearty scramble, and many a dusky form jumped down with a halloo to his neighbor to "kum and hab yer pixture tooken."

"Fur de land's sake, Gunpowder, what yer want yer pixture tooked for?"

"Well, it's jist der mos' marv'lous machine yer ever seed. Hit jist don' say one word, does it, Mister; does hits work like my old ooman when she's right-down mad."

"Break away boys!"

"What! Yer don' mean fer say as 'ow dat's dun a'ready, and while I was talkin'?"

"Yes; and the words you were saying are photographed and will come out with your picture."

"You don' say! Well, I'll be rooted; dat's jist cause I seed a white horse dis mornin' an' forgit ter make a cross on my shoe."

W. P. LOCKINGTON.

COLOR EFFECTS IN BRICK AND TERRA COTTA.

The architectural profession can claim a large proportion of men who have made a study of color effects, both at home and abroad, and those men who are progressive and are ambitious to excel in their profession, and also have "the courage of their ideals," are coming to the front in the use of colored brick, and are giving to the manufacturers that encouragement and assistance which they need in the development of this most interesting field.

CLAY-WORKER-INDS.

A Few of Gesner & Son's Employes.

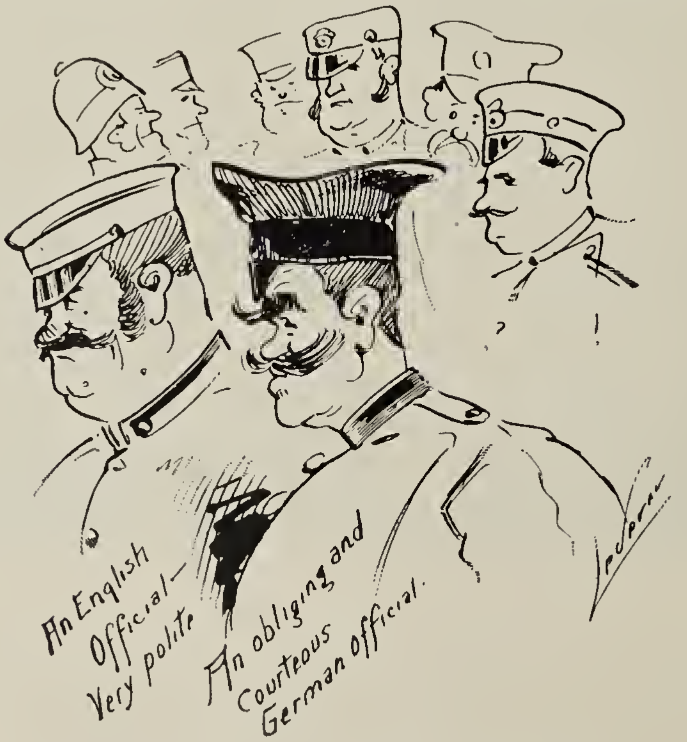
Modern clayworking has risen rapidly from a plodding industry to a mechanical art. The quality of the production has been vastly improved, until the best is now of a character to outlast any known building material. Forms and sizes of terra cotta are being produced which, a few years ago, would have been considered impossible. Now comes the question of color. A clay manufacturer who is alive to the inspiration of his calling rolls up his sleeves and calls upon Mother Nature to show up her possibilities. He stands in surprised admiration at the results. Soft, beautiful tones, covering an amazing range of color and shade, are his. Natural, unfading colors, made beautiful, some of them by intense fires, which are made hotter and hotter, till the whole kiln is as white inside as an electric light, while the roar of the stack is like that of a cataract. These bricks have been touched by a master hand. No two are just alike; fine shadings beautify every surface, and when put in position they show a character of their own, and have something to say to the beholder. A great artist is fire. —G. M. Fiske, in Architectural Record.

Written for the CLAY-WORKER.

IN A LAND OF WHISKERS.

The Clay-Worker's European Artist-Correspondent in a Hirsute Maze.

THE OFFICIALS IN ENGLAND and Germany, however stupid and stuck on themselves they may be, are never, at heart, quite as savage as their appearance would indicate. I have seen a London bobby look as ferocious as an American brickmaker when his Clay-Worker failed to reach him, but when spoken to and information was requested of him he turned out to be a man without a grievance and the possessor of a lamblike disposition. It is so here in Magdeburg, where there is a whole army corps quartered and where the people try to look as if they all had murder in their hearts. Yet they're almost infantile in their mildness. The police officers have a way of training their beards and moustaches that makes them look as if they belonged to a nation of pirates. They don't mean anything by it. I saw a young German go up to a burly policeman and tell him something, and then there were loud words. They both brandished their hands and pointed their fingers in each other's faces, and I fully expected to see the policeman draw his sword—they have swords here instead of clubs, as you know—and cut the rash young man into Hamburger steaks. I felt like asking the reckless youth his name and address, so that I could send word to his friends, but I was afraid to do so for fear the policeman would cut me up also. So I waited for the butchery to commence. But strange to relate, the young man stood his ground, and the policeman walked off, with his sword, figuratively, between his legs. Afterwards I found that the policeman had been in the wrong in some matter about which the young man had upbraided him, and on that account the policeman had shown the white feather. A German policeman, I am told, never arrests any one unless he is absolutely sure that he has a right to do so, and, as for using his sword, he would never think of doing such a thing except in self-defense, and as a very last resort at that.


An English Official— Very polite
An obliging and Courteous German official.

Foreign Officials are never as ferocious as they appear.

There is a distinctive German style to all beards.

The citizens, too, wear their beards in the prevailing style, the military style, and it is certainly effective, if not beautiful. Take three American tourists whom I met in Lubeck at a little Austellung, or exposition, which was held there last month. They let their barber comb and brush their moustaches in German style, until the natives thought they belonged to the Vaterland, and no longer expected tips from them. I am thinking seriously of having my moustache trained that way, but I'm afraid it might stay that way. I saw one official, and he was only a railway official, whose business it is to rush into the waiting room at the railway station and ring a bell and say: "Jehlsgehlsfortnach-Buderitz-Moser - Gusen - Wusterwitz - Brandenburg - Potsdam - oder - any - other - damplatz - und Berlin-Br-r-r!!!"

That's what it sounds like to a man up a tree, or wishes he was. Some time I'm going to pluck up courage enough to ask him if his beard is the result of having been half scared to death while first trying to raise it. His eyebrows have the same scared look.

If there is anything more horrible than anything else here it is the cigars they smoke as a steady diet in Germany. They are cheap, and that is the best thing you can say for them. They have imported cigars here, too, but they have lain in such close proximity to the domestic cigars (made of wild, never domestic, tobacco) that they have lost all their original Cuban patriot flavor. The people here mostly take the precaution of using long cigar holders, so as to keep the smoke out of their own nostrils. What they need here is a good smoke inspector—a good one like they haven't got in Chicago.

His eyebrows and beard had a scared look.

Speaking of Chicago, I suppose some of my German friends there will object to some of my caricatures of their countrymen, but I hope they will understand that there is no particular reason that I know of why I should be more careful of the feelings of the Germans in Germany than the latter are of Americans in general, native or naturalized. The people of Germany, those that I have seen in Bremen, Lubeck, Hamburg and Magdeburg, are not all like those I have sketched, but there are enough of them not to make one lose much time looking for them. CHARLES LEDERER.

Written for the CLAY-WORKER.

A PLEA FOR BRICK HOUSES.

Combustible Buildings are Against Public Policy, and Bad and Unprofitable for Private Policy.

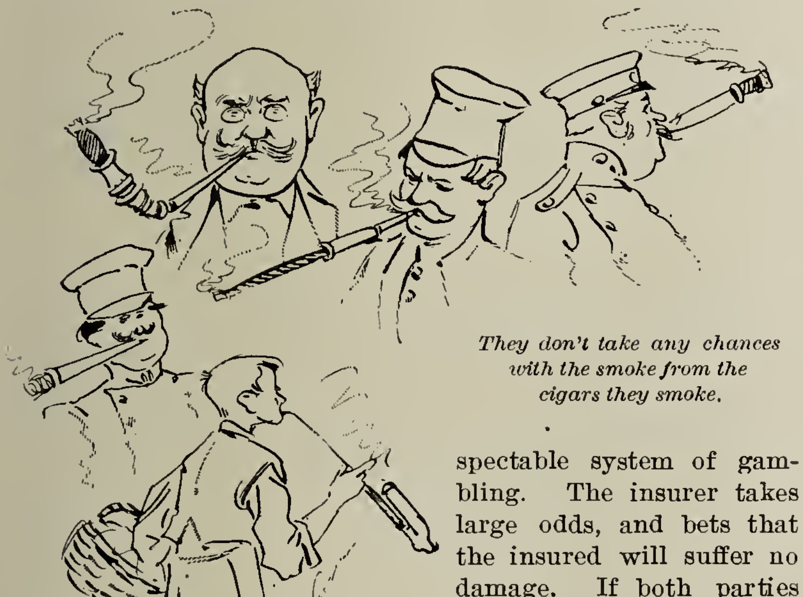
BY J. W. CRARY, SR.

PRIVATE GOOD OR RIGHTS must yield to public good," is a principle of common law that no well-informed person will dispute. If it is the interest of the public that substantial and reasonably fire-proof buildings should be constructed in towns and cities, the lawmaking power is ample to direct and control all such building so far as the interest and safety of the public is concerned. The only question is, How far can the lawmakers go, and to what extent is the general public conserved? The answer is two-fold: First, life and property; second, cost of insurance.

—Life and Property Right and Interest.—

If A has built a good, substantial brick house on his lot, B can have no just right to build a wooden house anywhere near A, and even in the absence of local law to restrain B, any competent judge, upon application of A, would enjoin B and protect A by ruling under the common law. It is upon this principle that cities protect themselves against loss or destruction by fire. Even though a combustible house may have been built before a city was laid off, if such house becomes a serious danger to the public it may be condemned and removed by law, but, of course, the owner could claim and collect reasonable damages.

—Cost of Insurance a General Public Burden.—



They don't take any chances with the smoke from the cigars they smoke.

The principle of insuring properties of all kinds is seldom considered, and not generally understood. It is, in fact, a respectable system of gambling. The insurer takes large odds, and bets that the insured will suffer no damage. If both parties are honest, the transaction is fair and legitimate. It is a sort of communism "on the sly." Every man, woman and child, where there is civilization and commerce, is "blind taxed" by the insurance policy. Every tenant of a building pays tax to insurance. The cost is added to his rent. Every shipper, every manufacturer, every merchant, little or big, pays insurance. Often the same article is insured three or four times, and the consumer at last pays, indirectly, the whole cost. I have thus glanced at the theory and cost of insurance. Now let us apply it to brick and lumber as building materials.

The people of Bremen, Hamburg, Lubeck and Magdeburg are not all like these.

Suppose we are outside the fire limits of a city. We have suburban lots, forty feet front, and desire to make a permanent investment improving them. We want to build houses in pairs, two stories high, with cellar of brick. Each house is to have eight rooms, five on the first floor, including pantry and store room, and three on the second floor. Now the question is, Which will pay best, brick or wood? If we make the proper plans and estimates, we find that it will take one hundred and twenty-five thousand brick to build one pair of these houses, and that the entire cost of one pair is three thousand dollars. We find that a pair, built of wood, will cost two thousand dollars. Now the question of pay on the investment, say for ten years, is to be decided. We can get a policy of insurance on the brick houses for $20 per year; insurance and repairs, ten years, $250; cost of policy for wooden house, ten years, including repairs, $500.

Interest on cost of brick house, ten years, at 8 per cent.	$2,400
Interest on cost of wooden house, ten years	1,600
Credit wooden house in the run of ten years' interest	$800
Credit wooden house, rent, run of ten years	4,320
	$5,120
Credit brick house, rent, for ten years	$4,800
Credit brick house, difference cost in repairs	250
Credit brick house, difference in value	1,000
	$6,050

It is seen that if the wooden house were as valuable as the brick house at the end of ten years there would only be $70 in its favor, but all good judges of property know that wooden houses rapidly decrease in value, while brick houses, if well built, are everlasting, excepting the woodwork, which is so little exposed to decay that, if well cared for, it will last for centuries. I have here put the wooden house at its best. A wise tenant will prefer a well-built brick house to a wooden house. If he desires to insure his household goods he can do it much cheaper than if in a wooden house, and his family is always assured in their personal safety much better than if in a wooden house.

—Ignorant People Think Brick Houses Are Damp.—

If a brick house be well and properly built it is less subject to atmospheric changes than a wooden house. The walls should be built hollow. For all dwellings the inside course of brick should be laid on edge, three courses on edge, then a band course, or "header." For all two-story dwellings what is called a "nine-inch wall" is thick enough, but a four-inch "jamb" should be "returned" inward for all openings. No "furring" is needed; the plastering goes directly on the brick. This adds much to the strength of the wall, saves room and cost of "furring," and leaves no place for mice or bugs. In building brick houses in pairs, the center, or "party wall," should be twelve inches thick, and the wall should be carried above the roof about two feet, and nine inches thick. All cellar walls should be at least thirteen inches thick. Brick should always be wet when laid, and the mortar should have hydraulic cement added just before taken on the scaffold. The proportion should be about one-sixth, or five buckets of lime and sand mortar to one bucket of dry cement, all well mixed just before being used.

—If Combustible Buildings Are Against Public and Private Policy, Can We Say What Kind of Materials Shall Be Used in Building?

This is a very open question, and admits of broad latitude and discursive argument in the line of discussion. The stone men, the iron men, the cement men, and, above all, the brick and terra cotta men, are all entitled to the "floor" at the proper time, and must be recognized by the general public. It is just and fair to listen respectfully to all, and so far as the clay-workers are concerned they can well afford to be liberal and yield the "floor" to their opponents, or competitors, to their "hearts' content," and just as long as the "house" will listen to them, or even the "galleries" will stay in their seats. If the question is

—Brick Against All Other Building Materials,—

I don't know that it will be necessary for any good brickmaker to take the "floor" at all. All that will be needed is for the chairman of the committee on noncombustible and everlastingly indestructible building materials to rise in his place and call for the "previous question." If the "house" be an intelligent, honest body, their minds will glance back, perhaps, to the prehistoric ages, from which have been exhumed building and other materials of artistic burned clay, in a perfect state of preservation, while the total absence of all other kinds of building materials forms a contrast so striking and remarkable in favor of burned clay as the very best and only everlasting material for building that the vote will be "Yea, yea," beyond all veto power.

There is no available building material excepting good, hard brick that will not rust out, burn out or disintegrate. Not only that, clay is the most inexhaustible and most available. Stone is only to be found and had in a few places, and cannot be properly worked into building material in competition with brick at a paying cost. Iron is too expensive, and, at best, is neither fire-proof nor rust-proof. Cement could be made into suitable blocks for building, but it would be more costly than brick, and would be inferior to brick in strength and fire-proof qualities. A hot fire will cleave and destroy either stone or cement.

—A Combination of Brick and Terra Cotta Best of All.—

In these materials strength, ornamentation, cheapness and durability are all perfectly combined. They are everywhere to be had, and the supply is inexhaustible. Common building brick can be made in almost any locality, and fire clay is so abundant that fire brick and terra cotta can be had at short notice and at fair prices to suit any demand. Iron is only had in few localities, so that the transportation as well as cost must always be greater than brick and terra cotta. It is the same with cement, and neither iron nor cement can ever be as cheap and available as brick and terra cotta for building materials. Many efforts are being made to compete with brick or supplant brick, and even some brickmakers are trying to improve the shape and size of brick, but all such experiments have failed, and will continue to fail. There is no possible way to improve on the generally accepted size of a brick. A brick about 8 3-8 inches long, 4 inches wide and 2 1-4 or 2 3-8 inches thick is as near perfection in size as it is possible to get. In the first place, such a brick is easily molded or pressed. It is quickly and safely dried. It is easily and quickly handled, either by the brickmaker or bricklayer. It is easily burned, and not so liable to break or crack as a larger brick. It can be readily cut and fitted to any place in a building. If a wall is to be hollow, courses can be set on edge and properly "bonded" so that it is stronger and better than if the brick were made hollow. No brick but a solid one, perfectly bedded in mortar, will make a strong wall.

—If Brick Buildings Are Best for Public and Private Policy, How Shall We Manage to Have Them?—

There are two ways to make a thing popular. One is to make it fashionable; the other is to show that the thing is the very best and most profitable in the end for the whole community. In all great reforms and enterprises everybody don't speak at once. Some one or some particular class or society always takes the initiative. Of course, their motives may be more or less selfish, for it is, indeed, a question whether or not such a thing, as a purely unselfish action, can be done by a human being. I would then say let every good brickmaker in the United States consider himself a member of the "committee of the whole" to act and speak on this subject. Talk brick and brick house on all opportune and proper occasions. Show the public advantage and necessity of good brick buildings. Then bring your best kindly logic and eloquence to bear on every friend who desires to build on his own account. Don't ask him to buy your brick, but find if he has decided on the kind of material he will use. If he is undetermined in that respect, then be ready, with facts and figures in your pocket, to show him that you are not after him to buy your brick, but that he should use somebody's brick for his own individual good and profit. Perhaps you can tell him that you have sold all your brick, but that your neighbor brickmaker has plenty of good brick to sell. He will see that your advice is unselfish, and if your facts and figures are plain to his understanding, he will be converted to brick, and thus a friend and patron of the brick craft.

—Now Go for the Architects and Builders.—

Lose no opportunity to talk brick with them. Don't insist on their using a great many brick in a building by unnecessarily thick walls, but show them that with good brick, well and properly laid, a few brick will build a large, excellent house, that will pay better than any other kind of a house. Good foundations and good bricklaying is what brickmakers should insist on. Brick laid dry, and the mortar turned to dust by the brick absorbing all its "water of crystallization," is very bad botch work. In fact, it is difficult to have a good job of bricklaying done by contract. The boss wants all he can get out of the men, so the mortar is bad and the brick laid dry and badly "bedded," the walls are faulty and sometimes fall, and then the blame is often laid to the brick, and, of course, that is against the interest of the brickmaker. If the mortar be good and the brick laid wet and well "bedded," and the joints well "flushed," and the "bond" perfect, in less than three months the wall is like one solid brick.

—Brickmakers Should Use the Newspapers.—

All the clay journals should "show up" on this subject of good brick building. I have time and again spoken of it in my writings, and I am glad to see, in the September Clay-Worker, that Brother R. B. Morrison gives the "target" a "center shot." If all the brickmakers will take this matter up earnestly and intelligently it will soon get to be a popular newspaper topic, and the general public will come to see it as a matter of prime necessity in public, as well as private, economy.

The street pavement contest is still going on between the brickmakers and the "asphaltumites," but the victory seems to be in sight for the brickmakers. It seems that if our streets should be paved with brick our houses should certainly be built of brick. In the case of streets, both price and durability was a question, but, in the case of houses, no one will dispute the very superior durability of brick houses, if well built. It is simply a question of first cost. Get out of some of the large cities and "brick house" seems to have an extravagant, aristocratic ring. It looks like a place for the rich, a luxury not to be thought of until the days of economy are past, when, in fact, if the villager or farmer had counted the profit and loss of ten years to come, he would have seen that the brick house was better than his wooden house, even if he had strained the point of finance a little to build it. In fact, it is all a notion about the economy of a wooden house. In the whole city of Philadelphia there are not enough of wooden houses to make a small village, and the few standing are old and dilapidated. No one would think of building a frame house, even if permitted to do so. A brick house can be built there about as cheap as a wooden house, and the insurance on a brick house is a mere trifle. I have seen a perpetual policy of insurance given for an eight-room brick house in Philadelphia for $50, paid in advance. The risk by fire is reduced to a minimum by the all-prevalent brick house. A house in a row may be burned out, while the people next door are scarcely disturbed.

—A Demand for Brick More Important than Price.—

A great effort has been made in several cities by the brickmakers to hold up the price of brick. Syndicates and combines have been formed, but so far nothing has been accomplished to insure what was considered a paying price. In fact, the attempt to force the consumers of brick to pay a fixed, arbitrary price had the opposite effect. The supply of brick was kept up or increased and the demand was decreased, for the reason that builders and investors were deterred in their intentions to use brick because of the threat of the brickmakers to combine and raise and hold up the price. Many builders declined to build, or else decided to use iron, stone or terra cotta, mixed, in one building, whereas, if brick could have been assured at common figures, they would have preferred to use them as the main material.

If brickmakers would combine and agree to supply all demands for brick at a fixed price, giving a fair and reasonable profit, without regard to demand, the use and demand for brick would rapidly increase, and the brickmakers would soon have a monopoly of the main building material. It is a fatal mistake for any kind of producers to try to fix and maintain high, arbitrary prices. It soon invites competition that will cut down the price and profits to ruinous rates, or else the demand will fall off to produce the same effect. All trusts and combines to fix high prices are great public as well as private evils. They are against public policy, and should be promptly stopped and punished.

OBITUARY.

Fatal Accident in New York.

ON SATURDAY AFTERNOON, Sept. 12, a defective scaffold built for the use of the masons employed in the setting of the terra cotta work broke and fell, carrying with it the three men who were standing upon it at the time. Two of them fell directly to the stone pavement below, a distance of fifty-five feet, and, striking upon their heads, were instantly killed. The third man, in his descent, struck upon some projections, and, although not killed at once, was fatally injured, having his leg and both arms broken, besides severe internal injuries. One of the victims who was killed by striking upon his head was Robert W. Taylor, a well-known clayworker, one of the pioneers in the architectural terra cotta industry of this country. Mr. Taylor, at the time of his sudden call into eternity, was in the employ of the White Terra Cotta Company, of Clayton, Mass. He was engaged in superintending the setting of the terra cotta in a building being erected at No. 55 Third street, New York, by Peter Tostevins & Sons, a New York firm of builders, who have had large experience in such work. He leaves a widow and a family of four daughters, to whom is willingly tendered the sincere sympathy of a very large circle of clayworkers. The funeral services were held at the Swedenborg Church, in New York, and were performed by the Rev. S. S. Seward, who was our friend's pastor for many years, and who also went to the grave to conduct the final service of burial.

Robert William Taylor was born in London, England, on Nov. 16, 1843, being about fifty-two years of age. He came to the United States in September, 1869, and took up his residence in New Jersey, working in New York city. In 1872 he removed to Chicago and entered the employ of the Chicago Terra Cotta Company, whose works had been reorganized in 1870 by his brother, James Taylor, and were then under his superintendence. In the year 1877 he returned to New Jersey, and was engaged to construct and manage the Perth Amboy Terra Cotta Works, then starting under the ownership of Alfred Hall & Sons. When Alfred Hall was removed from the control of the Perth Amboy Terra Cotta Company he established at Perth Amboy the Hall Terra Cotta Company, and the works were erected and equipped under the superintendence of Robert William Taylor, and they were successfully managed by him until their closing owing to the death of Mr. Alfred Hall, Sr. Robert William Taylor also established the terra cotta works of Calvin Pardee at Perth Amboy. After leaving the Pardee works he was employed in the model and mold department of the New York Terra Cotta Works, at Ravenswood, Long Island, and remained with them for several years. About one year ago he engaged with the White Terra Cotta Company to look after the delivery and setting of their work in New York city, a duty for which he was especially qualified by his long experience and knowledge of the details of such work. In this service he met his death, as above recorded.

His long connection (extending over twenty-six years) with the architectural clayworking fraternity embraces almost all the history of architectural terra cotta work in the United States, and has brought him into contact and fellowship with many of the terra cotta workers and builders and architects of our time. Many of our readers know him and will remember his record. It was a clean record. He knew his trade, and knew it well. As a workman he was skillful and industrious. In his employment he was faithful. To those under his charge he aimed to be just. In business he was honest; in his friendship stable and true; to his family kind and considerate. A good citizen has left us. We regret his sudden taking away, but his memory is with us still, and for good.

ROBERT W. TAYLOR, Deceased.

JAMES TAYLOR.

MORE WORK FOR BUILDERS.

Better times are close at hand, notwithstanding the voice of the professional shouters who infest all the political parties. General business shows marked improvement, as evidenced by the reports in the special trade papers. The building trades were the earliest to feel the depression, and they will therefore be the first to respond. Prepare for a late fall demand, a busy winter. Both seem almost certain.—National Builder.

THE HYDRAULIC-PRESS BRICK COMPANY'S NEW OFFICES.

THE ACCOMPANYING views, which were kindly given to the Clay-Worker's scribe by the affable Assistant Secretary of the Hydraulic-Press Brick Company, Mr. T. P. Plumridge, will give the reader an idea of the appearance of that company's new and commodious offices, on the twelfth floor of the Union Trust Building, St. Louis. Owing to the growth of their trade for buff, gray, mottled and other fancy colored brick, they were compelled to secure quarters which would give them room enough for their display.

In addition to the brick which they make in St. Louis, they have on exhibit the different brick made by their other companies, located at Philadelphia, Washington, D. C., Rochester, N. Y., Cleveland, O., Findlay, O., Chicago, Minneapolis, Omaha and Kansas City. Altogether, there are eight thousand face brick in this exhibition.

Architects and visitors, especially the brick fraternity, are cordially welcomed to this exhibit room, where some one is always waiting to greet strangers or customers. In addition to the numerous designs of ornamental brick which they have heretofore made, they have added largely to their stock, and these different brick are also on exhibition.

Their offices occupy the entire west wing of the twelfth floor of the Union Trust Building, which was divided to suit their requirements, and the subdivision of the offices was made both for comfort and convenience.

Mr. Plumridge says the brick business is better than they anticipated it would be. While it is true that prices are lower, the deliveries will show an excess over the corresponding time of last year.

Everybody is looking for dull times for the next sixty days, and are trimming their sails accordingly. The sales are not keeping up to the average. All the brickyards in St. Louis, with the exception of one or two, are running, most of them full time, and others close down on Saturday.

Deliveries on account of damages by cyclone in May are about completed, and it is only the normal demand which is now taking brick. BRIC-A-BRAC.

St. Louis, Sept. 23, 1896.

Written for the CLAY-WORKER.

THE NEW YORK MARKET.

"IT IS ALWAYS darkest before dawn" is quoted in regard to the hour when the house breaker is most likely to make a visit. In the present case, it is to be hoped that the darkness of depression in business may speedily give way to the dawn of increased trade. The darkness which overhangs the brick industry in this section at this date is black, indeed; not especially in reference to the New York market, but the local demand as well.

The old saying that it is easy to do business if you will only trust does not hold good here. Great Scott! If a purchaser should offer the brickmaker the cash at time of purchase or when the brick are delivered at the job, he would be so surprised that he would be unable to thank the customer. The brickmaker seems to be the one who, if there is any crooked work to be done, is the one picked out to cheat; in fact, the trade here is unanimous in saying that they do not know who to trust, as the many schemes practiced by parties who come out in the country and buy a tract of land, commence to build on it, make some payments, and, when completed, and the lumber and brick men go for their money, to find that there is a mortgage which has been kept in the background, "which takes all."

In one case brick were furnished for the foundations of five houses. On completion, a mortgage to a former Governor of this State appeared, which was on the property before the foundation was excavated, which covered all that was put on the property. The brick man was out between two and three hundred dollars as his share, as brick do not enter very largely in the construction of a frame building—only foundation and chimneys. It seems to be the study of the contractor, if he is likely to lose money, to throw up his job, and, as there are no bondsmen, it is whistle for his money. Is it any wonder that it looks dark for the trade? To still further show your readers about as clean a case of rascality as was ever practiced, and one which is hard to guard against unless cash is paid, we cite the following:

The son of a brickmaker had a yard in Paterson for the sale of building material. His father's yard could not manufacture enough to supply him. Last year he purchased brick from the yard next to his father's, and they carted them to the railroad for shipment. During the winter he made a contract with the owner, Mr. Cooper, for four millions for the season. In the spring he bought of Mr. C. E. Walsh between one and two hundred thousand, and when they were delivered gave him a note for one hundred days, which fell due in August. Mr. Cooper was shipping on the four million contract. Just before the first note was due on the notes given for the brick sold during the winter, he formed a stock company. On maturity of note he requested Mr. Cooper to renew it, which he did, and stopped shipping brick. A week later Mr. Walsh's note was due, and the day before maturity he sent, by a boy, a new note, with the interest added in the note, instead of sending check for interest and asking him to renew the note. This he refused to do, with the result that the note went to protest. The next week another note given to Mr. Cooper met the same fate.

Mr. Walsh sued, got judgment, tried to enforce, and found that the stock company was formed to repudiate all his obligations, and that as an individual all these debts were contracted, and there was nothing to attach. Everything of the company's was covered by a chattel mortgage.

The company, when formed, was capitalized for $15,000 par value, $100 per share, of which the gentleman in question takes 142 shares and brother and wife seven, and a lawyer in Paterson one share, making, in all, 150 shares, and all so secured that nothing is left. Mr. Walsh is out nearly $1,000, Mr. Cooper between six and seven thousand, and other claims making a good, round sum. It looks as if he had studied the doctrine of repudiation to his benefit. Mr. Walsh is about to commence supplementary proceedings to see if fraud cannot be proved, and it is to be hoped that he may succeed.

—Another Side of the Same Case.—

About the time when the notes were falling due parties from Passaic came to Hackensack, inquiring of the different brickmakers what they would sell half a million brick for, saying that the parties from Paterson would deliver them in Passaic for $4.50 per thousand. That settled it; there was no use to bid against that rate.

Now, let us see how he could furnish them so low. He paid Mr. Cooper $4, delivered on scows to carry them over the river to the railroad at a cost of 35 cents per thousand. The freight is 60 cents per thousand, making, in all, $4.95 on the siding in Passaic, then selling them for $4.50. In the light shed on the doings of the party in question, he could have sold them for any figure, however low, and then made money on the deal, as such work shut out all others. There was no room for competition; it was a case of simply trying to sell against their own brick. So much for the local market.

—A Woman Buyer.—

A few weeks ago a lady applied to some of the manufacturers, saying that she wished to buy three-quarters of a million brick. Two yards took the contract. One shipped about 300,000, the other nearly as many. When they went to the parties in New York they found that the lady had sold them to other parties. The owners of the barge could find no one to pay the freight when unloaded, and up to present writing have not been able to collect. They found the lady, after a few days' search, when she produced a five-hundred-dollar check on a Chicago bank, but could not get any one to identify her at any bank. The owners would not pay her the difference, and it looks as if they would never receive payment. The Flotsam and Jetsam of this world seem to be out to see who they can beat.

—Selling Brick—

Around the town or surrounding country at present is hard work. Wherever one of the bosses makes a sale he does not know that he will have a chance to deliver the brick—that is, if they are responsible parties—as it is quite likely some other brickmaker will go to the party and offer his stock for less money, and get the job. The range of prices under the shed was certainly low—$4.50 per thousand. One of the manufacturers could not sell any, so he cut the price to $4, with no material increase in sales to him. Some of the yards will not sell for less than $4.50 at the yard, while others are selling as low as $3.75. How is that for good hard brick for local use? At the lowest they should command one dollar per thousand more. It would not be a surprise if even that low rate were shaded.

At the present time the town is putting in a sewer that will require about one million brick. Parties from Philadelphia have the contract, but they have not given out the contract for the brick. It is quite possible that $5 per thousand at the job will be the price, if not a less figure. The contract calls for the best hard brick; no arches, or light, or swelled, but good, whole, smooth brick. No broken brick will be received. In a kiln fifty wide there will be 2,700 arch brick to take out, besides others which would go in any other work. It will take the gilt edge off the returns at—will we say?—$5 per thousand.

—Still Molding.—

One would say that, to look over the situation at present, it would be good judgment to stop making for this year, as the majority have done. It would seem that some have lost what business judgment they ever had—that is, if they ever had any—and to judge from past experience of the same parties, it would seem that nothing short of total business annihilation will do the job. The idea of any one continuing to make, and then pile out on the dock a million or more brick to make room to set in the green brick, while the hacks on the yard are three and four deep, with a market at the lowest ebb it has been for years, and no prospect of being better! Where they expect to get better returns to pay for the increase in the expense of extra handling it is hard to see. Possibly, being a strong believer in Bryan and his theories, he thinks that he may be elected, and, if so, the silver dollars of free coinage, which the government does not guarantee or back, will advance the price of brick to such an extent that he will be a "Croesus."

—Wind Mills,—

Not to supply the brickmakers with pure and unadulterated wind, but to pump out the clay banks or to keep the water from accumulating in the bank during the winter, are being erected on two yards at the present writing. If they prove a success, no doubt, the rest of the yards will use wind power to free the bank of surface water. It will be a saving of several hundreds of dollars in the course of the season, as well as having a dry bank to go into in the spring. The cost of one will be paid in one spring's pumping.

—Prospects of Demand—

Must be looked for in the projected buildings in New York city. The best part of the season is past, and a large number of buildings are under way. The number of permits for building will gradually drop off. As the figures of this year are compared up to date with those of last we find a shrinkage, not very large, it is true, but still less. As we compare prices for brick, the same state of things appears.

From Jan. 1 to Sept. 26, 1895, 3,128 permits were filed.

There were filed for the same date, 1896, 2,565, or a difference in favor of 1895 of 563. In this connection all real estate is seriously affected, as the following will show:

A lease recorded in the Register's office on Friday, Sept. 25, provided for the cancellation of the contract in the event of Bryan's election, in order to secure the lessor against the payment of his rent in fifty-three-cent dollars. As a potent and practical argument, this single lease stands pre-eminent in the midst of all the arguments set forth as to what free silver will do for the trade.

—The Market.—

I had hoped that the report this month would at least be of the "middle-of-the-road" order, if nothing more, but, like the chances of some of the presidential candidates, it is receding. The shipments have been restricted, likewise the demand. What stronger argument need be set forth than that still the supply exceeds the demand from day to day. There are but three yards shipping from Hackensack. The range of prices on Hudson river is from $3.75 to $4.25; Jerseys, $3.50 to $4. Before the November number is out I hope to be able to show a decided advance in rates. A. N. OLDTIMER.

DRYING BY THE WASTE HEAT OF KILN.

An Improved Burning System as it is in Use at the Royal Brick Co.'s Plant, Canton, Ohio.

THIS MATTER of which I write is of importance to all clayworkers, as it is the new system of utilizing the heat of the kiln for improving the burns of the brick, and then afterwards utilizing the heat to dry them with.

After seeing this system in operation for more than a month and the good results obtained, I think that as a student of ceramics it is of importance that all clayworkers should know that such a great saving of fuel for drying brick has been successfully accomplished.

—How It Originated.—

After the works of the Royal Brick Company had burnt down, a year ago, the General Manager, Otto Giessen, had come to the conclusion that the cost of the drying in previous years had been too expensive, and so determined to experiment to some extent. Ducts were built along each side of the kiln, leading to the chimneys. These ducts led into the main tunnel running along one end of the kilns to the fan, which is placed at the lower end of the drier. After these were completed it was put in operation, and to their surprise found not only the brick bone dry in less time than before, but the brick in the bottom courses of the kiln were as hard as those on top. This they attributed to pulling the heat down through them, and ever after got a larger per cent. of hard burnt brick than any time before.

—The Advantage They Obtained by Pulling the Heat Down Through the Floor.—

First—The heat is utilized instead of being wasted.

Second—It burns the bottom brick harder and better.

Third—You can stop burning from ten to fifteen hours sooner.

Fourth—It takes less coal to burn them with.

Fifth—It keeps the crown in better shape and gives it a longer life.

Explanations for above statements are as follows:

The first question answers itself. If you don't utilize this heat it is wasted.

It burns the bottom brick harder and better because, by pulling the heat down, they raise the temperature of the bottom brick to the same as those on the top.

They consider ten to fifteen hours a great saving of time on a kiln which, without this system, they could not save, but now, by pulling the heat down, they do not need to hold the top brick in the kiln and run chances of overburning it in order to burn the brick in the bottom as hard. They simply burn the top brick done, and then, by means of a fan, burn the bottom brick. This statement will answer itself, also. If they stop burning ten to fifteen hours sooner they save ten to fifteen hours' fuel and labor.

As the crown is the most sensitive part of the kiln, it occasionally caves in, but the life of a crown is assured from the fact that if you pull the heat away from it evenly it will contract slowly back into its normal position, instead of expanding more by letting the heat out of the top, and then fall all at once.

—Temperature That Can Be Obtained.—

You can produce any amount of heat in your drier you want and change the air as often as you like. At the end of each tunnel they have an opening to receive cold air. This was put there in order that the cold air would thoroughly mix with the hot air before reaching the drier. They change the fifty thousand cubic feet of air in their drier every fifty seconds and evaporate seventy-eight thousand pounds of water every twenty-four hours, keeping the temperature between 260 and 380 degrees all the time, but could have it hotter if necessary.

Their clay, or shale, is very tough, and will stand such high temperature without cracking. But for their tender clay they do not run such high temperature and do not change the air as often. In this way they dry this clay with perfect safety.

—The Difference Between Steam Tunnel Drying, the Old Way, and Their New System.—

Before having this system they had fifteen tracks, which contained thirty-five thousand feet of pipe, subject to cracking, leaking and freezing. To-day they have only ten tracks and dry as many brick and block, bone dry, in less time than with their fifteen-track steam drier. The reason for this is, in a steam drier you can only attain the maximum temperature of 180 degrees, where, under their new system, they have reached 500 degrees as the maximum.

Right here I want to relate that one of the company's men told me that they made, dried and set almost bone dry brick in the short duration of ten hours.

—Where the Great Saving of Fuel Comes In.—

When they used steam to dry their brick they kept a battery of three boilers going day and night, and invariably had wet brick. Now they fire two boilers to run the machinery and fan in the daytime, and it takes only from two to four tons a night to run the fan, but where they used to burn seventeen to nineteen carloads of coal per month now only burn from six to seven, saving ten to twelve cars, or from 250 to 300 tons, or $375 to $400 per month on fuel alone for drying. And the additional amount added which comes from the larger per cent. of hard burnt brick would swell the account double.

In conclusion, will say that the above statements are facts, and not speculation on the subject, and are results as obtained from the patented fuel saving and economical way for drying brick and improved burning system, as I have seen it in operation. CARL GIESSEN.

WHAT USERS THINK OF WILLIAMS'S COMBINED CRUSHER AND PULVERIZER.

Quincy Press Brick Company, Quincy, Ill., June 30, 1896.
Messrs. M. F. Williams & Co., St. Louis:

Gentlemen—I have now been running your new clay and shale combined crusher and pulverizer for two weeks, and can say that you have the very best machine for the purpose that has ever been constructed. I cannot say too much for it, and believe that I would be willing to sign any kind of testimonial that could be gotten up.

It should make you a fortune. If it was mine I know it would make one for me.

Its capacity for grinding clay is only limited by the ability of the elevator to carry it away fast enough. I will mail you a check some time next month.

Yours very truly,
QUINCY PRESS BRICK COMPANY.
H. W. GERKE, Manager.

COLLEGE FOR BRICKMAKERS ON THE INDUSTRIAL PLAN.

IN THE AUGUST Clay-Worker Mr. Crary has published his views of an ideal college, or rather a trade school of brickmaking, which he proposes to make a model brickyard in full working order. This is an entirely novel view of a school, and we believe that, as a shop for teaching manual labor, it would be a success. But as an institution for teaching the principles of science as applied to clayworking I am afraid it would not make a very favorable showing.

Ceramics, as it is now considered, is on a par with any other branch of technology, as civil, mechanical and mining engineering, and, as such, requires mathematical training, with a practical knowledge of surveying, drawing, and especially of inorganic chemistry—in fact, a complete collegiate course of studies. Who ever heard of a desire on the part of mining or civil engineers to establish an institution having, for instance, a mine and blast furnace in active operation instead of the present engineering schools. They never dreamed of such an idea, for they know that for experience they must go into industrial establishments. In all first-class technical institutions enough practice is given the student in laboratories to crystallize their theoretical knowledge into a clear and concise understanding of practical processes.

The natural way of obtaining actual experience of a certain branch of technology is to enter a manufactory as a workman either before attending college, or, better yet, after having pursued a technical course. There one does not only acquire a practical knowledge of the different operations, but also an insight into the methods of doing business and the dealing with men, which, in these days of competition, is of prime importance.

A young man, with his power of observation trained by a collegiate course, on entering a manufacturing concern, masters the detail of the business with rapidity, and, by systematic reasoning, will have no difficulty in reducing the processes of manufacture to a method. By the way, I do not believe that the brick business is so intricate that it requires a specially organized, subtle intellect to master it.

Mr. Crary suggests the time between 6 a. m. and 12 noon as hours of manual labor. I would like to know how a man, after six hours of physical exertion, could manage to wrangle with mathematics and its applications and do delicate chemical work. All who have had experience in this line will coincide with me that this is impossible without straining the physical and mental powers.

A great part of the students at the ceramics department of the Ohio State University have had practical experience in the business, and it is their desire to master the elements of the sciences applied in clayworking, with sufficient laboratory and experimental practice to familiarize themselves with the practice of clayworking, and this is what the Ohio department of ceramics offers. They would not give years of their lifetime for the privilege of doing manual labor, and, if nothing more than brickyard work could be offered them, they simply would not attend such a school.

As to the expenses of attending the institution, it can only be said that no young man possessed of an earnest desire of obtaining an education is excluded from the possibility of attending. If his desire is really earnest and supported by a measure of energy, he will surely acquire sufficient means for paying his way. On the other hand, if he has not the qualities and misses his chance by sheer lack of energy, he amply deserves his lot. Such a man is not fit to be one in whose charge thousands of dollars are to be placed and who is to direct the labor of many hands.

In conclusion, would advise Mr. Crary to carefully study the programme of the Ohio School of Ceramics. I can assure Mr. Crary of my great respect towards him, due to his vast experience, the results of which he has so generously imparted to us, but I felt it to be my duty to the institution I attend to say these words in favor of a rational system of education.

A STUDENT.

BRICKMAKING IN CANADA.

SOUTH OF THE St. Lawrence river, about forty miles from Montreal, on the Grand Trunk Railroad, in one of the most fertile districts of all Canada, is situated the beautiful village of Ormstown, with its three hotels, several large dry goods and grocery stores, to say nothing of its shops and mills. Ormstown is largely a village of wealthy, retired farmers, who collect rents and clip coupons for a livelihood.

While stopping there at the National Hotel, not long since, I was surprised early in the morning to see wagon loads of "toadstools" being hauled in and delivered to the jolly landlord, who, with a number of boys and girls, was packing them in boxes, each box holding from one to five pounds. When, on making some inquiry as to what had become of the toads, and whether or no they had been properly slaughtered for breakfast, to my great surprise I was informed that what I saw was not toadstools, neither were they the habitations of toads, but food for man. Imagine my astonishment when I learned that just below town was a large mushroom farm, on which grew annually thousands of dollars' worth of these choice bits of tenderloin decorations.

Views of the Crown Press Brick Co., Ormstown, Canada.

If you ever go to Ormstown to visit the Crown Press Brick Company's works, go also to the toadless mushroom farm. Mr. G. W. Butterworth, the Managing Director, was up early to show us through one of the first brick plants of importance in Canada. The company has a large tract of very fine press brick clay. They also have, in connection with their dry-press plant, a plant of three or more soft-mud machines, from which they are turning out a large quantity of common building brick. They have three large, well-built drying sheds, which they formerly used in drying repress brick, but now that they have dry-press machinery they have no further use for the dry sheds for brickmaking purposes. Mr. Butterworth informed me that the company was now considering the advisability of manufacturing terra cotta and drain tile from their terra cotta clay, of which they have an abundance. By this means they hope to be able to put the now idle sheds to a profitable use. The upper stratum of clay, to a depth of about six to eight feet, is a sandy yellow nature. This is used for the common brick. Below the yellow clay is a very fine quality of a bluish, sandy clay, well adapted to the manufacturing of dry-press brick and terra cotta. This blue clay is taken from the bank to large open sheds, where it is allowed to dry and settle before grinding and molding into brick. For some time the company has been trying to burn their dry-press brick in open up-draft kilns, but with very little success. Later they put in a small round down-draft kiln, with some better results. They are now building a plant of Eudaly square down-draft kilns, and claim to have made a great success. They are now working on the second kiln, and will continue until they have five of them. They have also altered the round kilns, doing away with the large stack, with excellent results.

Mr. Butterworth, the Manager, informed the writer that the company had recently contracted to fill large orders of pressed brick, both in Montreal and Ottawa. They are manufacturing a very high grade of ornamental brick, of which they had quite a large number of excellent patterns in stock. They set the ornamental brick along with the pressed brick in the down-draft kilns for burning, and are having very excellent results. They use a soft, bituminous coal, mostly brought from the United States. Mr. Butterworth is also a very large dealer in coal at Ottawa.

BUTTONHOLE TALKS.

IT WAS TOWARD the end of the Atlanta Convention. We had come in from beneath the sky of that sunny South that had no sun for us. We had sought our rooms, only to be frozen out of them, and in sheer desperation, and as having no other place to go, we were walking and standing in the hotel lobby, talking, when a solemn brother broke in on me. "Say," said he, "isn't this a nice Convention? Smooth as oil. Slick as butter. Everything lovely. No quarreling. No fighting. Nobody hot."

"No," said I, "we all think too much of each other to lose our tempers. We know each other too well. We have too much regard. We know we all have failings; indeed, we must have, being human, but we mutually bear with each other and avoid anything that may jar on a brother. We humor their whims and oddities, and they ours. We——"

Here I noticed such a strange, tired, weary, disgusted expression that I began to fear he was ill, and started to fan him, and then called for a glass of water. This evidently shocked him, and he seemed to revive, and went on talking in a weak, tired voice about what a time that man had who wrote my speeches, concluding with the remark: "Well, it isn't so bad as it might be, for evidently all he has to do is to teach them to you. He evidently never explains them. He certainly never attempts to do anything of that kind, or he would have to draw maps of them, or possibly use a chisel, or——"

Just here another brother caught us both by the buttonholes and broke in:

"Do you fossils notice the way the young men are breaking into this Association? I just tell you these boys are humping us back numbers now, you can just be sure. Why, there's that paper of Butterworth's on 'The General Manager!' Everybody's talking about it. And then there's Orton. Why,

MORE INTERESTING FIGURES.

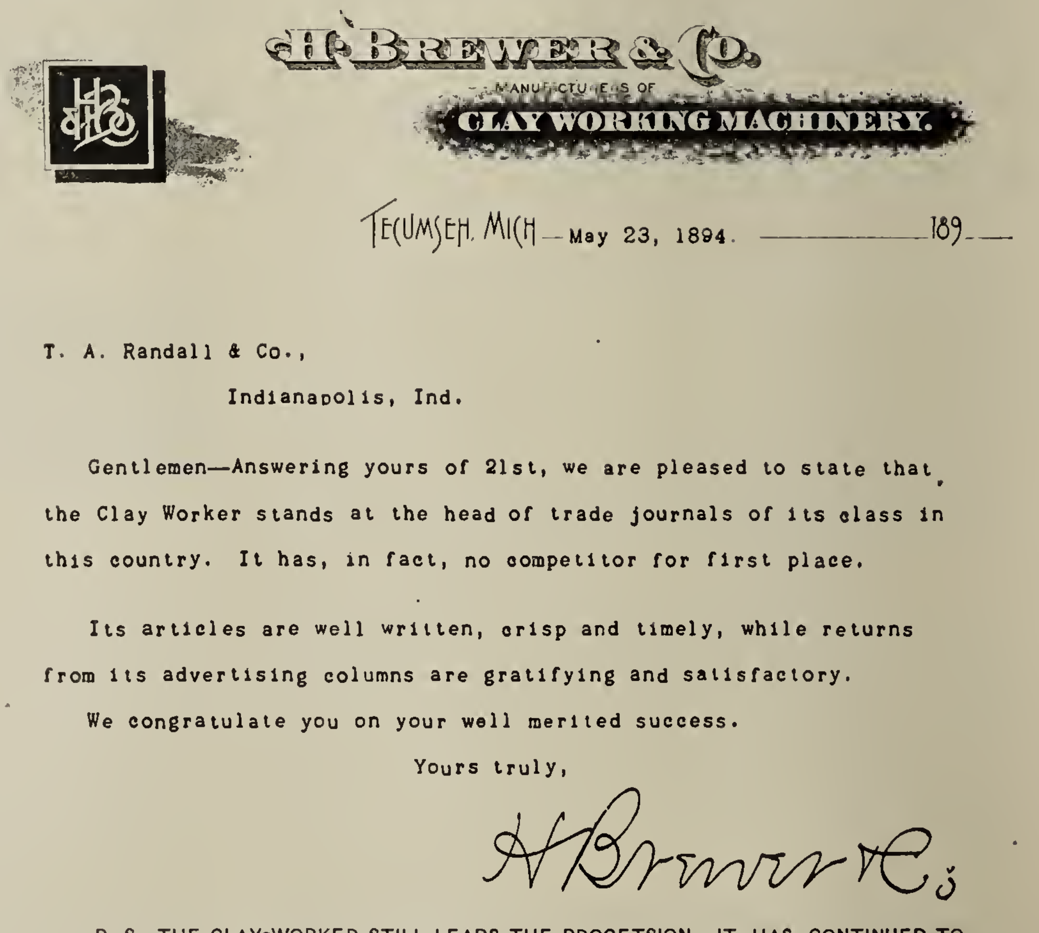
Any information relating to the precious metals has a lively interest for most people just now. We have received from the United States Geological Survey Director, Hon. Chas. D. Walcott, a large chart containing the total values of the various metals and minerals produced in this country during the years 1886 to 1895. inclusive. We copy those relating to silver and gold only. The coining value of each is given:

Years.	Silver.	Gold.
1886	$51,000,000	$35,000,000
1887	53,350,000	33,000,000
1888	59,195,000	33,833,954
1889	66,396,988	32,886,744
1890	70,464,645	32,845,000
1891	75,416,565	33,175,000
1892	82,099,150	33,000,000
1893	77,575,757	35,950,000
1894	64,000,000	39,500,000
1895	60,766,300	47,000,000

The table will prove an interesting study to those who have given the leading question of the day much attention.

It is said that there are only two words in the English language that contain all the vowels in their order. They are "abstemious" and "facetious."

IT STANDS AT THE HEAD WITH "NO COMPETITOR FOR FIRST PLACE."



H. BREWER & CO.
MANUFACTURERS OF
CLAY WORKING MACHINERY.

TECUMSEH, MICH — May 23, 1894. 189

T. A. Randall & Co.,

Indianapolis, Ind.

Gentlemen—Answering yours of 21st, we are pleased to state that the Clay Worker stands at the head of trade journals of its class in this country. It has, in fact, no competitor for first place.

Its articles are well written, crisp and timely, while returns from its advertising columns are gratifying and satisfactory.

We congratulate you on your well merited success.

Yours truly,

H Brewer & Co

P. S.—THE CLAY-WORKER STILL LEADS THE PROCETSION. IT HAS CONTINUED TO IMPROVE RIGHT ALONG AND WE HOLD THE SAME HIGH OPINION OF IT NOW AS WHEN THE ABOVE LETTER WAS WRITTEN.—H. B. & CO., AUGUST 26, 1896.

Orton is doing more for the future of clayworking to-day than anybody else—excepting you two. Why, in that report of his he didn't leave enough over to fill a thimble. When he reports on a subject he just hits it all—don't leave anything at all behind, and next time he has just got to report on something else, because there's none of the old lot left over. Not only that, but he is bringing up those boys in his classes in the same way. I know it, because I stopped over there and saw them awhile ago, and I want to inform you that they are 'hummers.' This Association ought to just adopt them, and do it quick, too, for they go at everything hammer and tongs, and go right down to the bottom, and some of these days they are going to make their marks high up in the history of clayworking. They have a Ceramic Asssociation of their own, and they argue questions and prepare papers, and they are just wide awake all the time and looking for information. They tell me there that he has to chase them out of the rooms nights, and then they get the key and get in early in the morning. What do you think of that—you folks that had to be chased to school with a gad when you were laying the foundation of the massive and impassive education that now weighs you down?" GATES.

PREVENTING RUSTING OF STEEL PALLETS USED IN DRYING BRICK—THE CONSTRUCTION OF KILN WALLS, ETC.

I HAVE RECEIVED a letter from an old subscriber to the Clay-Worker, Ricardo Calvo, Bogota, Republic of Colombia, South America, requesting me, as a contributor to our leading trade journal, to inform him if there is any method of preventing the rusting and consequent destruction of the steel pallet used in the drying of brick in a drier. This difficulty has probably caused inconvenience to many of your readers, therefore I will offer the following as the best inexpensive remedy to my knowledge:

Rusting of steel or ironwork of all kinds may be remedied in a great measure by an occasional coating of warm boiled linseed oil. If the steel pallets are occasionally dipped into a bath of warmed boiled linseed oil they will be found to last much longer than if not so treated. The dipping is recommended because it is quickest, but it can be done equally well, and with less waste of oil, by the oil being applied with a brush. The application of a coating of oil (boiled linseed) will be a great protector, and found to preserve all the ironwork connected with brick drier movable tools, such as pallet, cars, racks, etc. When the brickmaking season suspends, all such tools should have a coating of boiled linseed oil, in which a quantity of air-slacked lime has been mixed so as to make a thin paint.

Mr. Calvo also wishes "to know the best firms from which to obtain the most approved iron equipments for brick driers." This one could hardly undertake to decide amongst so many manufacturers of well established reputation. It would, however, be safe to suggest that your advertisers communicate directly with our correspondent and present their claims personally.

Mr. Calvo proves himself to be a thorough, gentlemanly brickmaker, for, while seeking information from his fellow-clayworkers, he also desires to give some in return, and he does it in advance, too.

He uses an old-time Dutch, or open-top, kiln. In common with others, he has had great difficulty, caused by the bulging of the inner wall, which has been a frequent cause for repairs, and sometimes rebuilding, notwithstanding the use of "many cast-iron bars in the walls" and good bracing. In seeking to prevent this costly damage he has adopted a plan of building the walls upon a segmental line instead of on a straight line, as is usual. This makes a round wall outside and a hollow surface inside of the kiln. A segment of one inch in two feet is sufficient, and has proved with him to be an effectual preventive of that difficulty, entirely overcoming it and saving much expense.

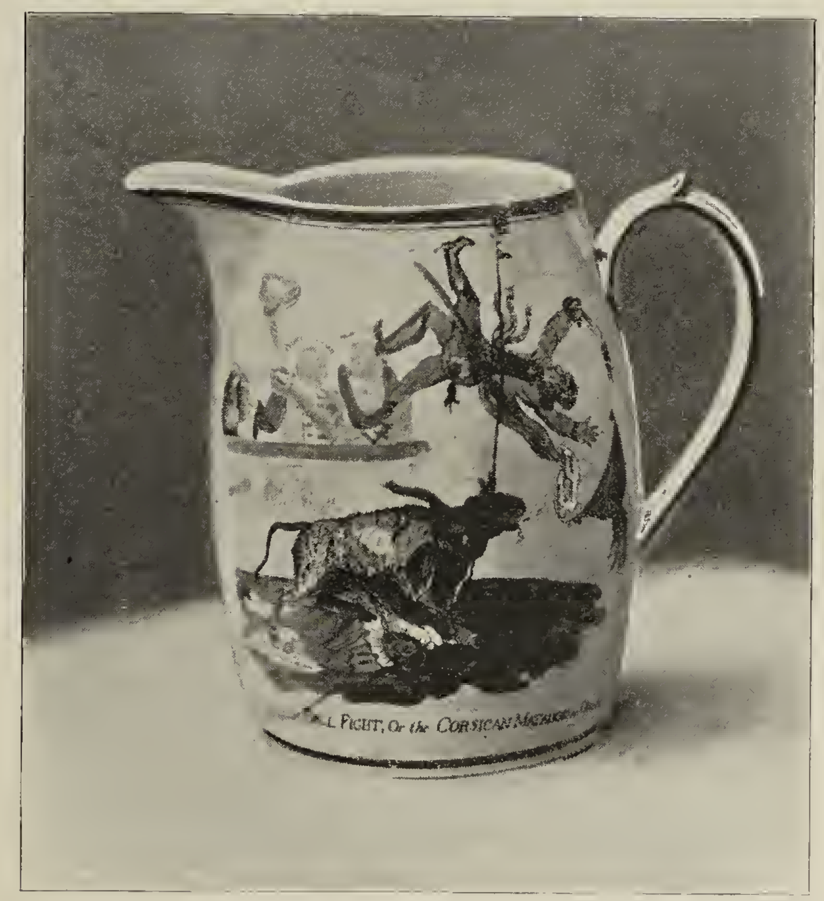
Such construction is based upon rational lines. It is well known that the falling away of the inside walls of the open-top kiln is due to the expansion of the bricks caused by the heat generated during the process of firing or burning. This expansion naturally goes inward, because that is the only free course for it to escape. But when the wall is built upon a segmental plan this expansion reacts upon the solid wall, and is held in place by the cooler mass of outside wall.

Mr. Calvo also states that he uses "many cast-iron bars, built into the brickwork, for cross ties," in the walls of his kilns. These may, in a measure, be an injury to the walls, owing to the unequal expansion of iron and brick when exposed to great heat. It would be better to use stout hoop iron, one and one-half inches wide, about No. 18 guage, laid flat in the mortar of the horizontal joints. This is one of the very best methods of tying brickwork so as to produce the most strength when it is liable to be exposed to great heat, because the iron is of so small an amount that it is very little affected by the action of heating and cooling of the walls.

As this segmental plan described by Mr. Calvo is perhaps new to many of our brickmakers and kiln builders, it would be, perhaps, interesting to have the opinions of some of our practical co-workers upon the subject. I have for many years used the oval plan for my kilns in preference to the circular, which is the plan almost universally used by terra cotta kiln builders, and for my adoption of the oval I can give very good and satisfactory reasons. JAMES TAYLOR.

A SPANISH BULL FIGHT, OR A CORSICAN MATADOR—A CARICATURE IN CHINA.

THIS PITCHER is of cream pottery, called Faience in France and Italy, being the same as the Liverpool and Staffordshire wares in England. It is much better adapted to bright colored decorations than stonewares or porcelains. The decorations of this piece are in gay colors to suit its theatrical character. The inscription near the bull is "Coronation de Joseph Bonaparte, Rex Efhagorot Gibralta." Near the hat falling from the tossed-up victim is "Plan Pour Asfujetti Monde," this not very distinct. Over the head of the left spectator is "Prince de Brazil," and over the head at the right "Polar Star."



BULL FIGHT ON THE CORSICAN MATADOR. A Caricature.

The scene is evidently a caricature upon the appointment of Joseph Bonaparte as King of Spain by his brother, the great Napoleon, in 1808, and who, at the same time, gave the throne of Naples to Murat, who was the husband of Napoleon's sister. It sounds something like a game of battledore and shuttlecock, with crowns and kingdoms tossed forward and back. But Joseph, who had found Naples somewhat difficult, found Spain very much more difficult, and he disliked the change very much. He entreated Napoleon to relieve him, and in 1813 gladly returned to his estate at Morfontaine, in France, while Ferdinand VII was recognized by the Emperor as King of Spain. Joseph Bonaparte was the only brother who possessed the affection of Napoleon. He was very handsome, with an innate refinement and culture which made him exceedingly attractive in society and in the family circle. Joseph Bonaparte came to America after the fall of the empire, and lived for many years in New Jersey, where he was highly respected. He died in Florence, where he had rejoined his wife, in 1844. This quaint illustration in ceramics is from a pitcher owned by Mr. R. T. Van Deusen, of Albany, New York.

MARY E. NEALY.

FOR SOUND MONEY.

With true Southern enthusiasm and impulsiveness, "Dixie," of Atlanta, the leading industrial magazine of the South, has taken up the cause of sound money, and has devoted the major part of its editorial pages for several issues to the discussion of this subject, expressing opinions on the political situation with a fervor that would hardly be tolerated in a Northern trade magazine. It has "called a spade a spade," and denounced what it considers free silver heresies in unmeasured terms. Aside from this feature, its arguments have been pointed and effective. In its September issue, under the head "Free Silver Antidote in Broken Doses," it continues the discussion at much length. The following excerpts are particularly well put:

"No one can deny that present conditions are very unsatisfactory; but it is folly to say that present conditions could not be worse. Death is worse than disease. For the cure of our disease it behooves us to heed the voice of experience. What physician is sent for to cure our brother stretched upon a bed of pain? Do we send for the young enthusiast, bubbling over with untried theories, or do we call for the doctor whose medicines long years of experience have proved to be reliable? Surely there would be no doubt or hesitation here. In such a condition do we find the commercial body to-day. Shall we take a medicine that has cured and kept healthy the fifteen strong nations of the world, or shall we accept the theories of the silver party, and swallow medicine that has never yet lifted a nation to greatness or a people to prosperity?

* * *

"With evident delight the silver orators exclaim: 'If the gold standard is a good thing, why is it that so many mills and factories are closed? Why all this talk of hard times and dull business?' These men may be likened to the boy who finds himself without fishing line or hook, and stands belaboring the water with his rod and calling out to his companion: 'Why don't you catch fish? I haven't stolen the water?' The silverites have not robbed the world of its money, but they have destroyed confidence, and until the manhood of this Nation declares itself and wins back that precious jewel there will be idleness and suffering in the land.

* * *

"Our annual wheat crop is measured, and the number of bushels accurately and conveniently determined, although there is not a separate bushel measure to represent each bushel of grain. This principle applies with equal truth to our financial system. Our daily commercial transactions amount to many millions of dollars above the actual currency in existence, but the dollar, like the bushel measure, is the basis upon which these transactions are carried out. Modern commercial methods seldom call currency into actual use. It is an admitted fact that more than 90 per cent. of our commercial exchange is accomplished by the use of checks. Thus, while we have only a little more than two billion dollars of actual money in circulation, our currency is augmented, by the use of checks, to more than twenty billion dollars. There is a wide difference, however, between the influence that makes us willing to accept a check in settlement of debt. We accept money because all the resources of our government are pledged to maintain the dollar at par value. We accept a check only because we have confidence in the individual issuing it. Rob the business world of confidence, and checks go out of circulation; they are no longer acceptable. Rob commerce of its checks and our currency is immediately contracted. In times of normal confidence it is safe to say that our circulating medium is augmented ten-fold. When confidence is shaken this increased circulation is impaired, and in times of panic checks are valueless. When the business world is buoyed by confidence there is but little use for money.

* * *

"When argument is based upon a wrong principle it is full of inconsistencies. Candidate Bryan says that our dollar is too valuable; that it has enhanced until two bushels of wheat are now required in exchange for a dollar, whereas one bushel of wheat was exchangeable for a dollar in days gone by. Mr. Bryan's remedy is to cheapen the dollar. This is logical, and the dollar would certainly be cheapened by 'free coinage;' no doubt of that. So far Candidate Bryan is consistent; but wait a moment. He says, also, that free coinage of silver by the United States alone would double the price of silver bullion and make it worth a dollar and twenty-nine cents per ounce in gold the world over. If this advance should result, the silver dollar would rise in value to the present worth of the gold dollar, and there would be absolutely no change in our financial system. These two propositions are utterly at variance with each other. One of them must of necessity be incorrect.

* * *

"It is a stock argument with the silverites to say that gold has appreciated—doubled in value. They attempt to prove this by the present price of other commodities. They point to the fact that silver bullion is cheaper than it used to be; that food products and fabrics are lower in price; that every commodity for which money is given or received is lower to-day than twenty years ago. What reason is there in saying that the value of these commodities has remained the same and that one thing—gold—has appreciated? Besides this, there is ample reason for the depreciated value of commodities in general. But no one attempts to explain why gold has appreciated. For the past thirty years increase in the production of gold has remained in strict ratio with the increase of population, whereas the inventive genius of all mankind has been turned upon the problem of increasing and cheapening our food products and other necessities. Of what use to humanity has been the inventive genius of man unless the necessities and comforts of life have been cheapened, and thus put within reach of a greater percentage of the population?

* * *

"A great deal has been said about 'corporations' and the 'money power.' We suggest to the men who have been impressed with this argument that they bring the question home. Study the 'corporations' and wealthy men of your own city. Are they a menace to the best welfare of your town? Don't place the 'bugaboo' in some other city, but look over the labor-employing institutions of your own city and decide honestly with yourself whether they are a harm or a benefit to your locality."

Some people are alarmed because the raw material out of which paper is made is likely to give out. The supply of rags long ago became insufficient; then they took to using wood, but now the forests are thinning out so fast that it is only a question of time when the wood must fail. But there is no cause for alarm. By the time wood gives out good paper will be manufactured out of clay. It may be hard on the brickmakers of that coming time to have to share their clay with the papermakers, but they are a generous people, and they will do it cheerfully.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

GEORGIA PROGRESS—N. B. M. A. CONVENTIONS, ETC.

Editor Clay-Worker:

Your readers will remember that Brother Eudaly honored us Romans with his presence during the "warm spell," and we all wish to thank him for his complimentary remarks, including "Old Dave," who sleeps quietly on the old red hill, over which he scampered so gayly with a little darkey dragging at the end of the lines. Brother Eudaly gave a truthful account of the good traits of "Dave's" character. Among other things, he said "Old Dave" never complained of overhours. This was literally true, for "Dave" simply wouldn't work after the whistle blew, under any circumstances, but did not complain about it. He simply struck a bee line for the barn in spite of the vigorous pulls and imprecations of the little darkey, who hit the high places en route. No, "Dave" never complained about overtime. "Dave" was a mule of deeds, not words. The men in the clay mine always worked cheerfully in the rain until they saw a composite streak of mule, gear lines and pickaninny strewn from bottom to top of that same red hill; then they knew it was too wet to work outside. Still, we all think "Dave" the greatest and best mule that was, is or will be in this section.

Friend Eudaly's description of the Georgia "horseless carriage" was edifying and interesting. It was technically correct, but I fear some of your readers would not catch on to the bovinity of the motor power. In reference to the fuel used, wood is used exclusively; hickory is the favorite kind. The natural gas referred to is used not to make heat, but to produce sounds, which is a necessary qualification for the motorman, gongs not being a part of the Georgia horseless carriage. I cannot hope to improve on Brother Eudaly's description, but will endeavor to secure an illustration of one of these wonderful vehicles pictured on the pages of the Clay-Worker.

In reference to place of meeting for our next Annual Convention, I hoped we would have the pleasure of being entertained by our New England brethren in the famous city of Boston, and in that section live some of the brightest and brainiest and most earnest and faithful members of our National Association, and I can think of no other place I would rather go to attend our meeting. However, when we consider that while Boston may be the hub of the universe, it is nevertheless located near the outer rim of the felly of the great American wheel. This fact would not cut much of a figure in ordinary times, but now, after brickmakers have gone through a year of very low prices and orders like "towns out West," we might have a light attendance unless we meet at a central point. Our Boston brethren appreciate the situation, and are willing to waive their claims to the next Convention if a majority of the Executive Committee think it best.

I heartily indorse the idea of having the ladies attend our powwow, and favor the programme this would call for; also, that each member pay his share of the expense incurred. We could then meet at any point desired without waiting for a formal invitation from local brickmakers.

Rome, Ga., Oct. 3, 1896. R. B. MORRISON.

From the Land of Free Silver.

Editor Clay-Worker:

As you invite discussion of the money question, perhaps a line or two from Mexico may not be without interest for some of your readers.

I notice that this country is sometimes quoted to prove the advantages of a silver standard. Those enjoying (?) this form of currency altogether fail to appreciate its wonderful benefits. They are, however, possibly on the principle that "misery loves company," largely in favor of its adoption by the United States, probably in the vain hope that it will have some effect in raising the value of their silver.

Apart from the weightier political reasons, which absolutely forbid the adoption of a depreciated and fluctuating currency by a great nation like the United States, a silver standard simply means the reduction of the laborers' wages by nearly 50 per cent., and at the same time the doubling in price of many of the necessities of life. The common laborer here receives about 50 cents a day, silver, and this is more than double what is paid in many parts of the Republic, while those who drink tea, for example, have to pay for the worst quality a dollar and five cents a pound, and for a better class three dollars. The best we never get at all, except when some sympathetic friend in England or the States kindly sends a small packet by mail (this is not intended as a hint to the readers of the Clay-Worker), while coffee, which is grown on the spot, costs about 50 cents a pound, because the countries which blindly adhere to the gold standard can afford to pay the equivalent of this for it.

Allow me to congratulate you warmly on the clearness and conciseness of your editorials on this subject. You are quite right when you say "the profit to the owner of silver bullion would be insignificant. * * * He can get bullion prices now for his silver, and that is all any one will get whenever, from free coinage or any other cause, a silver dollar may not readily be converted into a gold dollar."

No government nor combination of governments can, in the face of the inexorable law of supply and demand, make, by turning it into coin, 50 cents' worth of silver sell for one dollar; nor can it compel its meanest subject to receive the same for more than its real value. The people don't want silver—won't have it—so long as they can get something better, more convenient.

Mr. Chapelle complains that "the act of 1873 absolutely destroyed the legal-tender character of silver in amounts exceeding five dollars." What does any one want with more silver than enough to change a five-dollar gold piece or banknote, unless they desire to do as people are obliged to here—take along a lot of "mozos," or pack mules, to carry the silver every time they have a few thousand dollars to pay. It is an exceedingly pleasant way of doing business!

It is argued that the silver standard has proved advantageous to Mexico in that it encourages manufacture within her borders and gives her a large premium on her exports. This is, to a certain extent, true, but it is all done at the expense of the poor laborer, who, as before stated, often receives no more for his day's work than the equivalent of 12 or 13 cents in gold. Just think of it! Barely enough to buy a very limited supply of the very cheapest articles of diet. And this is the case in every country similarly situated with regard to currency.

Nations operating on the silver basis do not do so from choice, but from necessity—not because they think it best, but because they are unable to do better. For the United States to adopt such a policy would be a retrograde step which the pride and common sense of her people will never permit.

Tuxpam, Mexico. R. M. GREER.

Some Questions About Money.

Editor Clay-Worker:

When our friend, Burr W. Blair, says anything, he is sure to tell the truth; that is why it sounds so good. I cannot follow him in his statistics, for I cannot comprehend millions, except in a brick pile, but I believe they are right, for he says so. But I have a remark of Wm. McKinley's in my mind. A few days ago, in speaking to some Grand Army men, he said: "I want the pensions of our soldiers paid in the best money in the world, money that will not burn up, that cannot be destroyed by fire." Did he mean that in truth, or was it gush?

I, too, want the best money in the world. The money I have now before me I believe to be mostly of that class. It is the only money I have been able to get during my residence in America. The quality is good enough; only the quantity is what troubles me. Looking over the little pile I now hold I find 39 per cent. silver bills, paper fire will destroy; 15 per cent. United States bills, paper fire will destroy; 30 per cent. national bank bills, paper fire will destroy; 15 per cent. silver coin, fire will reduce 47 per cent. (Gold is too good for the common business men and those who create all the wealth of the world, so I have none of it.)

Does Mr. McKinley really mean that when he gets into the White House we are to be paid in gold, and only gold? No money which fire will destroy? Where will the gold be found to do it? As so many are willing to make arguments and statements, I will take the liberty of asking a few questions:

First—Is there enough gold in the world to exchange for all the other money in circulation?

Second—Is there enough gold and silver combined to do so at its bullion value?

Third—Why are checks and notes accepted in payment of debts?

Fourth—What would happen if we all did as the money sellers do, viz.: go to the United States Treasury and demand gold in exchange for bills?

Fifth—Why have the money sellers brought so many millions of gold back from Europe since the Chicago platform was published?

Sixth—Why is there such unity between the trust kings and the lions and lambs of both of the old political parties?

Since bimetallism is a good thing, and both the St. Louis and the Chicago platforms proclaim it to be so, why not let us have it? Why wait for the consent of the money kings of Europe? Our forefathers demanded freedom when King George ruled in London one hundred years ago, and, upon his refusal, took it without his consent, and kept it, too. Now we demand freedom to control our own system of money. For twenty years our government, under the leadership of Republicans and Democrats, has demanded bimetallism from the money kings who now rule in London. But they refuse to consent. Why not do without their consent? There were Tories in those days, who shouted treason. So there are today. May the truth prevail, and what is just and equal rule in our land. That means the good of all.

JAMES TAYLOR.

The Real Cause of Hard Times.

Editor Clay-Worker:

I have read all the articles in your September number, and especially those which refer to money. I do not think it can be truthfully said that you are allowing the Clay-Worker to degenerate into a political paper, for the reason that this question of money as presented to the people during this campaign is not a matter of politics or policies, but it is a question of business, commercial honor and good, old-fashioned integrity. Neither Crank, Blair, Caldwell or any of your able contributors would deny that they are in favor of sound money, and it seems to me that the whole question resolves itself to this: Can the parity of gold and silver be maintained, provided the government of the United States allows or authorizes the free and unlimited coinage of silver? If Crank, Blair et al. can guarantee that the answer to my question will be affirmative then I am with them, but unless they or some other equally good authority can give me this guarantee then I shall be compelled to stick to Caldwell and his crowd. I am thoroughly convinced that our financial safety consists in a currency that shall be stable, and I cannot see how, with a law that would permit all the silver in the world to be coined into United States silver dollars, it would be possible for the government of the United States to maintain their value with the gold standard. Further, it is apparent to me that the gainers by the passage of a law permitting the free and unlimited coinage of silver at the government's expense would be the present owners and future producers of the silver metal, and no one else. We are very apt to consult our individual interests in deciding questions of public policy, and I confess to an utter inability to see how I could possibly be benefited by the passage of a free silver law.

May I say just one word, which, while it does not bear upon the kind of money we shall have, does affect very materially the quantity? I do not believe the question of a change in the laws governing the coinage of gold or silver has anything to do with the present depressed condition of business. Four years ago we were a happy, prosperous, contented people. Our mills and factories were all running on full or overtime. The receipts of the government were in excess of expenditures. Few industrious men in good health but were able to lay aside from their earnings something for old age or sickness. Our wives and children were well fed and well clothed, and we were all looking forward to the day when we could enjoy a well deserved rest. Our money was as good as any in the world, and the question of how many or how few grains of metal it contained was never asked or considered. To my dear friend Blair and his friend Crank let me say that to me the proposition is a very simple one. The answer is, Put our beloved country under the same laws which governed us four years ago, give us precisely the same conditions which existed then, and I will guarantee the same results. All this clamoring for free silver is the result of a failure of the party now in power to keep the promises it made through its platform and speakers of 1892. I will close with a little campaign incident which I have good reason to believe is true. The head of the Railroad and Warehouse Commission of this State is the Hon. Thos. Gahan, a very able business man, a good politician and a thoroughly good fellow. He is Chairman of the State Committee for the silver Democracy and the Illinois member of the National Committee for the same party. While Mr. Gahan is a very practical man, he has never delved deep in the mysteries of political economy, and the story is that early in the campaign, before the St. Louis or Chicago conventions had been held, Mr. Gahan went to his Excellency, Governor Altgeld, and said to him: "Governor, what is all this talk about free silver? What is there to it, anyway?" And the Governor replied: "There is nothing to it, Tom, absolutely nothing; but it's all we've got to shout for this year." And there's where you are at.

Yours, etc., D. V. PURINGTON.

The Silver Lining.

Editor Clay-Worker;

I wish to answer a few of the assertions made by the gold men in the September issue. Justice Bradley, of the United States Supreme Court (pretty good Republican authority, who, by his vote, seated President Hayes), said he "had never seen an argument against free silver." Such has been my experience, and with all the prejudice of my twenty-six years of Republicanism I have never seen the free silver argument successfully answered. One writer speaks of the stability of currency. We have always had a more stable currency under the double standard than under the single. Silver has always been stable. Statistics show that an ounce of silver will always buy a bushel of wheat in London, while a gold dollar will buy sometimes one bushel, and, as now, two; so it shows gold fluctuates and silver remains the same. The workingman wants the honest silver dollar, the money of the people. Your charge that there were only eight million silver dollars coined prior to 1873 is correct, but you forgot to state that there were about $135,000,000 fractional currency made legal tender and about 100,000,000 of foreign silver dollars admitted as legal tender, which made a total of over $235,000,000 in silver previous to 1873. You also forgot to add that only about 19,000,000 of gold dollars have been coined altogether in this country, and that now the coinage of the gold dollar is discontinued altogether. A gold dollar is so scarce in New York it readily commands one dollar and fifty cents as a curiosity, so you are fighting under a fictitious standard when you throw out the yellow flag. You forgot to say anything about the coinage value of the output of silver last year being only $36,000,000. You have put in all the silver used in the arts. We could absorb a great deal of silver in this country, though, with our immense crops, and not have an inflation of the currency. The dumping theory from other nations was so effectually answered in my last that I will only say if other nations are kind enough to give us their silver we will willingly take it and thank them. We can absorb it. We have to pay them dearly, or the Rothschilds, for their gold when we sell bonds, and I expect all the silver we got from foreign nations would cost dear. The gold for $262,000,000 of bonds has cost us about $30,000,000. I believe you say that we would get about $350,000,000 of silver if we remonetize. We won't; no such good luck. But if we did, now that would start up our brick factories and furnish us with markets for brick at $10 per thousand instead of the fifty-three-cent brick our friend has now to keep in his kilns.

Brother Caldwell says we have in circulation over $1,800,000,000. Let Brother Caldwell turn to Treasury Circular, No. 123, issued by Secretary Carlisle, and he will find it is something over $1,800,000,000, or a shrinkage of $150,000,000 in the last two years. Then this is not all in circulation. There is not $10 per capita in circulation. Senator Plumb said, some years ago, there was only $6 per capita. Then he argues, in case of free silver, $600,000,000 of gold would leave us and the balance would depreciate, or that which was left us would depreciate. Who ever heard, if you decrease the volume of money, that the lesser amount would decrease in value. If the gold went out the silver would come in, and then there would not be contraction. The gold would go to another country and cheapen gold there, and then it would return to this country. In fact, now, under a single standard, gold all goes to London, and Rothschild sells it back to us to maintain the gold standard.

Then Mr. Caldwell quotes the French assignat, which was money founded on the confidence of people and the forfeited lands of the clergy, and also the Mississippi scheme. The silver money is another thing. The latter was a great paper inflation, founded on confidence we hear so much about now in the gold arguments. I quote from "Tucker's Money and Banks:"

"The Mississippi scheme, founded by John Law—He mixed up the following untenable positions: That money owes its value to the public confidence, and that paper or anything else may answer this purpose as well as the precious metals (the first as well as the last he regarded as the mere signs of wealth), and that land was a better commodity for money than silver (observe silver), and that the currency of the country might be increased to the whole value of the land."

Silver is wealth, is capital. We don't want paper money or promises to pay; we want the precious metals, gold and silver. I have the testimony of Senator Morton. I quote from his speech: "I hold in my hand a silver dollar; that is money. It is a promise to pay the paper dollar."

We do not want the single gold standard, with its fictitious, scarce, lonely gold dollar, an imaginary object. "The gold dollar is too scarce and dear to go into commerce," says Mr. Bryan. Give us the money of the people, that circulates and is not so aristocratic that it hides itself and rushes off to Lombard street, London. Silver will start up the mills and furnish the lubricating oil to run them. As a Republican I was taught by that great statesman, James G. Blaine, not to look to foreign nations, and especially England, for help or assistance in tariff matters, so now, in finances, I am not going to take lessons and advice from England. We could make out our case in favor of silver and only cite authorities and assertions from prominent advocates of the gold standard of to-day. The Cincinnati Commercial formerly advocated the "dollar of the daddies," also the Louisville Courier-Journal, the Chicago Tribune, Puck and other prominent gold papers. The statesman, Speaker Reed, said "the white man with the yellow metal put his industries at the mercy of the yellow man with the white metal," so we might corroborate with silver expressions from Butterworth, Foraker, Palmer, Buckner, Carlisle, Sherman and McKinley, who have formerly strenuously and forcibly advocated the remonetization of silver. Some say hard times from overproduction, but McKinley says start up the mills. Why start up the mills if there is overproduction? The latter is on a par with the assertion that "we give the silver mine owner a dollar for fifty-three cents' worth of silver bullion," and then turn right around and contradict themselves by saying "we pay the workingman in fifty-cent dollars." Oh, how glad, during these three years of distress owing to repeal of the Sherman purchasing clause, our workingmen would have been to have some of the fifty-cent dollars instead of not being able to see, let alone handle, the gold dollar of 200 per cent. enhanced value in purchasing power! What remedy do our goldite advocates promise us? Silver advocates say remonetization of silver will bring better times by making money more abundant and sufficient to start business and manufacturing once again. What relief, what remedy, do the gold people offer? So, dear Clay-Worker, we might continue our argument in favor of the honest, sound, silver dollar, but space will not permit. We want to congratulate your patrons for the wise, moderate and conservative manner in which the debate of silver versus gold has been conducted in your columns. Both sides are striving for the same object, "better times." I think it can only come through not having money so scarce and adding the volume of silver to our circulating medium. If I should be mistaken and Major McKinley be elected, which I do not expect, may all the clouds of financial distress be lifted from our house, and we may find "a silver lining to every cloud." "Fondly do we hope and fervently do we pray" for this result. BURR W. BLAIR.

Cincinnati, O., Oct. 3, 1896.

Overproduction, not Lack of Money, the Cause of Business Depression.

Editor Clay-Worker:

If one may judge the present political outlook from the tone of the many published letters to the different newspapers and periodicals, our anxiety may cease and contentment again reign, and we should begin to fit ourselves for the strain of business activity that the success of sound money promises.

Politics has no pity, but, from our individual views, many will sympathize with the few previously accredited bright public men who now champion the silver side of our financial debate. They are few, battling under adverse circumstances, and destroying the brilliancy of their previous records. They may be sincere, but inefficient to handle the question they have undertaken.

Much of the correspondence is an attempt at argument, based on statistics of money at different times in our history, and displays the contortion that these figures may be made to exhibit, and peculiar impressions such exhibits leave on the mind. Silverites should never use statistics, for no proper use of them will do anything but defeat their cause.

It is deplorable that any party should call the attention of any class of men to bank presidents as being a class of men to be despised. And it is right that such remarks work a greater injury to the party making them than to those whom it is their intention to decry. No class of business men show greater judgment in helping business when depressed, take greater risks or is a greater help to all the people than the bank presidents, or their banks, and they should have the moral and financial support of every class of men.

In this campaign there is confusion between monopolists, capitalists and business men by our silver advocates. But while all may be business men, all business men are not capitalists and but few monopolists.

If free silver, the proposed remedy to defeat monopolists and capitalists, should be adopted, it must pass through the hands of this very class of men first before it can reach the workingman or any whom the silver advocates attempt to benefit. Thus, instead of reducing the wealth and power of this class of men, they are bound to be richer and more powerful.

Statements that a dollar is made by stamping it and that 53 cents' worth of silver is a dollar because so stamped are idle, as, if this is so, why need it be stated in the same breath that free coinage will increase the price of silver to twice its present value? This being the case, would not silver be just as "dear" as gold? Why, then, define one as "dear" and the other as cheap, and on the cry of cheap offer it to the workingman? It's a delusion.

The main difficulty with the silverites is that they do not conceive the function of money. They appear to believe that money is the article. Money is not food, drink, shelter or clothing. Those that perform labor do not do so for money, but for what it represents, such as food, drink, etc. The transaction is an exchange of labor or commodity for commodity or labor, and money is but the medium that unites the separated transactions. As, for instance, if two neighbors had each an article that the other wanted, and both as valuable to each other, they would exchange these articles, and no money would be needed. But if the conditions and desires were the same, but, the parties being separated and strangers, they could not know where or who had the article they wished, they are thus compelled to go to a third party, who purchases both articles and sells to each the article of the other. Thus the exchange is complete, and, although money has been passed, all parties now stand as before, except such moneys as may have been a profit to any or all. The actual transaction is the commodity exchange.

Relative to the quantity of money making business, it is to be remarked that at no time is money so plentiful as when business is the most quiet. At these times money is cheap, and this immense amount wholly at the call of the depositors. Or, regarding the volume of money as giving value to commodity, this is a reversal of fact, as the value of commodity is dependent entirely on the volume of commodity and the proportionate need for such quantity, taken together with the quantities and needs of corresponding commodities, that must be exchanged to provide for all the wants of all the people.

Free coinage at the ratio proposed will antagonize every nation with whom we have business dealings. It is the effort of all nations to have a balance of trade in their favor, and if such a balance be made they would be compelled to take pay for such balance in money worth but one-half value. This would result in their refusing to sell us unless paid in gold, which, finally, would make gold so scarce that a premium would be exacted. Such goods would then be worth their first price plus the premium, and for us to buy these from the importer with silver would make the price exorbitant. An article worth one dollar in a foreign country, and assuming gold to be 25 cents premium, for us to pay in silver we would have to give $2.50 for an article that would otherwise cost $1, or an advance of 150 per cent.

But one benefit can the silverites claim for the coinage of silver at the ratio of 16 to 1, and that is in paying the debts at present contracted, and presuming the silver kings to be taken with a philanthropic mood and sacrifice the additional legal tender value that the proposed act would give them, and give to all with whom they do business double as many dollars as they otherwise need. By this method, if carried out in all business, would debtors be benefited. But this is dependent entirely on the action of the silver owner and wholly improbable. But after such debt was paid no after advantage could be expected, providing a parity of the two metals should be established at the said ratio. But what grounds for such presumption? And as such will be a fact, would this not be repudiation of at least one-half the debt in all places where our laws would not reach or the country has no jurisdiction? Will this not antagonize all nations and cut off all foreign business relations? Our aim should be to have the confidence and support of all nations, and especially the wealthy ones. Our country is large and must be developed. Such development is not usually very remunerative for some years. The first cost must lay and more money be had for working capital. All this can be got abroad, with the confidence we have enjoyed heretofore, at very low rates, and the commercial ties thus created are to help all these developments to a final success, as the profits of their purchases or transactions with us indirectly go back in dividends to them. Our foreign business is thus immensely increased. With the success and profit of such investments, the dividends will be put into other industries. But this will not be if we are to repudiate one-half our debt with them, or by giving twice as much for silver as can be got anywhere else. Or, if we give one-half as much commodity as we do now, this would prohibit their purchasing unless they paid in silver, or by us making gold twice as valuable as now. In any of the above transactions, except where we take pay in silver, the ratio is 32 to 1 instead of 16 to 1. It is evident, then, we have done nothing to raise the price of silver and establish the parity as desired. Or is there any way, unless the producers are willing to give as much labor or commodity for an overvalued silver dollar as they do now for a gold dollar.

Again, what we purchase from them must be paid for in gold or silver at its bullion value. Thus, those that bought tea, coffee, sugar, rubber, tin or any imported article, would be compelled to double the price if paid in silver.

Really, money is not our trouble, and, if it were, silver is not our remedy, as at present proposed. What is our trouble? Why so many out of employment? Why such low prices for our productions? At present, distrust; but before this spasm of silver fanaticism it was overproduction and an insufficient foreign market. Our natural resources are immense, our production excessive, and the surplus must be used before more is produced. A surplus of production means a surplus of producers. What the remedy? To extend our business to every nation of the earth and build a market to consume our entire production. When such is done all will be put to work and their productions moved and consumed to permit of the regular rotation of such business. Money will then travel with every balance.

H. H. FERNALD.

The Evils of a Single Gold Standard.

Editor Clay-Worker:

If any sentence in my recent paper was tainted with sarcasm or ill-nature, I was unfortunate in my choice of language. It is useless to indulge in any hair or word-splitting argument as to whether silver was demonetized or demintized by the act of 1873. It is enough to show that this law stopped the coinage of the standard silver dollar, substituted the trade dollar for it—which was only an implied promise to pay a dollar—destroyed the legal tender quality of silver in amounts over five dollars, annulled the quality of redemption, or money of final payment, given to silver by the laws of all nations, and emasculated the money system of this country. Now apply any name you see fit. These are the facts, clearly set forth by the expressed terms of the law itself, regardless of theory or opinion.

In charging grave business disaster and ill results to the act of 1873 I am but quoting from the officially recorded utterances of Sherman, Blaine, Carlisle, Allison, Conkling and many others of national repute, and should you question my authority I will, with pleasure, send you certified copies of these remarks as taken from the Congressional Record, if you will publish them. A fact to which I would call the particular attention of your readers is that nearly all the great men of this country, the men most honored and most respected, regardless of party, have, at one time or another, emphatically condemned the act of 1873 because it "demonetized silver," according to the terms employed by them.

I have stated that the logical and inevitable result of a single gold standard is the concentration of money. Every thoughtful man will admit that the undue concentration of money is an unmixed evil, though some may deny the partial cause I have given.

Without time to go into the argument upon that branch of the subject, I will say that the weight of authorities sustains my conclusion. And, what is of more importance, the figures show that such concentration is going on too rapidly in this country for our safety as a prosperous and free people. The United States census shows that in 1870 70 per cent. of the people of this country owned their own homes. In 1890, after seventeen years of gold standard, the number of home owners had gradually been reduced to 37 per cent. Some of your correspondents will promptly say that it was not gold, but high tariff or low tariff, as they may feel upon that subject. But England established a gold standard in 1816. Then 59 per cent. of her people owned their homes. In 1890, after seventy-four years of gold standard, part of the time under a tariff and part of the time under practical free trade, the home owners were reduced to 22 per cent.

Our last census shows that from 1880 to 1890 the increase of wealth of New York alone was thirty millions of dollars more than the increase of wealth of the nine great Middle Western States, comprising a section of territory most highly developed and equal in productiveness to any in the world. The census figures further show that the per capita consumption of the most necessary commodities is decreasing, notwithstanding decreasing prices would seemingly make them easier to procure. The consumption of that prime necessity, wheat, has fallen from 5.41 bushels in 1870 to 3.28 bushels per capita in 1895. Here is a problem for thoughtful men—a steadily declining price and a steadily declining use of a necessity of life. I shall admit without argument that a large production of a commodity may be and is a factor, but to claim overproduction as the sole cause of shrinking prices is to logically say that we have developed our resources and enlarged our facilities for production to a point where we can no longer afford to produce. The success of a merchant in handling products and commodities is measured by his surplus, or the difference between his receipts and what he expends or consumes in the conduct of his business. But by the argument of overproduction, the farmer or wage earner, by producing a surplus, defeats the object of his own industry. Still further, if overproduction is the sole evil afflicting us, then an abundance must logically result in want. Then industry is no longer honorable or sensible. The industrious man must limit his production to his own wants or bar the progress of the human race—except that portion which neither toils nor spins. There is no overproduction to-day as compared with the needs or ability of people to consume products, but there is a very large overproduction measured by the ability of people to buy, for they haven't the money to buy with. And this is the evil. Solve this and you have solved the whole problem.

Every writer upon economic subjects admits that the volume or quantity of the money of ultimate payment is the measure of all values. This proposition is the axiom of monetary science, and means that a small volume of ultimate or final payment money results in a high exchange value of such money and necessarily low value for commodities.

The act of 1873 reduced the volume of ultimate money or real money one-half by casting out silver, and increased the exchange value of the remaining gold. All the talk about more silver having been coined since is idle. Not one dollar of it is real money or the money of final payment, and consequently does not serve as a measure of value. But its being made indirectly redeemable in gold has, if anything, aggravated the evil by increasing the function and consequently the demand for gold. All silver coinage since 1873 has had but limited legal tender, both in law and in fact, and all legislation from the same date alleged to be in favor of silver has been nothing more nor less than attempts to make a successful circulating medium of a commodity without endowing it with the full function of money. These are the prime causes of the depreciated price of silver bullion when measured in gold.

The correctness of the rule that the volume of money of final payment is the measure of all values is fully shown by the fact that silver bullion, measured in gold, is worth but 66 cents, yet the same ounce of silver, measured by all the staple products, which are our source of wealth, is worth as much as it ever was. In other words an ounce of silver will buy as much wheat, corn, cotton or any other necessary product as it ever would, showing that the exchange value of silver bullion is unchanged, but by reason of the legislation making gold the sole standard, or money of final payment, its exchange value or purchasing power is materially increased. This increase in the exchange value of money can be illustrated by a brick deal. If one of your patrons gives you twenty dollars for one thousand brick, his money has bought your brick, but, no less, your brick have bought his money, and we may assume that the exchange was mutually fair. But when the time comes that the brick manufacturer has to give two thousand of the same quality of brick to get the twenty dollars, then the effect of a reduced volume of standard money is felt. Then business paralysis, as it is called, sets in. Then those who never look below the surface shout, "Overproduction is the sole cause."

It is certain that some of your correspondents will reply that the remonetization of silver is a mine owners' scheme, etc., etc.; that wages are higher now than ever. China, Japan and Mexico will be cited as terrible examples, etc., etc. If permitted to reply I should be glad to meet their arguments.

The whole contention of the bimetallist is that the law shall be applied equally to both gold and silver, as was the case for nearly a century of our history. To do this, we believe, would be of vast benefit to the farmer, the wage earner, the business man and all kindred interests by securing a more stable and equitable measure of value, increasing the volume of such measure, stimulating business activity and increasing the opportunity for labor, for the good of all, and, last but not least, restoring an equitable relation between fixed interest-bearing obligations and business or productive investments.

To the opponent who charges us with "dishonesty," because, as he puts it, we are trying to "make fifty cents' worth of silver equal to one hundred cents' worth of gold" by law, we can only reply that it is law, and law only, which gives gold its representative or its exchange value. This line of argument against bimetallism depends wholly upon the hypothesis that the representative value of the gold dollar is based upon the intrinsic value of the bullion contained in it. If the hypothesis were correct a gold currency would be an extremely unstable and varying affair, for its intrinsic value is either the labor value consumed in its production or its use value to mankind. If the labor cost is selected as the true test, then its intrinsic value would be almost as variable as the winds, for the labor cost of mining gold varies in every mine, in every country, and from month to month in each mine. The placer miner may secure untold wealth by a single blow of the pick, while by the slow processes of ore production a year's labor may result in less than a single day's development in some other mine. Then how is it if the utility test is applied? Years ago Benjamin Franklin wrote that gold was less useful to the human race, and therefore of less intrinsic value, than iron. But you may reply that its money use is its principal use, and consequently fixes its value. Granted that this is true, it would still fluctuate to such an extent as to destroy its usefulness, unless its representative value was fixed by law. For without the support of the law and its symbol, the stamp of the mint, to fix its value, it would rise or fall with increasing or lessening production. But by virtue of the law the mint value and the commercial value of gold bullion is the same, and will not change except by change in the law. Embrace silver in the same law, and it will be governed by the same conditions.

I am aware that any arguments I may present will be met by the usual retort of "repudiation," dishonesty," and more in that line. Yet the gentlemen who bark the loudest up this particular tree, while strenuously objecting to independent legislation by the United States looking toward bimetallism, advocate it if done concurrently with other nations—by international agreement, to use their own language. It may be impolite to question the sincerity of this quasi advocacy of bimetallism, yet I always welcome the argument for an international agreement, for it is an emphatic indorsement of the great principle involved and for which true bimetallists contend—that is, that the representative value of metal money depends not upon the intrinsic value of the bullion in the dollar, but upon the law. For whether bimetallism is accomplished independently or by agreement, the principle, the operation is the same. The value is fixed by law. It is the stamp of government, the act of sovereignty.

If the free coinage of silver is dishonest, will it become less so because agreed to by some other nation? If it is an impairment of contract or repudiation by one nation, it is no less so if agreed to by others. If independent bimetallism is a crime, it is not made virtue by a partnership.

In conclusion, permit me to say that an enhanced dollar may be as dishonest and a greater hardship than a debased dollar. And, though you argue against silver till doomsday, you cannot have a sound or honest metal currency without it. For no money is sound except there be enough of it to serve all the people, and no money is honest if it serves the interests of the few at the expense of the many.

A. CHAPELLE.

Money—More or Less, Better or Worse—Which?

Editor Clay-Worker:

The success of the free silver scheme to make money more plentiful depends on a "supposition," on an "if," and Mr. Bryan recognizes this in his late speech in North Carolina. After expatiating on his pet theory of raising the price of silver by a fiat of the government, from 66 cents to $1.29 an ounce, he said: "The only way to know absolutely is to try." According to this wise man we cannot know anything by our own experience or the experience of others. We must try. Don't know anything about it; we "must try." He further says: "If we can take it all (meaning silver) we will fix the price at $1.29 per ounce, and we should thereby raise the price of those things which come in competition with the products of other countries, thereby restoring prosperity to the farmer. He would then purchase at our stores (because the price was increased), and make a demand for the products of our factories." The remarkable thing about the above is the "if" and the farmer buying more freely because the prices were up. The price of the farmer's wheat is set by the market price in Liverpool, and free silver will have no effect on that market. But as Mr. Cockran said in his speech here last week, there are many things proposed by the Popocrats that we may not hope to understand. Mr. Bryan shuts his eyes to the fact that we have tried over and over again, and that other enlightened nations have tried and found it an impossibility to keep gold and silver on a parity otherwise than by making the weaker redeemable in the stronger. Brother Blair says "free coinage of silver would make money plenty (What about the quality?) and so promote business." He asserts that our dollars have nearly double their purchasing power, and he would destroy this large purchasing power by free coinage. Who gets the most benefit from the large purchasing power of our dollars, the rich or the poor? The poor, assuredly, and that is good policy that secures the greatest good to the greatest number. To compel the poor laboring man to take a dollar that has not the purchasing power of any dollar on earth is a crime. I take it for granted that Mr. Blair bases his scheme on the "assumption" that free coinage will raise the value of the silver dollar to that of the gold dollar. This is the vital point. This is the foundation of the whole free silver argument. Has it been proved or can it be proved? Mr. Bryan says it has not and cannot only by trying. The effects of failure would be what? A disgraced nation. Business in a state of chaos and distress, and want on every hand. It would be decidedly unwise. More than that, it would be wicked to risk the well-being of the millions in an experiment. But it is not, strictly speaking, an experiment; it has been tried and found wanting, and the evidence all against it and nothing in its favor makes the proposed experiment a heinous crime. We believe Brother Blair and others who have expressed themselves on this subject are honest, but fearfully mistaken. Mr. B. assumes that our hard times arise from the scarcity of money (we have more money per capita, I think, than any nation on earth except France), and that this scarcity results from the so-called demonetization of silver. This is another assumption devoid of proof. The best times we ever had were prior to 1893, when, he says, silver was demonetized, and when we had less money per capita than we have to-day. These are facts, not supposition. It would seem to a common man that if we want the good times we had before 1893 we should get back to the conditions then existing and that produced the good times, and not shut our eyes on all our past experience and take a leap in the dark. I know Brother B. don't do that in his brick business. Hard times commenced in 1893, and it was caused largely by the lack of confidence in the government to carry the load of purchasing 54,000,000 ounces of silver annually. I know there were other causes besides this. The change of an administration and the published threat of free trade had its effect, but the Sherman act was admitted by both parties to be an evil, and haste was made to repeal it. There was no complaint at this time of a scarcity of money, and there was none. In fact, there can be no scarcity of money when the rate of interest decreases, unless by a stagnation of business.

In regard to the effects of the gold standard on the volume of the circulating medium, we find, in 1873, the bank deposits of the country amounted to $673,400,000. Under the gold standard, from 1873 to 1893, they increased to $1,989,300,000 in 1895. The deposits in our savings banks now amount to $1,800,000,000, more than double those of 1873. These figures show that since 1873 the circulating medium has increased much faster than the population, and this disposes of the assertion that the hard times are caused by a lack of money. We do not claim that the gold standard since 1873 has caused the large increase in money, but mention the above figures to prove that it is not the want of money, but the lack of confidence that produces the hard times. We can make passable vinegar out of sweets, and if former sound money Republicans and Democrats are not too far gone in the process of fermentation we would ask them to look for the cause of the present hard times to other sources than the demonetization of silver. The argument of Mr. B. and other silver men, in a nutshell, is that the hard times are produced by a scarcity of money, and that that scarcity is produced by the demonetization of silver, and the sovereign remedy is in the free coinage of silver. Here are three propositions. Are they true? Is any one of them true? To be as brief as possible, we have shown that the hard times were not produced by a scarcity of money. If this point is established it removes the necessity of the doubtful and dangerous remedy proposed, viz.: free coinage of silver. Even if the cause of hard times was produced by a scarcity of money, the remedy proposed is so suppositional, so certain to work an injury and a disgrace to the Nation, that it should not be seriously thought of without being backed up with unanswerable evidence that it will produce the beneficial results claimed for it. This evidence has not been produced and cannot be, because it don't exist. The evidence is all against it. Prior to 1873 the difference between the coin value and the bullion value of a dollar was about 3 per cent., and yet with this small difference we could not keep gold and silver circulating on a parity. How unreasonable, and, I may say, absurd, to suppose we can do so now, when the difference is 47 cents on the dollar, and that, too, in favor of the more precious metal. This is our home experience, but it amounts to nothing in the eyes of the silver men. When we look to the experience of the older civilized countries we find that most of them have tried free coinage of silver and were obliged to give it up. If we are not fools, we will profit by their experience. Look for a moment at the list of such countries. Every fully civilized country under the sun, and some not fully civilized, are on a gold standard. Look, free silver men, in this galaxy of honored names in favor of a gold standard. Now look on the other picture and see the company you are in. Strictly speaking, Mexico is the only free silver country. India, with her 280,000,000 of inhabitants, used to be the great silver country, but she had to stop free coinage. However, as you may be lonesome in company with Mexico alone, you can seek some comfort from India, China and Japan. They are not, strictly speaking, gold standard countries, because the circulating medium is silver.

I wish to assert again that I believe there can only be one standard, and only one is needed. We have a gold standard, which is the root and stem of our financial system. On this we have engrafted on the one side silver and on the other paper money, both deriving their vitality from the gold root and stem. Sever their connection from this gold stem and neither of them has ability in themselves to be a circulating medium. Brother B. favors free coinage because it will make money plenty. We would accept this if they could prove that silver will be, under free coinage, equal to gold as a circulating medium. This they have not proven, and admit it can only be proven by a trial. We have evidence to prove that it will fail to accomplish the ends sought, even if free coinage is ordered. Its first effect will be to drive our $618,000,000 of gold into seclusion. This will decrease our present circulating medium by that much, and by so far as a scarcity of money and the lack of confidence can make hard times then we will have them. But free coinage, if it fails to keep gold and silver on a parity, will not stop there. It will depreciate our silver and silver certificates to the market value of silver bullion, and thus be a loss to the government of two to three hundred millions, and further curtailing the currency by so much. This would be the immediate effect, and would take place and produce its direful effects before our mints could make up but a fraction of the amount curtailed. Our mints, running night and day, would take years to supply silver equal to gold withdrawn and the depreciation of our silver currency. Then it should be remembered that if silver bullion in the markets of the world remains at about the same price as now our new silver dollars would only be worth in purchasing power about 50 cents each. If this state of affairs should come to pass (and it is legitimate to expect it from the premises), what would be the state of the country during this recuperating period? What inducement would there be to go into manufacturing or merchandising with our financial system all shattered to pieces? Surely it is time for patriotic men to stop and think, and let patriotism and love of the honor of our country triumph over mistaken and sordid avarice.

In regard to the price or value of our silver mines, the price named was stock price, and, further, it is said 75 per cent. of all this stock is held in England. My first objection to the free coinage of silver is that it is class legislation—in the interests of a few to the damage of the many. Second, because it would force a depreciated currency on an unwilling people. Third, because it would be a step downward and backward, and a disgrace to us in the eyes of all civilized nations. Fourth, I object because it would rob the laborer and poor by increasing the cost of all necessaries of life without increasing his wages. I defy any man to show that free coinage of silver in any country has increased the price of labor over that of gold countries. Fifth, I object to the free coinage of silver at the ratio of 16 to 1 because it makes every citizen a party to the crime of issuing a dishonest dollar. Sixth, I object to free silver and free trade, because (first) it will deprive the laboring man of work to a large extent by destroying confidence in the stability of our financial system, and (second) what work may be had will be paid for in the cheapest money in the land. The man who toils for ten hours a day is entitled to the best dollar in the world. Free trade and free coinage of silver would prove a great curse to the workingman. The rich can take care of themselves, and to many of them free coinage would open avenues of wealth not heretofore enjoyed, but all this at the expense of the poor. I can readily see how free coinage will put a big premium on gold, but I cannot see how it will help the brickmakers. They don't generally have much gold, and silver mines are not a part of their earthly possessions. Blind prejudice seems to control a great many. Remind them that the intelligent men of the country and the men who have brains enough to accumulate wealth are generally all in favor of our present financial system, and it arouses their anger like a red flag held before a Mexican bull. They seem to think if a man is a banker or a successful merchant or manufacturer, and therefore may be supposed to know something of the science of finances, that on that very account he is their enemy. They prefer to follow the financial vagaries of long-haired cranks and men who have never been able to accumulate anything. Not only do they reject the teaching and wisdom of the best minds in our own country, but they affect to disdain the experience and wisdom of older nations. With the lamented Lincoln, I have faith in the good sense of the masses, and expect to see it assert itself. We ask all silver men to look at the character of the nations that have tried silver and given it up. Compare these with nations that are yet in bondage to silver. Then we ask you to look at the character of the men and the press who are in favor of sound money. Then look at the silver party, composed of Populists and the tag end of the Democratic and Republican parties. If a man is known by the company he keeps, he has here a chance to see himself as others see him.

When I commenced to write this article I did not intend to give so much attention to Brother Blair, but I am free to say that his article in the Clay-Worker is amongst the best I have seen on that subject. I say this not because he has told the truth and nothing but the truth, nor because he has backed up his statements by any argument, but because his subject is one that is hard to defend, and it takes a good man to uphold a bad cause. Our sympathies, on this account, go out to Brother Bryan. He makes a great many speeches, and is charged with saying nothing that is backed up by facts, and the reason is he is riding the free silver hobby, and there is nothing in it that can be supported by facts and sound argument. Perhaps this is why he resorts so much to raising class prejudices, pitting one class against another, causing bitterness and strife. Let all who love their country, hate dishonorable dealing and favor sound and honest money, good wages, good pay, bury, on Nov. 3, the free coinage of silver heresy so deep that it will not trouble the present generation at least.

J. K. CALDWELL.

The Fall of Silver—A Reply to Blair.

Editor Clay-Worker:

Our friend, Burr W. Blair, is asking us as a Nation to do something that he would not do as an individual. He must know that silver is on the decline both in price and as a unit of standard of value. All civilized powers and those that are semi-civilized are striving to the same thing, viz.: discarding it as a standard. Would Brother Blair invest his money in a manufacturing plant to manufacture an article that was on the decline in price and demand? I will answer "No" for him. Then he should not expect us as a Nation to enter into the manufacture of an article that the price is on the decline and the demand will soon become less. Gold being coined under the unlimited rule is worth but its bullion value. Does it not argue that silver under unlimited coinage will be the same?

All civilized powers are adopting the gold standard of value and all other powers will as they become civilized. Then gold will be in demand for many years to come. Then, if gold becomes so plentiful, the silver will be worth nothing as a money metal except for subsidiary coins. As gold is less bulky and requires less storage room, it will be used in the future ages as a reserve to issue paper money on and to be redeemed with. There is no money that is so convenient in business transactions as paper money, therefore it should be backed by the more precious metal.

It is true that the government can regulate the weight and fineness of her dollars, which many construe as regulating value, but can she regulate the number of brick Brother Blair will give for the dollar? Therefore, with unlimited coinage of silver, the government's stamp is only a guarantee to the people that the dollar so stamped is composed of a certain number of grains of pure silver and of a certain fineness.

Mr. Blair also claims that unlimited coinage will raise the price of silver bullion. Let me ask him if the unlimited manufacture of brick in the city of Cincinnati will not lower the price. Now, if Brother Blair is not sure on this point, let him confer with the Chicago brick manufacturers. Where they have doubled the capacity for manufacturing brick since 1892, they have found the unlimited coinage of brick very unprofitable. Values, in this rapid age of competition, are only maintained by pools, trusts, combines and limited production. France, the Latin Union and other foreign nations, as well as ourselves, have been able to keep silver on a parity with gold by limiting the product. We are confident that if Brother

Blair will investigate on other lines, such as overproduction of silver, loss of markets by repealing the reciprocity acts, the number of articles admitted free and with ad valorem duties that should be manufactured in our own country, thereby employing our own people, he will find that we need something else than free coinage of silver at 16 to 1. TIM TINKER.

The Depreciation of Silver.

Editor Clay-Worker:

Would the free and unlimited coinage of silver at the present ratio of 16 to 1, by the United States alone, raise the price of silver or lower the price of gold, or both, to such a degree as to enable the government to maintain the coins of both metals on a parity?

As Mr. Bryan said recently, in one of his speeches, we never will know until we have tried it. That is, it is impossible to present facts, or figures, or arguments that will absolutely prove this important point, but that is no reason why it should be ignored entirely, as it is by most advocates of the gold standard. The great cry made by Mr. Caldwell against the Chicago platform is based upon the assumption, unsupported by any argument of his, that the silver dollar under free coinage would be a fifty-three-cent dollar. This is begging the question. The advocates of free coinage claim that the silver dollar would be a one-hundred-cent dollar, the equal of any other dollar, and they base their claim upon laws as old as the science of political economy, and if Mr. Caldwell does not believe this to be a valid claim let him attempt to disprove it, instead of setting up straw arguments of his own invention to knock down again, and making a great hue and cry about "repudiation" and a "dishonest" dollar.

In 1873 the bullion value of a silver dollar was equal to that of a gold dollar—in fact, was worth 2 per cent. more on account of our having a higher coinage ratio than the countries of Europe—but now the bullion value of a silver dollar is worth but little more than half as much as that of a gold dollar. Why is this? What has caused this fall in the price of silver in the past twenty years? Surely this is a pertinent question, upon which hinges the solution of the whole problem.

Most of the really careful and unbiased economic students agree that the real cause of the fall in the price of silver, as well as that of all other commodities, was the demonetization of this metal by several of the earth's chief commercial nations, the destruction of about one-half of their actual or final redemption money. The demand for final money regularly increasing with the increase of population and of civilized commerce, and the supply of such final money being suddenly cut down one-half, the half (gold) not thus cut down must inevitably, though gradually, rise in value according to the unchanging law of supply and demand. Thus, by demonetization, silver bullion was made a mere commodity and decreased in price along with other commodities. Or, all commodities being then measured in gold alone, and the supply of gold being inadequate, it is rather the gold that has risen in value; for an ounce of silver is as valuable, will purchase as much of the world's products as it ever would. That gold has thus gradually risen in value, as measured by forty-five of the earth's leading commodities, including silver bullion, has been proven conclusively by Sauerbeck's celebrated tables, or "index numbers," known to all careful students of currency questions and disproved by none.

It has been attempted by many to show that the fact that an ounce of gold will buy about twice as much of averaged commodities now as it would in 1873, or for twenty or forty years before 1873, is due not to the rise of gold, but to "tariff laws," "better machinery," "cheaper transportation," "overproduction," etc. I would like to discuss these alleged causes of the universal fall of prices in all gold standard countries, but I must use all the space allowed me in this number for the consideration of the question with which I began this letter. I will say, however, that I have carefully examined all of the facts and arguments on both sides, and I am forced to believe that no adequate explanation of the fall of prices and consequent distress of the producing classes in the past few years can be found except in the demonetization of silver. The evil is not in low prices, when caused by a decreased cost of production, but in a general fall of prices, from which the debtor and the producer receives no benefit. But to go back to silver.

You say that the fall in the gold price of silver is simply "a case of overproduction," and this is the way you think you prove it: "Our own mines, which, in 1870, yielded only $16,000,000, in 1874 yielded $37,300,000, and the ratio (of value) went from 15.57 to 1 up to 16.17, and it has kept going up until it is now 30 1-3 to 1."

Now, you evidently want to show that this increase in the value ratio of the two metals is due to the increase of production of silver, but you leave out of consideration the other factor, the increased production of gold, and your figures merely show the effect of the fall in price of silver and not its cause. When silver was demonetized there was no talk of overproduction of silver, and when it is remonetized there will be no such talk. Make a law that only rye flour shall be made into bread, and there will be a rise in the price of rye, but a great fall in the price of wheat and a cry of "overproduction." Make a law that only stone shall be used for the walls of buildings, and there will be an "overproduction" of brick, and the mining of stone will take the place of the mining of clay. This, of course, would be a bad thing for clay mine owners, but it would be a bonanza for stone mine owners; and if, after a time, it should be proposed to repeal this law, some one might say that it was a movement merely for the benefit of the clay mine owners.

But let us examine your theory of overproduction of silver as a cause for the increased ratio between the price of gold and silver. If the ratio between the price of gold and silver has increased to such an extent since 1873 there must be a cause for it, and the cause must be either that the ratio of demand for the two metals has decreased or else that the ratio of supply has increased. Which is it? From the United States Treasury circular, No. 123, issued last July, I take figures showing the production of gold and silver in the world, as follows:

	Gold (ounces).	Silver (ounces).
1493-1870	278,360,327	5,497,117,916
1871-1895	146,539,875	2,514,004,119
Total	424,900,202	8,011,122,035

The ratio of production of the two metals from the discovery of America to 1871 is shown by these figures to have been 19.72 to 1. From 1870 to the present year the ratio has been 17.15 to 1. Hence the increased ratio between the values of the two metals since 1870 has not been due to overproduction of silver, since the production of silver in that time has not kept pace with the increased production of gold. Therefore, we must conclude that the change in the relative price of gold and silver, which varied so slightly for two hundred years previous to 1873, has been due to the decreased demand for silver as final money by the commercial nations of the world. Now, if legislation can thus decrease the demand for a product and reduce its price, it follows that legislation can also increase the demand and restore the price. But, you will say, it was the legislation of nearly the whole of Europe, as well as the United States, that decreased the price of silver, whereas it is proposed to restore the price by the legislation of the United States alone. The answer to this is that the United States alone can produce enough every year to exchange for all the silver that would be brought to her mints—that is, all the silver not used in the arts and as money by other nations. In other words, the United States, with seventy millions of the most intelligent and energetic people on the globe, can do what Mexico and South America and the semi-civilized nations of the East have been unable to do, and would still have the ever increasing help of these peoples.

I could present other figures and arguments, if space were permitted, to show that the opening of our mints to the free and unlimited coinage of silver would raise the price of this metal and lower the price of gold, so that the government could probably maintain the two metals on a parity. But if I believed that a failure to maintain gold and silver coins at a parity would result disastrously to the business of our country I would hesitate to advocate the risk of free coinage. But I believe that free coinage of silver would be a good thing, even if the two metals were not on a parity. But, you say, this would withdraw gold from our circulation and put us upon a silver basis. So be it. Better a money that is too cheap than one that is too dear. Gold is not in circulation now; it is hoarded and held by banks as reserves, and this seems to be the function of gold everywhere. It has no use as a circulating medium in any country save to settle international accounts. In June, 1896, nine banks of Europe held more than $1,550,000,000 in gold—more than one-third of the estimated stock of gold money in the entire world.

What we need to-day is to increase our exports and raise the price of our products, and the surest way of doing this is to have a cheaper money than gold—the European money—so as to increase the rate of exchange upon Europe and give us protection at home and abroad. The most prosperous (mind, I do not say the most enlightened) nations to-day, the ones that have made the greatest relative progress in the past twenty years, are the nations that have the silver standard, with their mints open to the coinage of both metals. Protected by the rate of exchange upon London, Mexico and Japan are developing their resources and increasing their manufactures to an extent that would not have been believed possible a few years ago, and that has caused us to fear the competition of the latter country. I met last week a prominent flint-glass manufacturer, who has always been a Republican, but is now supporting Bryan, in the hopes that the free coinage of silver will put gold at a premium and thus give him protection at home and abroad. He told me that the best days he ever saw were when gold was at a premium here; that he then exported his glass to Europe, even to the glass-making country of France.

Jesse R. Grant, the youngest son of the late President Grant, has furnished for publication a copy of a letter to a relative, explaining why he has left the Republican party. In it he says upon this point:

"I believe honestly in the great advantage to this country of the free coinage of silver. It does not mean repudiation of our debts at home or abroad. We could not pay our debts with both gold and silver, even if we had it all, our mortgages being equal to the enormous sum of $19,000,000,000. These debts will have to be paid in produce, and anything that will raise the value of this will, I believe, benefit all classes. If we can double the price of a silver rupee we can double the price of wheat that comes into competition with our wheat, and, therefore, double our wheat as to its debt-paying capacity. The same argument holds good in the silver peso of the Latin-American countries and the price of our meats and live stock. It holds good, too, in the silver ruble and the price of oil. It holds good in many ways too numerous to mention. Instead of foreigners purchasing the product of our silver mines at the rate of about 70 cents per ounce, and with this silver buying produce (some of which comes in direct competition with our productions), from South America and the Orient, they would have to pay at the rate of $1.29 per ounce."

I am willing to admit that it is possible that we would not be able to maintain the two metals on a parity under free coinage. There might be a premium on gold and this might help some people to pay their debts; but isn't it about time that we take some action to favor the debtor class, since most legislation has been in the interests of the creditor class? Personally, I cannot see that I would receive any benefit from either policy save as it might make better times for the country at large. But my sympathies are with those who toil in the shop and on the farm for a bare subsistence, who, in spite of all their efforts, have seen their taxes increase, their mortgages grow larger and their farms and homes depreciate in value, until they must soon become mere tenants unless some relief is afforded. I cannot believe that a plutocracy can be established in this age and country without a struggle. The ballot box is our safety valve and will prevent a revolution. The people will learn how to use the ballot to protect their interests; they will see the danger in the single gold standard, which means what it has always meant—dear money and cheap men; they will understand that this clamor for gold, under the delusive plea for "honest money," is a clamor for a kind of money that is insufficient in volume to enable the bankers themselves, who cry the loudest for it, to pay even 2 per cent. of their debts; that the national debts of the civilized world now aggregate $29,000,000,000, or $7 of national debt for every dollar of gold in the world, and that there is not enough gold in the world to pay $1 on every $35 of private and corporate debts now in force; and that the gold is owned by the parties who hold the debts against the people; that money borrowed at interest cannot repay both principal and interest out of the original sum; that there must be a sufficient increase of money, through artificial sources, to meet the interest charge and employ labor, or productive industry and labor itself must surrender to the avarice of the few.

Now, Mr. Editor, I realize the intricacies and many-sidedness of this money question, and I have studied it carefully and conscientiously, but from the widespread distress caused by our present financial policy only one sufficient remedy is proposed by any party, and that is the reopening of our mints to the free and unlimited coinage of silver at the ratio of 16 to 1. Hence I have no choice but to support that party, and, convinced that all our hopes of prosperous times lie in the success of that party, I would support it and vote with it, even were it opposed by all the rest of our numerous family.

ADAM CRANK.

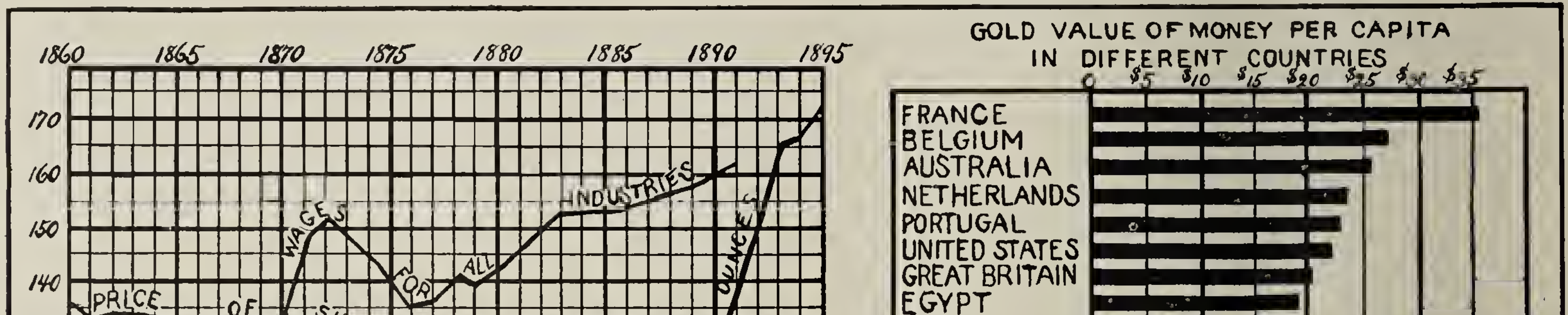
Getting Ready for the Rush.

Messrs. T. A. Randall & Co.:

We inclose you check for Clay-Worker for twelve months. In April, 1896, we purchased the plant formerly owned by G. B. Dougherty & Sons, this place. Since then we have built three new kilns, had railroad track put into works and otherwise enlarged and improved our plant very considerably. We expect to make many more improvements this winter. We have sixteen acres of land adjoining town, with shale, fire and potters' clay, and can make all kinds of brick. We also uncovered a large vein of limestone, which we burn.

KITTANNING CLAY MFG. CO.

Kittanning, Pa., Oct. 7, 1896.



COMPLIMENTS OF

THE SIMPSON BRICK PRESS CO.

CHICAGO.

COPYRIGHTED 1896 BY C. L. REDFIELD MECHANICAL EXPERT AND PATENT ATTORNEY 269 DEARBORN ST. CHICAGO.

Down in Jersey.

Editor Clay-Worker:

As we commence this letter we are in the midst of the equinoctial storms, which, no doubt, will be a closer-up for the open yards. Since my last month's letter was written nothing much of importance has happened in this part of the brick and terra cotta field. The factories are running about the same as last month, except I note the Ostrander Company is running both night and day.

The C. Pardee Works commenced yesterday to run nine hours instead of ten, as formerly. This brings laborers' wages down to 99 cents per day. How in thunder human beings can exist upon that amount, perhaps a whole family at that, is a mystery. An important addition to the machinery in this plant since my last letter is one of Pennfield's largest machines for making hollow brick. During a visit there a week or so ago, and noticing this improvement, we asked the Superintendent what they intended to do with the three hundred tons of material it is said this machine is capable of making. "Oh," he said, "we have a place for it." A new office building is also being erected down near the factory at this place.

While on our way to New Brunswick, our county seat, this morning, we counted seventy-two Huns in a crowd going to court to be naturalized. We could not help but say to a friend: "It is a d—d shame to allow that gang to vote. My boy is fifteen years in this country and will have to stay six more before he can vote, and if he is no smarter than the best informed of that gang I would disown him." Wages 99 cents a day, and dozens of idle men waiting at the gate, offering to work for 80 cents per day! These fellows will, without doubt, vote like a drove of cattle for whoever gives them the highest price. Until we have an amendment to the Constitution prohibiting the scum of the earth coming to our shores, and the presidential term extended to eight or ten years, we cannot hope for better times in the best country God ever made. But I forget your journal makes no pretentions to political honor, and aims to build up the clay industries. But can we build up the cities and towns forever by giving good money to these fellows, who, at best, only stay on our shores a few years, then retire to their native land and live in peace on a few hundred dollars? An illustration of what it costs a single man of Hungarian build to live, that came under my own notice, some months since, is here given: I picked up a young Hun to help me sink a well, agreeing to pay him $1.50 per day. After a few days I asked him where he lived. He said he rented a room and bought for food bologna sausage and stale bread. When asked how much it cost him a day, he answered, "Twenty cents." Here was a fellow who saved $1.30 per day out of $1.50. I must confess I could not bear to keep that fellow around me any longer than possible. Not because he was saving money—I can honor a man for that habit—but because he chose to live like a hog, and then go back to Hungary in a short time, and, perhaps, send over his father, brother, cousins and aunts to take his place and help swell the ranks of workmen, who have the right to better wages than given now simply because of this pauper immigration. An honest dollar and a chance to earn it is the motto flying in the breeze on many McKinley and Hobart banners in this section of the country to-day, and may it come so overwhelmingly that for all time to come no one can point their finger at Uncle Sam and say: "You are a defaulter and we won't have anything to do with you!"

A friend writes us: "There are only two ways to get money in this world. One is to earn it, the other is to steal it." The closing words would, perhaps, seem harsh to our silver advocates, so we withhold them.

With good, honest money, New Jersey will produce enough clay goods to reach around the world in a single year. Yes, a dozen times over. With uncertainty in money matters, her vast resources will be held in check, and all these huge factories, which pay out, when running full time, more than $200,000 per month, will only pay about one-fourth, and labor, at 99 cents per day, will, of course, even curtail their expenses, if it is possible to do so.

The banks are refusing to discount any but gilt-edged paper, although no doubt they have plenty of money on hand. It seems ridiculous that all this turmoil should come upon us every four years.

We note an addition to M. D. Valentine Bros. Company's factory at Woodbridge. This consists of a large frame structure, to be used as blacksmith and repair shop. This firm keeps both its factories running and is shipping some brick. Its brand is so well and favorably known that the firm always manages to scoop in part of the orders that are going.

While taking down a windmill for R. N. and H. Valentine, during the past week, to be removed from clay banks to the residence of Howard Valentine, we noticed at the noon hour both gentlemen smoked, not a cigar, but a "Pittsburg Toby." While not a user of the weed myself, you may wonder how I knew they were Pittsburg Tobies. Well, I was born near Pittsburg, and it fell to my lot in early life to smell the smoke of many tobies, and one never forgets the smell of anything strong, you know. Perhaps some of your members of the N. B. M. A. have had an odor like double distilled fertilizer float around their heads while sitting beside some of your Pittsburg brethren at many of your conventions. If so, they will understand why I recognized the toby. These tobies are such a rarity in the East I must ask them how they came to use them.

Another brother of the clan Valentine is getting to be quite a noted man in several ways. A letter some months since explained how Mr. Ross Valentine became the owner of the title colonel. Last week he covered himself with glory—and mud—in a baseball game between the business men of this city and Woodbridge. The local press says, in its report of the game, that when the "Colonel" did finally hit the ball, instead of running the bases, he laid down and rolled, as he could make faster time, being about nine feet around and only 5.6 high. I suppose, when next I pass him on the road (if this reaches his eye), I shall have to turn clear out to avoid his buggy whip, but we make it a point to tell the truth about all the clay industries and their proprietors, let the consequences be whatever they may.

There is still quite an amount of building going on in this city, more, probably, for the season, than any other city of the same size in the State. Brick are offered as low as $4. Where is the manufacturer coming out even, with freight at $1 and hauling 75 cents?

Mr. Andrew S. Church, well known in brick circles in the South River district, has scooped the nomination for Sheriff at Republican primaries, and a hot fight is on.

Mr. Milton Edgar is very much indisposed at his residence in this city.

Meeting an old friend on the street yesterday, we naturally drifted into conversation regarding prospects of the terra cotta business. Said friend is employed at one of the smaller works here. He intimated that the reason the largest works in the country (in this city) were partly idle was on account of the bitter strike last year, and that the union men in New York still had their knives out for the old works. If this is true, it was a sorry day for both factory and strikers when the shop closed its doors. Twenty to twenty-five thousand dollars per mouth in wages is not to be sneezed at these times. Now the pay roll probably does not amount to one-fifth of above amount.

We must congratulate (the only) Clay-Worker on its circulation in foreign countries. We received yesterday an inquiry from a party in England regarding machinery for sinking wells, saying he had seen our ad. in the Clay-Worker.

From the many inquiries we receive nowadays regarding machinery for furnishing water, and from the contracts we are able to place, business cannot be so very dull. People do not usually spend money for things they can get along without, for a time at least, and from the fact that trade in my own line has been fair, we opine that business will be all O. K. after election is over.
W. R. O.

Perth Amboy, N. J., Sept. 29.

Wants a Change.

Editor Clay-Worker:

Inclosed please find $2 for my subscription to the Clay-Worker. We have been shut down two months on account of not being able to make collections, and will not start up until collections are easier. I am interested in a sewer-pipe plant of this place that only run nine months in 1894, six months in 1895 and two months in 1896, with no prospects of starting up. This is what the Wilson tariff bill has done for us. The Democratic administration has given us short time, and now, for compensation for the evil they have done, want to give us short dollars, so that we shall be equally balanced. I suppose, now, if Mr. Bryan can explain to the people how short time, short pay and short dollars will benefit the workingman, his chances are good to be elected as our next President, otherwise he is swamped.
GEO. ROSS.

Uhrichsville, O., Oct. 3, 1896.

If you are going to overhaul your yard and get ready for business as soon as the election is over, keep in mind that you may find what you want in the way of machinery advertised in the "Wanted," "For Sale," etc., columns.

THE CLAY-WORKER

Entered at the Indianapolis postoffice as second-class matter.

A Practical Illustrated Monthly Magazine, devoted to Brickmaking and allied Clayworking Arts and Industries.

THIRTEENTH YEAR OF PUBLICATION.

OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

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5 Monument Place.] T. A. RANDALL & CO., Indianapolis.

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BRICK HOUSES.

Our venerable scribe, Mr. J. W. Crary, contributes to this number a plea for brick houses. The habit which leads people to build so many frame houses is stronger than the reasons which should lead them to the building of brick houses. The habit of building the less substantial structure continues after the reason therefor has passed. In a new country, where money is scarce and dear, or in a section where ultimate development is uncertain, the frame house is justified. A matter of this kind can be settled by the rate of interest. Mr. Crary's figures on this subject are interesting, yet he does not, we believe, fully estimate depreciation or loss of earning capacity. If we take the ordinary house built for investment, it is safe to say that in the case of a frame building the depreciation should be rated at 4 per cent. per annum. The earning capacity of the frame house does not usually extend beyond twenty-five years. At the end of that period it is fair to say that the entire principal must be replaced. Then there is the additional cost of maintenance over and above that of a brick building, the difference in the cost of insurance, and, as well, the decrease in the rental value, to be considered in connection with frame buildings. In connection with the latter point the writer has in mind five houses built upon a tract of land in a city than which there has been none more prosperous in this country. When these buildings were first put up they rented for thirty-five dollars a month. They now rent for twenty and twenty-two. During the last ten years, while the rental of these buildings has decreased, the value of the land has increased, and the capacity of the people of that city to pay a higher rent has increased. The general location has relatively improved because of the outward march of improvements, together with improved streets and electric cars. What would have been the result if these houses had been built of brick? Unquestionably they would have been good in character, dignified, substantial and in a condition to rent for as much to-day as when they were originally built. This would be true, because it is true of other property of the same high character. The proper presentation of facts of this kind to the public will lead them to build more largely of brick.

FRAME HOUSE WITH BRICK SHELLS.

Even in this land of cheap brick, veneered houses are built—houses with a shell of wood and a covering of brick. Are they warmer than brick houses? No. Are they cheaper than brick houses? Certainly not. Are they drier than brick houses? All brick buildings in this section are dry. Why do people build veneered houses under such circumstances? Because they do not know better. Such a house looks cheaper, and they think it is cheaper. The reason for building veneered houses in certain sections of the country is that all brick is very high—face brick as well as backing-up brick. In sections of the country where common brick have to be hauled two, three or four hundred miles a man can erect a veneered house and feel that he has good reason for it, but the man who builds a veneered house in this section of five-and-a-half and six-dollar brick is fooling himself. If he faces with the high-priced brick he can back up with the cheap brick. Another kind of a frame house with a brick shell is one where the outside wall is of brick and all the inside walls of wood. In the nature of things, a certain number of walls of an ordinary dwelling must be of wood, but many more than is now common could be made of hollow tile or of brick. If some of our friends who are anxious to build a good house should investigate the cost of a fire-proof structure they would find the difference between it and the ordinary combustible structure much less than their imagination now suggests. Furthermore, they would have the satisfaction of being proof against fire.

THE SOURCE OF PROFIT IN MANUFACTURING.

Years ago, when only a few kilns of brick were made by the average yard in a year, when the last thing that was done in the fall was to burn a kiln of brick, the price per thousand was much higher then than now. It had to be. The profit that was realized had to be a relatively large profit per thousand in order to amount to even a moderate sum in the aggregate. An 8-per-cent. profit on a business of $10,000 a year would not count for much. Nevertheless, there was a time when $10,000 per year was a pretty fair business for a brickyard. Eight-per-cent. profit on $400,000 will take care of several families and lay up something for a rainy day. This is one reason that the price of brick has been gradually getting lower in recent years, rather than that gold or money has been getting dearer, as some of our friends might say. A few years ago we heard the talk that lumber would soon be much more expensive on account of its scarcity adjacent to the markets. Notwithstanding the fact that ordinary grades of lumber have been getting scarcer, the price has been getting lower. The reason for this is that transportation is getting cheaper all the time, methods of transporting logs through the forest to the mill are improving, mills are being built larger, their mechanical equipment improved generally with respect to the cost of production, so, notwithstanding the fact that the ordinary grades of lumber are getting scarcer, their price is getting lower. The Pacific coast is a competitor for shingles and finishing lumber. The price per thousand feet has thus been reduced, while, in many instances, the relative profit has not been changed.

With the return to better times we may not expect any material increase in the price of our products. When we have a market there may be an increase in price sufficient to make a fair profit, but certainly nothing large. The profits in the various lines of manufacturing are now made by the improvement in the quality of the product or result from mechanical improvements. The dividends which have been declared by the cotton and woolen mills of New England have, for years past, come out of what was formerly an absolute waste. The burned clay business is no longer a roadside industry. It is a great manufacturing business, requiring large investments and splendid executive ability.

THE MONEY QUESTION AGAIN, AND FINALLY.

We do not regret the opening of the columns of the Clay-Worker for a time to the discussion of the money question, though such a discussion is foreign to the field we normally occupy. Our apology, if any is needed, is that it is the ruling question of the hour and every citizen is interested in learning all about it. We have been impartial in admitting facts and opinions from every side of this many-sided question, and we must say, in all candor, that we are proud of the high character of every paper presented, confirming, as it does, our opinion that in our industry are to be found men of the highest culture and of the most commanding abilities, and that these men know a good thing when they see it, and therefore are patrons of the Clay-Worker.

We give this month several valuable contributions. They represent different views, but they are all able and worthy of careful reading. But with this number, having published all that reached us before going to press, as a matter of course we must close our columns to this discussion for four years at least, and we hope forever, as before another month it will have passed from the category of living issues, or, at any rate, into the condition of "suspended animation" for at least that length of time. We thank our contributors for their papers, and invite them to take up the pen in matters bearing more directly on our own trade interests.

THE BEST COIN NONE TOO GOOD.

In our editorial conduct of the question we have aimed only to give facts as we understand them, without drawing conclusions to influence any one in the vote he may cast. In this spirit we wish to say that official papers before us lead us to supplement Brother Chapelle's paper with a few remarks. In the first place, our information from official source is that every silver dollar that has been coined since 1878 is that much added to the ultimate or real money of the country, for every dollar of it, like all that had gone before, is, in the official language of Secretary Carlisle, "a legal tender at its face value, in payment of all debts, public and private, without regard to the amount, except where otherwise expressly stipulated in the contract." Gold can be no more. It is even less, for its legal tender quality depends upon its not having been worn, while the abrasion of a silver dollar does not detract from its legal-tender value. He repeats the same truth in another form when he says: "Gold coins and standard silver dollars, being standard coins of the United States, are not redeemable."

FIGURES ARE SOMETIMES DECEPTIVE.

Our information, derived from official documents, would very materially modify the conclusions Mr. Chappelle draws, if the relative number of home owners of 1890, as compared with 1870, has anything whatever to do with the question of free coinage. He gives 70 per cent. as the ratio in 1870 and 37 per cent. as that of 1890, and concludes that we are going to the bad in a hurry. Now, while the census of 1890 gives 37 per cent. as to cities of eight thousand and upwards, it gives 66 per cent. as to the rural districts and towns and cities of less than eight thousand. Seeing how small a per cent. of our entire population is included in large cities only, and that they are the homes of the thriftless classes, many of whom do not care enough for a home of their own to make the needed exertion to obtain one, and how much the relative population of these large cities had increased in these twenty years, there is by no means the falling off of home owners he would make out by using only the per cent. in large cities, the huddling places of the poor. But the census of 1870 and of 1880 were so imperfect on such statistics that Congress passed a special act for that of 1890 to cure the defects of the former laws, and it may be that the per cent. is no more reliable than the statistics which made out that our people consumed five and a half bushels per head of wheat in 1870 and only three and a quarter in 1895, all because in 1873 we quit coining silver dollars at the rate of 100,000 of them a year, as we had done for the preceding eighty years, and five years later resumed coining the same kind of dollar, of the same weight and with identically the same functions in every respect, at the rate of about $26,500,000 annually. No man will believe for a moment that the people of the United States were living last year on 7-12 rations because the market price of silver and wheat had each diminished nearly one-half in twenty-five years, for wheat has been cheaper than potatoes.

MORTGAGES OFTTIMES MEAN ENTERPRISE.

There is one feature of this home-owning business not as generally understood as it should be, and we are sure our readers of every political faith will thank us for alluding to it. Before taking the census of 1890 some statesmen had conceived the idea that farmers and others were being eaten up by mortgages, hence they provided a special act, above referred to, that the number and amounts of the mortgages of the Nation should be ascertained by the forthcoming census. It was at once the most delicate and difficult task assigned to the office, but it was patiently and accurately done as to homes, not including business properties. The result was a surprise to calamity hunters. It was developed by this census that in every hundred homes in the country and towns of less than eight thousand inhabitants only 28.22 were under mortgage to 71.78 that were unincumbered, and in the larger cities the ratio was substantially the same, 27.70 mortgaged to 72.30 unincumbered. The inquiry revealed another unexpected and, except to calamity hunters, a highly gratifying condition, namely, that 80.13 per cent. of all the mortgages given were made exclusively to secure a part of the purchase money for the mortgaged property or for improving it. Adding to these a class of mortgages which were for the purpose, in part at least, of purchasing farm stock or farm implements or other substantial articles, such mortgages would make 89.82 per cent. of all the mortgages on farms or town or city homes, and the aggregate of these mortgages constitute 94.37 per cent. of the entire mortgage debt of the Nation. The report adds: "The original amount of the existing debt incurred for purchase money, improvements, business and personal property is about 96 per cent. of the original amount of the total debt now in force." This being the case, creditors cannot be the heartless shylocks they are pictured by demagogues.

A FLUCTUATING CURRENCY NOT DESIRABLE.

In the same spirit and for the same reason, namely, that our younger readers who have not access to official documents may not be misled, we call Mr. Blair's attention to the fact that our silver dollars are now and always have been standard dollars, with all the functions of gold dollars. The contention, as we understand it, is the possibility of keeping gold and silver at a parity if the coinage of silver is to be unlimited and free, seeing the billions of silver that would seek a market at our mints if it could be coined into dollars at no expense to the owners. No one asks for gold monometallism, and the trouble is the fear that this free coinage business would result in silver monometallism, so that we would have to convert our local coin into the gold money of other countries at a great loss whenever we have commercial transactions with other people. Just what the ceasing of the coinage of gold dollars has to do with the question of free coinage, seeing that it was abandoned wholly to create a demand for silver dollars, so as to compel their use in all small transactions, we cannot see.

One of Brother Blair's statements is likely to be misleading. Evidently it is a slip of the pen, for a man who has so thoroughly studied the question could not possibly have overlooked the fact, which we have referred to above, that after 1837, when the ratio was changed from 15 to 1 to 16 to 1, our silver coins were all sold as bullion and never entered permanently into circulation, except that in 1853 our subsidiary coins were made so light weight that it was unprofitable to use them thus, and that from that date to 1879 they were legal tender only to the amount of $5, and since that date only to $10. No matter whether millions or billions of silver dollars were coined, they added nothing to our circulation; and he must have referred to the wrong authority when he says that the output of silver last year was only $36,000,000 and the per capita circulation less than $10. The latest report from the Treasury Department, prepared especially to give information on this question, gives the coinage value of silver for 1895 at $226,000,000 and the per capita circulation June 30, 1896, $21.10, whereas it was only $18.04 in 1873. We make no comment upon the opinions expressed by any of our correspondents, but we can hardly refrain from saying that if an ounce of silver has always been and is always to be the price of a bushel of wheat, the price of silver will have to "'bout face" soon, if the price of wheat continues to advance as it has within a month or two. Perhaps, after all, this upward tendency of wheat is in anticipation of the election of Mr. Bryan and the advance in the price of silver, instead of owing to short crops. But what is the matter with silver? Why is it not advancing, too?

OVERPRODUCTION THE CAUSE OF LOW PRICES.

Brother Chappelle is certainly mistaken when he says that our coinage laws applied equally for nearly a century to gold and silver. Our history of coinage teaches that for sixty years they did, and the result was that for forty-four years, coining at the ratio of 15 to 1, all our gold coins left the country, being more valuable as a bullion than as currency; that in 1837, to remedy this, we changed the ratio to 16 to 1, and the result was the reverse, our silver coins, big and little, being worth more as bullion than as currency, left the country or went into spoons and the like, so that the only silver coins in circulation were Spanish milled dollars, worth only 98 cents as bullion, and Spanish "bits" (12½ cents) and "fips" (6¼ cents), and Spanish quarters and halves, until 1853, when we discontinued coining small coins at the ratio of 16 to 1 and coined them at the ratio of 15 to 1, so that they would not be used as bullion at home or abroad, and that then and there we demonetized silver, if discontinuing free coinage means that; for all these coins were made on our own account of silver bought in the market at the market price, just as we are now coining dollars on our own account. So that while the coinage of dollars was merely nominal from the beginning, some years not a dollar being coined and some not more than 12,000 of them, we coined of these quarters, halves and dimes more in value some years than we had coined of standard silver dollars in the eighty years of our free coinage of them, and we bought the bullion in the market, just as we buy it now for coining dollars, but all these years we have been coining gold free. Our present system of coinage dates back to 1853, except that we apply it to dollars now as well as to subsidiary coins. Whether the coinage of an average of about 26,500,000 of these silver dollars annually on our own account, to be used as currency, instead of an occasional thousand on the account of the silver owner, to be used by him as bullion and sold in the market as such, instead of going into circulation as money, is responsible in any degree for the fall in the prices of hogs, horses, brick and bullion is a matter of opinion. With these historic facts before our readers, we leave them to form their own conclusions. We are of the opinion, though, that brickmakers will find the cause of low prices nearer home than the government mints and of more recent date than 1873. Brickmakers know that there is such a thing as overproduction, and that when capital is shy and seeks safety vaults instead of trade channels the demand for their products diminishes, and, unless local organization prevents rate cutting, their business is demoralized. In fact, there are few brickmakers in our land to-day who are not praying for relief from just these undesirable conditions. More confidence on the part of those having money to invest is what is wanted now. There is plenty of money, money as good as any in the world, if it can only be put at work.

ONE WAY TO REDUCE EXPENSES.

We are in receipt of a devilish-looking circular from the United States Rocking Grate Bar Company, 225 Dearborn street, Chicago, a new firm, composed of Jno. J. Moroney, H. W. Boyd and A. M. Hopkins, all of whom were formerly connected with the Chisholm, Boyd & White Company, and therefore are thoroughly familiar with the brickmaking interests. Hence, when they say that their improved grate bar will enable brickmakers to reduce their fuel bills very materially, we concede the fact, and advise those who feel the burden of heavy coal bills to write to the U. S. R. G. B. Co. and get relief.

QUEER MONEY OF PRIMITIVE PEOPLE.

Under the above head the Chicago Inter Ocean relates an interesting story of the quaint substitutes for money that have been and are still being used by the uncivilized natives of this and other countries. The list includes many queer things, such as shells, feathers, the teeth of animals and fishes and many substances that the modern business man would find very inconvenient. Perhaps it may be news to many of our readers to learn that clay bricks have served as money, having been used at different times by the natives of Arabia, China and Siam. If a good cheap money is wanted, why not use burned clay? The free and unlimited coinage of brick and terra cotta would stimulate the clay industries, the raw material could not be cornered by syndicates or trusts, and the coin would be indestructible, which is more than can be said of some materials now used.

A BIG BUILDING SCHEME.

James E. Dingee, of Pennsylvania, a millionaire, who owns and conducts an extensive brickyard in Philadelphia, is going into the building business to an extent never before attempted by one man. He will build 7,500 three-story houses near his brickmaking plant, putting the entire number under way at one time. The houses will be of the same general style. And yet they call Philadelphia slow.

The foregoing paragraph is going the rounds of the Eastern press, and, if literally true, the City of Brotherly Love is, indeed, making giant strides, as the reader will grant after figuring on the proposition a little. If the houses Mr. Dingee is to build average twenty feet in width the total frontage would amount to 150,000 feet, or more than twenty-eight miles. Averaging five persons to the house, they would shelter 37,500 people, hence we take it that there has been a slight mistake made somewhere. Mr. Dingee is a man of large means and a great brickmaker and builder, but we do not believe he will build 7,500 three-story brick houses this year. All the houses that he does build, however, will be of brick.

PERSONAL MENTION.

Our genial Washington correspondent, who edits "New Inventions," Mr. Edward C. Weaver, was wedded to Miss Ethel I. Dinsmore, of Charleston, W. Va., Sept. 23, which accounts for the absence from this issue of his usual contribution.

Mr. J. W. Everal, Westerville, O., one of the best known tile manufacturers of the Buckeye State, and one of the Lord's noblemen, looked in on us the 14th inst. He seemed in unusually fine health and spirits. The latter was explained by a confidential confession that his trip to Hoosierdom was not solely to call on the Clay-Worker, but for the purpose of carrying away with him a bride. He was wedded to Mrs. Rose A. Neely, of Lebanon, the same evening. We wish them bon voyage.

PACIFIC COAST NEWS.

Charles D. Hanford, President of the Trenton Rockingham Pottery, of Trenton, N. J., has written to the San Francisco Supervisors for information as to whether the citizens of San Francisco would be likely to assist in establishing a pottery there. He says he understands that no pottery is manufactured in California, except on a small scale in Stockton, and he believes the conditions in San Francisco to be favorable to such an industry. He says: "Some of our manufacturers here have made from $100,000 to $200,000 in a few years in the business, and it is a means of other enterprises springing up in a city. It has been the means of making our own city what it is to-day, for the working potter earns fair wages and is a good spender." He thinks there would be less competition in San Francisco. Mr. Hanford is correct in his conclusions regarding the extent of the industry in California. The Stockton plant, though turning out a fine quality of ware, was obliged to depend in a large degree on local patronage, and did not meet with much encouragement. San Francisco business men heretofore have not been over-liberal in subsidizing new industries, but they may be made to think better of Mr. Hanford's proposition.

A party of Portlanders, while prospecting in eastern Oregon recently, came across a bed of kaolin, the clay from which the finest chinaware is made. Claims were staked out, the locators being F. C. Brody, Herbert Baker, C. W. James and J. H. Burgard. Samples of the kaolin were sent to a Delaware pottery, one of the largest in the United States, with the request that the clay be worked into chinaware. With the return of the ware came letters from the potters, asking as to the extent of the field and its distance from railroad communication. They said that the quality of the clay was fully equal to that formerly imported from England, and in which country they were forced to place their sole dependence. The letter concludes with a proposition that a stock company be formed and the kaolin mined in a systematic manner. The mines are five miles from Huntington, the deposit apparently being inexhaustible.

The citizens of Vallejo, Cal., are still anxiously discussing the probable resumption of the big terra cotta plant at that city, which has been shut down for three years. It would mean work for at least one hundred men, but considering the condition of the market for clay products on the coast, it is not considered likely that Gladding & McBean, who purchased the plant, will run it. They have an extensive plant now in operation at Lincoln, in Placer county, which is entirely sufficient to supply the present demands.

OBITUARY—DEATH OF WM. McKENNA.

William McKenna, a well-known resident of Chicago for forty years, died suddenly at his home, No. 3837 Archer avenue, Sept. 16. Mr. McKenna was born in Donegal, Ireland, in 1824. At the age of sixteen years he came to America alone and obtained employment in a brickyard at Haverstraw, N. Y. He remained there until thirty-two years old, following the same business, and had gained the reputation of being the best brick burner in the East. In 1856 he came to Chicago to superintend a brick factory for Gibbs & Moran, at Eighteenth street and the river. He was the first man to use machinery in the manufacture of brick in Chicago. When he came here the river at Halsted street was so narrow a man could almost jump across it. Mr. McKenna discovered that the clay at the bottom and at the sides of it made a superior quality of brick, and he was struck with the idea of deepening and widening the river, and at the same time securing the best of clay for brick. The development of this idea of Mr. McKenna has made the Chicago river navigable, with comparatively no expense to the city or the United States, as far south as Kedzie avenue and north to Sharpshooters' Park. Before the brickmakers began operations the north branch practically ended at Division street. The brick used in the first lake tunnels were burned by Mr. McKenna, who maintained here the reputation he made in the East as the best brick burner in the business. At various times he was at the head of that most important department of brickmaking for the Dunlop Brick Company, Cutting & Walker, E. R. Gord and the United States Brick Company. From 1874 to 1892 he was engaged in the business for himself, retiring from active work at the latter date. Mr. McKenna was married in 1853 to Miss Mary McNamara, of Haverstraw, N. Y. She died about five years ago. Mr. McKenna was well known to the clayworking world, having been a member of the N. B. M. A. and at one time Treasurer of the Association, to which office he was elected at Memphis in 1888. The Clay-Worker joins with the craft in extending heartfelt sympathies to the children, of whom there are two sons and two daughters.

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BOOKS FOR BRICKMAKERS.

It is pretty generally conceded that wonderful progress is being made in the ancient and heretofore unprogressive art of brickmaking. Among the best evidences of this is the fact that the brickmaking craft is no longer without a literature of its own. There are now some good practical books treating on the manipulation of clay—the making, drying and burning of brick. The list is not so large but that every brickmaker can afford to have them all. Get them and read them.

"BRICKMAKERS' MANUAL," Morrison and Reep	$3.00
"BRICKMAKING AND BURNING," J. W. Crary, Sr	2.50
"TABLE OF ANALYSES OF CLAYS," Alfred Crossley	1.00
"VITRIFIED PAVING BRICK," H. A. Wheeler, E. M	1.00
"PRACTICAL FARM DRAINAGE," J. J. W. Billingsley	1.00

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

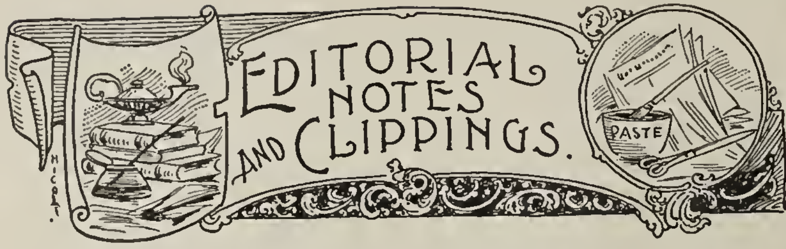
ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, ST. LOUIS, MO.



EDITORIAL NOTES AND CLIPPINGS.

Kunkletown, Pa., is to have a new brickyard.

E. L. Mitchell is making brick at Ventura, Cal.

Telford & Minor are making brick at Ramona, Cal.

Saugerties, N. Y., is to have a new shale brickworks.

Jno. Breed will establish a brick plant at Arcadia, Tex.

Olstein & Monroe will establish a brick plant at Silex, Mo.

A tile factory is to be established near Sandy Creek, N. Y.

Lewis & Sons have opened their first kiln of fire brick at Elsinore, Cal.

Ballew & Leach have established a new brick plant at Karnes City, Tex.

Ovando, Mont., has a new brickyard, which is being operated by Mr. Garrison.

The Gay Head Clay and Brick Company, Chelsea, Mass., has made an assignment.

A. K. Walker, Portland, Me., had over 100,000 brick ruined by a rainstorm last month.

The Rollin Calkins brickyard, at Watertown, N. Y., has been sold to the Harmon Brick Company.

The brickyard of Archer & Collins, at Detroit, Mich., has been purchased by Jno. C. McDonald.

Gibbs Bros., brick and tile manufacturers, at Arcadia, Mich., report having done a large business this season.

The Post Stone and Brick Company has been incorporated at Carnegie, Pa., with a capital stock of $50,000.

The Seattle Brick and Tile Company, at Seattle, Wash., has given realty and chattel mortgages for $7,000.

P. Olohan has begun the manufacture of brick at Arroyo Grande, Cal., and is now molding his first 100,000.

The Malvern (O.) Clay Company received an order that will keep them busy for some time, it being for 1,500,000.

Fire at the brickyard of Reed & May, Harrisburg, Pa., caused a loss of $1,250, on which there was no insurance.

The largest tile contract let in California is for the San Diego Courthouse, and it has been awarded to C. H. Barney.

Chas. McShane, Manager of McShane Bros.' Tile and Brick Works, Lostant, Ill., died at his home in that city Sept. 17.

The large plant of the Busse-Heidecker Brick Company, at Covington, Ky., was almost completely destroyed by fire Oct. 7.

Homer Laughlin, the East Liverpool, O., pottery man, is in Los Angeles, Cal., and will probably spend the winter there.

The Mechanicsville (N. Y.) Brick Company will add to its plant a department for the manufacture of vitrified paving brick.

The "Wanted," "For Sale," etc., column is the place to look for experienced workmen or bargains in second-hand machinery.

The Pasadena, Cal., firm of Houlahan & Griffith are furnishing 700,000 brick for the big Spreckles warehouse at Los Angeles.

John L. Russell, of Troy, N. Y., has purchased the pottery of Smith & Shipley, Waterville, N. Y., and will continue the business.

The Savernake Brick Company's plant, at Buena Vista, Va., has been sold to I. H. Glass, who will, in all probability, operate same.

Geo. W. Buxton, Martinsburg, W. Va., has enjoyed a very prosperous season, and is still receiving orders as fast as he can fill them.

Messrs. Creight & Hahn will establish a small pottery at Winnsboro, S. C., a fine deposit of clay having been discovered at that place.

The Chambers Bros.' Company, Philadelphia, Pa., recently booked an order for an entire brickmaking outfit for a Baltimore manufacturer.

After a hard fight with the railroads, Mr. Stratton, of C. C. Stratton & Co., of Macon, Ga., has succeeded in having the

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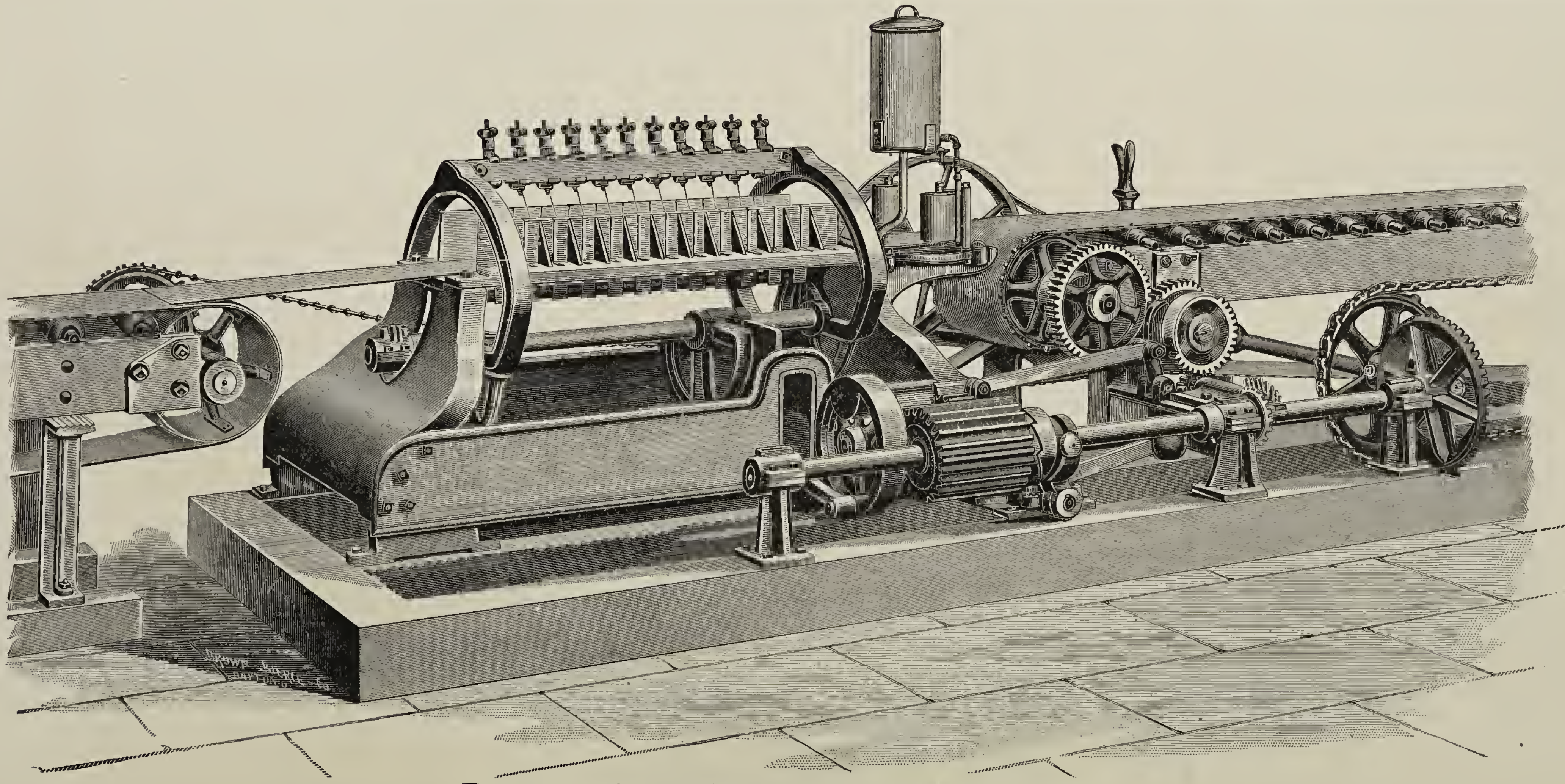
JUST THINK OF IT

The Most Perfect and Wonderful Piece of Machinery in their Whole Brick Plant.



Raymond's Side Cut Automatic Table.

Messrs. C. W. Raymond & Co., Dayton, Ohio. P. O. Verona, Pa., July 9, 1896.

Gentlemen—We take pleasure in saying that we are perfectly satisfied and well pleased with your Automatic Cutting Table furnished with our second Daytonian No. 1 Brick Machine. Having confidence in your ability to turn out first-class work we purchased your Automatic Cutting Table and in so doing we were not disappointed, as we have every reason to believe it the only perfect one on the market. We therefore gladly recommend it to do splendid work and to accomplish all that you claim for it. It is no experiment, as our experience for the last five months has been such as to prove to us beyond a doubt that it is a pronounced success. We look upon it as the most perfect and wonderful piece of machinery in our whole Brick Plant and we express our wish that your efforts may be crowned with a rich reward.

We will be pleased to answer any inquiries we may receive.

Yours very truly,
(Signed) BLATCHFORD, MEEDS BRICK CO.
H. P. Meeds, Jr., Treasurer.

C. W. RAYMOND & CO.,

Send for Catalogue.

DAYTON, OHIO.

EDITORIAL NOTES AND CLIPPINGS.—Continued.

minimum carload weight on brick raised to 40,000 pounds, which is the equivalent of a reduction in the rate of 20 per cent.

The Star Furnace Brick Works, at Sciotoville, O., were destroyed by fire on the 6th inst. The loss is estimated at $10,000. No insurance.

The drier at McDonald & McPeck's brickyard, at Bellefontaine, O., was destroyed by fire the 17th of last month, entailing a loss of $200.

The Gaffney Brick Works, St. Louis, will probably be enlarged. It is rumored that $100,000 of additional capital will be invested in the plant.

Wm. Burke, a large brick manufacturer, of Epping, N. H., has disappeared, leaving behind him unpaid bills amounting to something like $18,000.

Geo. W. Marchant has been appointed receiver of the McMullen Brick Company, Minneapolis, Minn., and will operate same under a trust deed.

Geo. F. Beardsley has retired from the Union Brick and Tile Company, of Champaign, Ill., and Messrs. J. W. and G. W. Stipes will continue the business.

A. Steiger & Sons are exhibiting the terra cotta arch which they made for the World's Fair at the Santa Clara County Fair, now being held at San Jose, Cal.

A. H. Lupton, of Bridgeton, N. J., has secured the contract to furnish 3,000,000 brick for the new power house the street-car company is building at New Castle, Del.

The Los Angeles Terra Cotta and Pressed Brick Company has purchased three lots in the Beaudry tract, No. 2, of Los Angeles, for use in the brickmaking business.

N. Chaney, of Haut's Ford, near Flora, Ill., writes that he has just finished burning a kiln of 200,000 brick, which he hopes to dispose of before the season is over.

T. B. McAvoy & Sons, of Philadelphia, Pa., have recently been awarded a four-million contract in connection with the rebuilding of a large publication house in that city.

J. Parker, of Potter Valley, Cal., has established an agency with F. Brunner & Son, at Ukiah. His new machines have a capacity of 6,000 small tile or 8,000 brick per day.

Bunnell & Brown, brick manufacturers, Galt, Mo., have opened up their first kiln of brick, which they find are first-class. They now have their plant running smoothly.

The sixteen-year-old wife of Thomas Baker, foreman at the Pomona, Cal., brickyard, recently made an unsuccessful attempt at suicide by swallowing an ounce of laudanum.

A boiler explosion occurred at Hall's brickyard, Des Moines, Ia., completely wrecking the boiler house, doing a great deal of damage to the brickworks, and injuring two workmen.

During a storm which passed over Harrisburg, Pa., recently, Leedy's brickyard caught fire and the machinery building was completely destroyed. Mr. Leedy estimates his loss at $2,500.

E. M. Ayers has leased twenty acres of land near Zanesville, O., which contains rich deposits of clay and sand, for a term of ten years. A brick plant will be established ere long.

A brickyard on a large scale will in all probability be established at South Fork, Pa., where a superior quality of clay has been found in abundance. Stineman Bros., of that city, are interested.

Tony Schultz, an employe of the Consolidated Brick and Tile Company, Grand Rapids, Mich., was hit on the head by a bit of falling timber and quite seriously injured. It is thought he will recover.

The brickyards at the Albuquerque, N. M., penitentiary are in full blast, with about 800,000 bricks on hand and a kiln of 375,000 burning. They are shipping bricks to Las Vegas for the new Catholic Sanitarium.

The Chattahoochee Brick Company, Atlanta, Ga., report business this year as having been very extensive. They have so many orders on hand that they are considering the advisability of running a night force.

The Centerville (Ia.) Brick and Tile Company have made improvements in their plant, including, among other things, the putting in of a new press brick machine that will increase their capacity to 20,000 brick a day.

The Carbondale (Ia.) Fuel Company has been making some experiments with clay which had been discovered on a tract on which it had been intending to erect a large plant, and with the result that has been very gratifying. It has demonstrated that the clay is suitable for making fine glazed brick and floor tiles, and a large plant will be erected for the manufacture of this ware in the near future.

Almarin B. Paul, mining man and agent for Dr. William H. Garlick, a wealthy pottery manufacturer of Ohio, and owner of the famous Calumet mining property in Old Diggings, was in Redding, Cal., last week, on business.

The death of T. P. Snow occurred at Paris, Tenn., Sept. 21, where he had been engaged in the manufacture of brick for a long time. He leaves a widow and large family, to whom are extended the sympathies of a large circle of friends.

Jno. Carter, the well-known brick manufacturer, of St. Catharines, Ont., died in that city Sept. 13, in his sixty-fourth year. Mr. Carter was a man of many good characteristics, and will be sadly missed by the community in which he lived.

H. A. Brooks, Orrington, Me., has just put in a flower pot machine at his tileworks, and expects to manufacture a large number of flower pots this winter. Mr. Brooks is the only manufacturer in Maine who is making flower pots by machinery.

The Iowa Brick and Tile Company's plant, at Des Moines, which was destroyed by fire some time ago, is being rebuilt, and will be ready for operation in about a month. The plant will be much larger than before and equipped with modern machinery.

A. L. Gribling and E. V. Wilson have purchased the Alhambra (Ariz.) brickyard, and will commence making brick at once. As both Mr. Gribling and Mr. Wilson are experienced brick manufacturers, there is no doubt as to the success of the plant under the new management.

C. and A. Potts & Co., Indianapolis, report having shipped quite a number of disintegrators within the last two weeks or so, among the number being one to Stevens Bros., at Milledgeville, Ga., one to D. S. & A. C. Plummer, Wiscasset, Me., one to Springfield, Ill., and one to Wisconsin.

The oldest love letter in the world, says an exchange, is in the British Museum. It is a proposal of marriage for the hand of an Egyptian princess, and it was made 3,500 years ago. It is in the form of an inscribed brick, and is, therefore, not only the oldest, but the most substantial love letter in existence.

The brickmaking firm of Lynch Bros., Holyoke, Mass., has been dissolved, and in its stead there will be the Lynch Bros. Brick Company, a corporation with $21,000 capital stock, of which Michael Lynch is President and Maurice Lynch Secretary and Treasurer. The change was made for business reasons.

The Druid Brick Company, Baltimore, Md., were fortunate in securing the contract for the brick for the new courthouse now in course of construction at that place, to which they are now sending about 40,000 Chambers machine-made brick per day. They also have other contracts on hand that are keeping them running full-handed.

On the afternoon of Sept. 21 fire was discovered in one of the dry sheds at the Marion (Ind.) Brick Works, and the building and an adjoining shed, with the contents, were destroyed. There was no water protection, and all that was done was with buckets and ladders. The loss is estimated at $700, which is fully covered by insurance. The burned portion will be rebuilt at once.

The Buena Vista (Va.) Fire Clay and Roofing Tile Company, of which H. J. Quandt is President and Wm. Korn Secretary and Treasurer, has been chartered to manufacture roofing tile, fire brick, ornamental and architectural terra cotta and other products of clay. The new company has purchased the property and rights of the old Buena Vista Fire Clay Company, and will begin operations at once.

The Charter Oak Brick Company, Hartford, Conn., has recently booked some unusually large orders. One contract alone calls for 3,000,000 brick, and others aggregate as many more. To meet this demand they must enlarge their works, and have ordered a complete equipment from the Eastern Machinery Company, New Haven, having a daily capacity of 50,000. The "enemy's country" is evidently leading in the movement towards better times.

R. S. Bluck, Woodstone Brickyard, Petersboro, England, in a recent letter, says: "I want to sink a well, estimated at two thousand feet, as a test hole for artesian water. The strata are Oxford clay, Oxford shale, with oolite rock in beds of from six inches to eight feet thick between the layers of clay and shale. I am informed that the American tools are superior to English ones for this work, and will be obliged if you will mention in the Clay-Worker that I would like to receive communications from American well drillers, with catalogues of the necessary tools. I can supply my own engine, boiler, derrick and cable."

WANTED:

To Give Information About,

The "Monarch" Brick Machine, (Horizontal,)

It is big, strong and simple. Weighs almost 12,000 pounds.

Has double pug-mills giving 14 feet of tempering capacity; double presses, which produce the most powerful pressure of any machine, and being "all in the mud," don't wear a bit; bearings where clay **cannot** get into them.

It is the only "soft mud" machine put on the market for years that had a new **fundamental** idea in it. All others have been improvements or modifications only of fundamentally **wrong principles.** Fully explained in circular. Seventy-five in daily use.

The "Iron Quaker" Brick Machines, Horse and Steam Power.

For 15 years, the acknowledged leading Upright Machines. Comparitively low in price. List of hundreds in circular.

The "Wellington" Mould-Sanding Machine.

A new one. The simplest, best, and at same time, lowest priced.

Ball Bearing Brick Barrows.

These good things don't need even pushing along. Load them, balance them, and then a slight inclination carries them along. Wheelers increase their days work 20 to 30 per cent. Order a sample one.

Double-Deck Pallet Trucks. The best of all.

Moulds. All kinds. Machine; hand; shapes; lined, etc., etc.

Cast Iron Dryer Cars. The best pattern. Roller bearings. Low prices.

Kiln Castings. Doors and frames. Furnace fronts. All kinds grate bars.

FOR SALE.

Odd sizes of molds. New. Not been used:
5 Molds, 8¾ x 4¼ x 2⅜ in. 9-16 in. partitions.
20 Molds, 8 13-16 x 4 3-16 x 2 7-16 in. 9-16 in. partitions.

Second-hand, but used a few days only:
10 Molds, 9½ x 4⅝ x 2¾ in. 9-16 in. partitions.
19 Molds, 9½ x 4 9-16 x 2¾ in. ½ in. partitions.

All of above are six-brick Machine Moulds. Cherry.

Also, 10 3-brick hand molds, new, 8¾ x 4¼ x 2½ in.

Elevators, Dump Tables, Sand Barrows,
All Styles of Trucks, Dump Carts, Represses,
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The Wellington Machine Co.,

Wellington, Ohio.

Enameled and Glazed Clay Wares,

How to Make Them.

THOSE WHO are interested in the manufacture of enameled brick or glazed clay ware of any kind will find a great deal of practical information in the new book entitled "Clay Glazes and Enamels," which is from the pen of Henry R. Griffen, who ranks among the ablest and most successful of enameled ware manufacturers in the world. The book is written in a plain, common-sense style. The formulas for all the ordinary glazes and colors are given, and the manner of making and using them is clearly set forth in plain terms, so that the average reader may fully comprehend what is meant without any books of translation.

The book is substantially bound in Morocco, with flexible covers, to adapt it for pocket or laboratory use, and will be mailed, post free, to any address, on receipt of price, $5, by the publishers, T. A. Randall & Co., Indianapolis, Ind. See ad. on page 335.

FOR SALE, WANTED, ETC.

☛ **Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.**

TO LEASE, SELL OR INTEREST Parties in a clay deposit of unusual value for tiles, building or paving brick of high quality. On railroad, easy to mine—free from gravel or boulders. Impervious to water and makes a tough, hard and non-absorbing brick, very compact. Address, BOX 115,
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9-foot Chisholm, Boyd & White dry pan.
Chisholm, Boyd & White revolving screen and mixer, with ⅛ screen, and bucket elevator, with 20 6-inch buckets.
75-horse-power Westinghouse engine.
All the above but little used and in first-class condition. Address, WALNUT,
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WANTED—Situation as superintendent or burner; understands all up-to-date methods of manufacturing press brick; can also speak the Spanish language. No. 1 references given. Address.
W. C. MITCHELL,
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WANTED—Practical brickmaker, with $3,500 to invest, to take position as superintendent of new plant, only in operation the past season. Buildings and machinery all new. Capacity. 30,000 daily; 50 acres land. Address, RIVERSIDE,
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WANTED—Re-engagement as superintendent of fire brick works; thoroughly experienced in fire brick manufacture, also architectural and paving brick, particularly the former. First-class references. Address, "FIRE BRICK,"
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WANTED—Superintendent, thoroughly understanding stiff-mud and dry-press processes. Must be able to manufacture fine front and ornamental brick. None but first-class man with good references need apply. Address,
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WANTED—Situation as superintendent of brick plant by a practical and competent manufacturer. Prefer to take an interest in the plant, and will invest a limited amount of capital if conditions are satisfactory. Now running a plant in a small town, and wish to locate in a larger market. HYRUM,
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FOR SALE—Nearly new brick and tile plant; fine location, good clay, good machinery, kilns and building, on Wisconsin Central Railroad, forty-six miles from Chicago. Will sell all or lease, or sell part to experienced man and allow him to run pant. For further information address,
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WANTED—A young chemist, Dr. Phil., graduate of one of the universities of Europe, speaks German, French and English, now occupying a responsible position as chemist and assistant manager of one of the largest terra cotta and tiling factories in Europe, desires a position in this country. For further information address, B. K.,
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RECEIVER'S SALE.

I will offer at public sale, at Covington, Fountain county, Indiana, Nov. 6, 1896, at 10 a. m., the works of the Hillsboro Brown Stone and Pressed Brick Company, consisting of 80 acres of fine clay, 6 to 8 feet in depth, and 12 feet or more of fine shale, and a well-equipped dry-press brick plant, including engine, boiler, brick machinery, kilns, stock sheds, etc., etc. For particulars address, PERRY HATT, Receiver,
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NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
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WANTED—Employment by man understanding iron and woodwork, laying, setting or burning brick; recommends to this effect from an experience around works of thirteen years. Address
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WANTED—Situation as superintendent, foreman, or charge of setting, burning, repair and erection of kilns, either dry clay, stiff clay or vitrified street paver works. Can superintend erection of works. Practical in every branch. Also a kiln builder. Good references. Address, SUCCESS,
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FOR SALE—Two Simpson presses, one Plymouth brick and tile machine, Plymouth board delivery, brick cutting table, Plymouth tile cutting table, Freese "A Special" brick machine, Stevenson pug mill and Emens granulator. For description of this machinery see page 579, June Clay-Worker, or address
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NOTICE.

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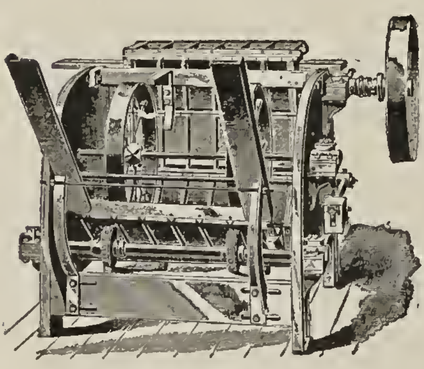
Commencing June 22, through parlor cars will be operated between Indianapolis and South Bend daily, except Sunday, on Big Four train No. 3, leaving Indianapolis at 5 p. m., making immediate connection with Vandalia line fast train at Colfax, which passes through Frankfort, Logansport, Lake Maxinkuckee and Plymouth, arriving at South Bend at 10:45 p. m. G. E. ROCKWELL, D. P. A., for details.



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That will sand any size of mold. No expense to keep in repair.

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Which holds 150 brick is the best and cheapest. Is perfectly balanced.

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Which saves your more and costs you less than inferior machines, and our

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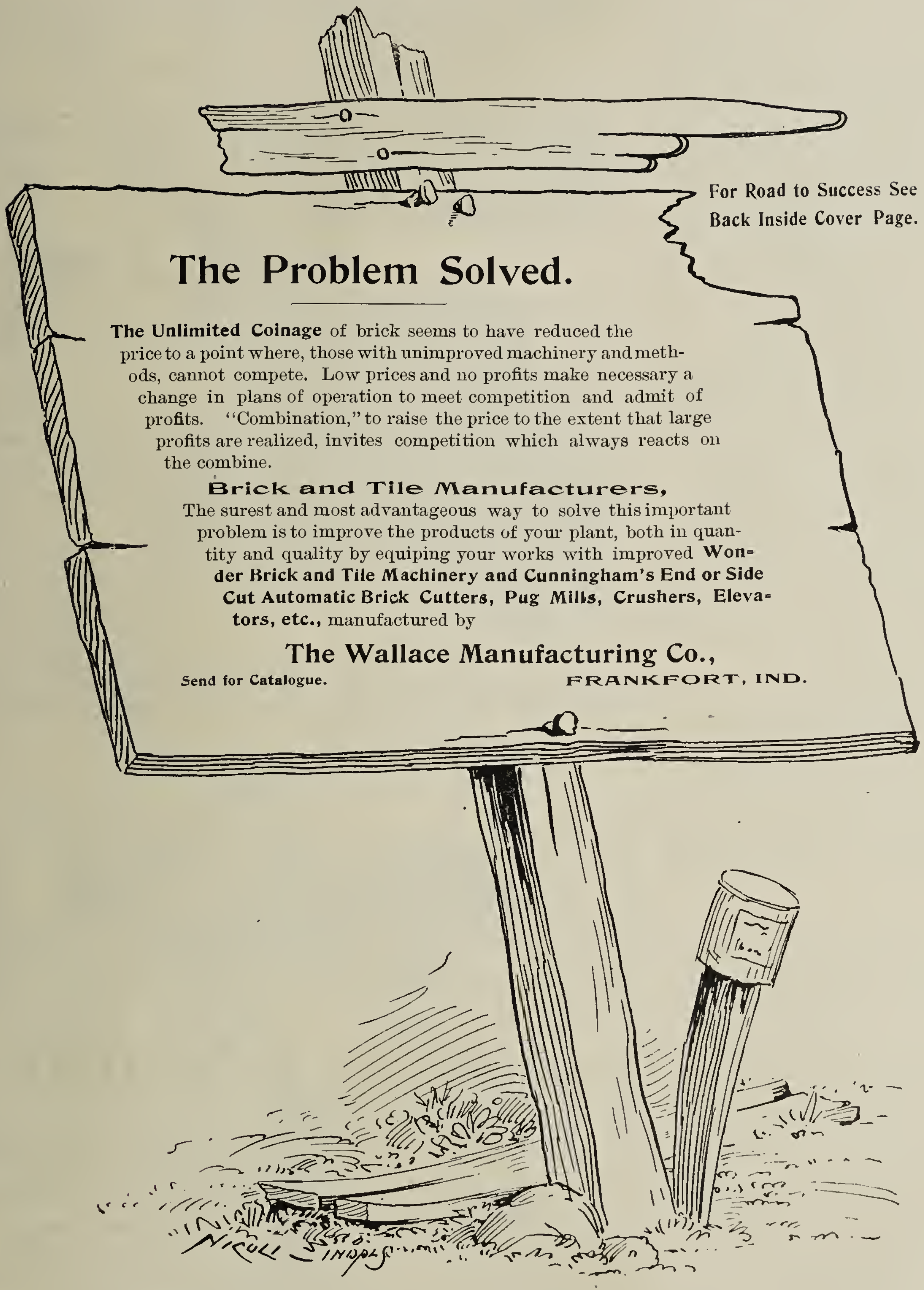

For Road to Success See Back Inside Cover Page.

The Problem Solved.

The Unlimited Coinage of brick seems to have reduced the price to a point where, those with unimproved machinery and methods, cannot compete. Low prices and no profits make necessary a change in plans of operation to meet competition and admit of profits. "Combination," to raise the price to the extent that large profits are realized, invites competition which always reacts on the combine.

Brick and Tile Manufacturers,

The surest and most advantageous way to solve this important problem is to improve the products of your plant, both in quantity and quality by equiping your works with improved **Wonder Brick and Tile Machinery and Cunningham's End or Side Cut Automatic Brick Cutters, Pug Mills, Crushers, Elevators, etc.,** manufactured by

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Alkalies	.27
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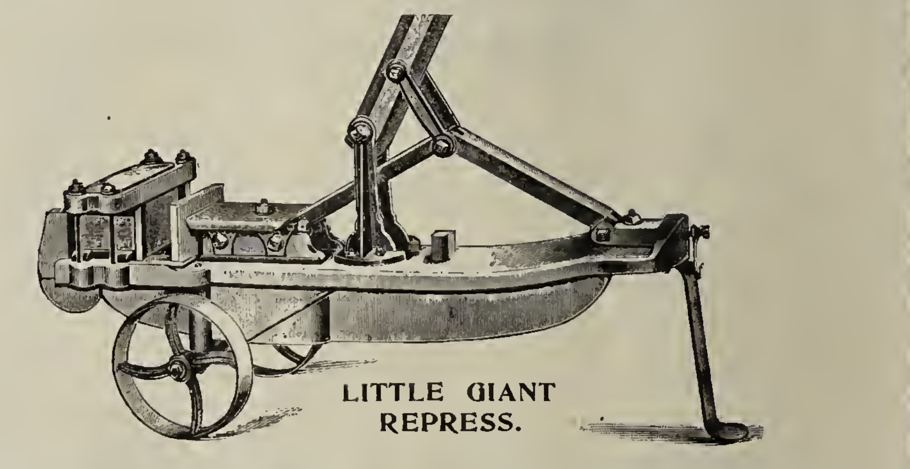
Total	100.12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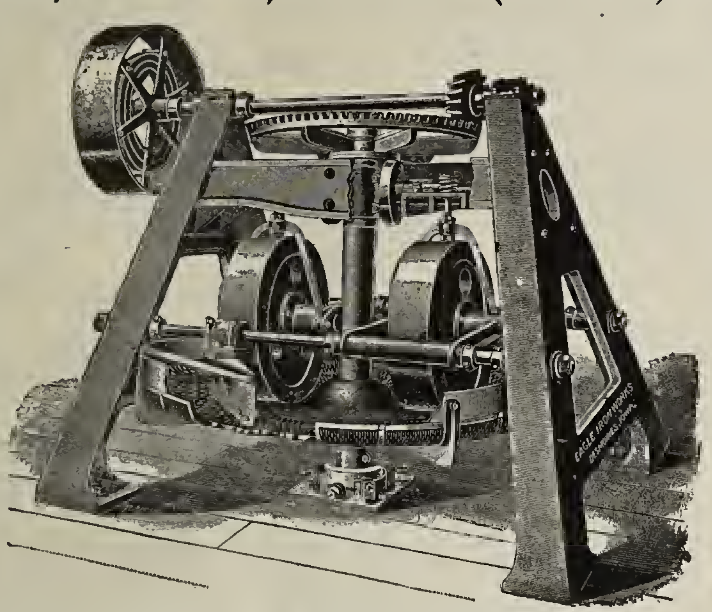

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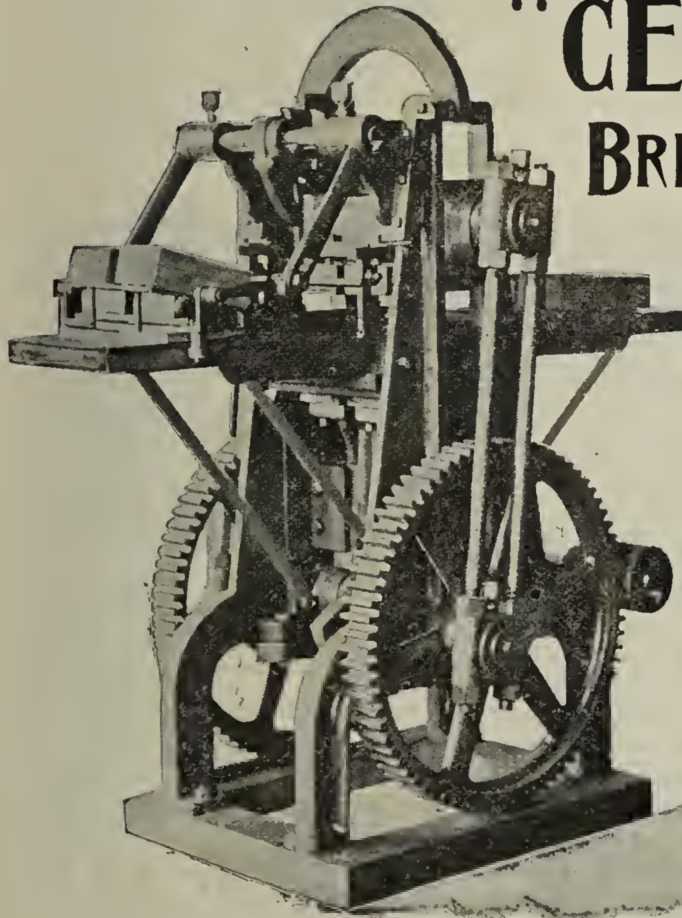

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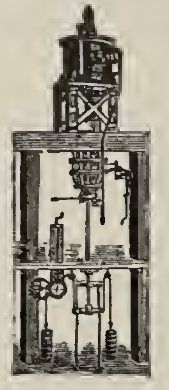

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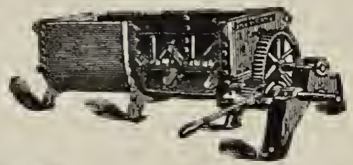

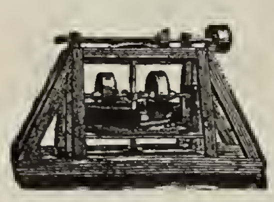

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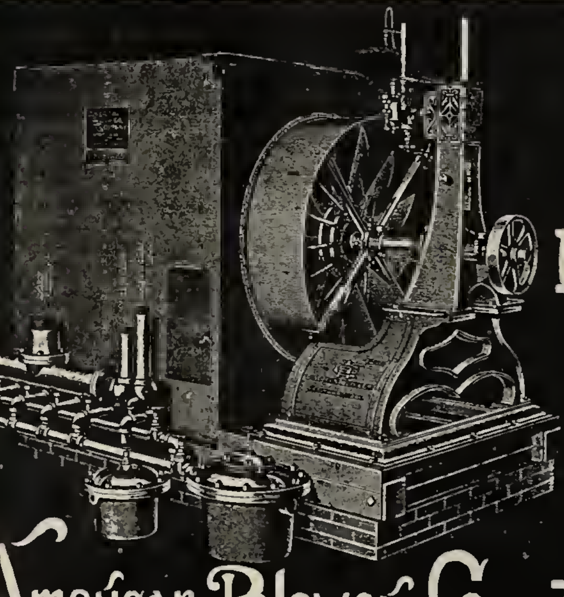

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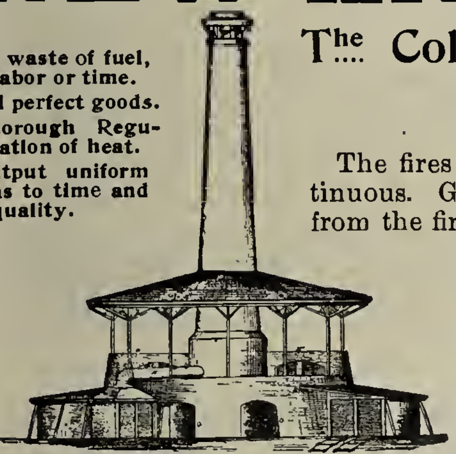

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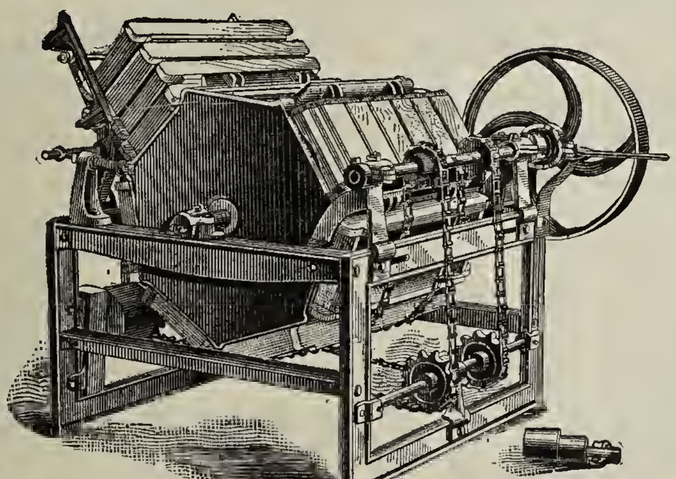

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THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

4000 TO 5500
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BY HAND-POWER.

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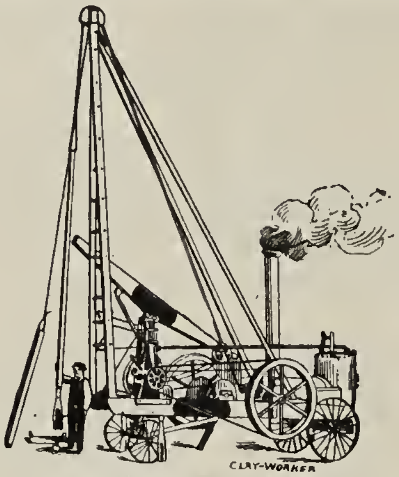

PUMPS, WIND MILLS with large pumps specially adapted for keeping clay pits clear of water.

Eastern agent for the famous Star Drilling Machinery. Machines capable of drilling wells from 150 to 2,500 feet, any diameter desired. Practical men furnished for work of this class. All machinery handled by me guaranteed first-class.

Tanks of any size from 100 to 100,000 gallons capacity.

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The Short Line for

St. LOUIS AND THE WEST.

LEAVE INDIANAPOLIS,	AT. TERRA HAUTE	AR. ST. LOUIS.
* 7:20 am	9:45 am	....
* 8:50 am	10:35 am	3:44 pm
*12:50 noon	2:45 pm	7:24 pm
* 7:00 pm	9:00 pm	1:44 am
*11:20 pm	1:30 am	7:00 am

*Daily.

All trains carry first-class coaches. 12:50 noon train has Parlor and Dining Cars for St. Louis. 11:20 pm train has local sleeping cars starting from Indianapolis for St. Louis and Evansville, open every night at 8:30. All trains enter the Union Passenger Station at Terre Haute and St. Louis.

Tickets Offices, 48 West Washington St., 46 Jackson Place and Union Station.

GEO. E. ROCKWELL, Dis. Pass. Agt.

Send your name for a Souvenir of the Works of Eugene Field,

FIELD ❧ FLOWERS

The Eugene Field Monument Souvenir

The most beautiful Art Production of the century. "A small bunch of the most fragrant of blossoms gathered from the broad acres of Eugene Field's Farm of Love." Contains a selection of the most beautiful of the poems of Eugene Field. Handsomely illustrated by thirty-five of the world's greatest artists as their contribution to the Monument Fund. But for the noble contributions of the great artists this book could not have been manufactured for $7.00. For sale at book stores, or sent prepaid on receipt of $1.10. The love offering to the Child's Poet Laureate, published by the Committee to create a fund to build the Monument and to care for the family of the beloved poet.

Eugene Field Monument Souvenir Fund,
180 Monroe Street, Chicago, Ill.

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Dover Fire Brick Co.,
INCORPORATED 1870. MANUFACTURERS OF
Dover and Buckeye Fire Brick,
Unexcelled for Kiln Purposes.
44 Mercantile Bank Bldg., Cleveland, Ohio.

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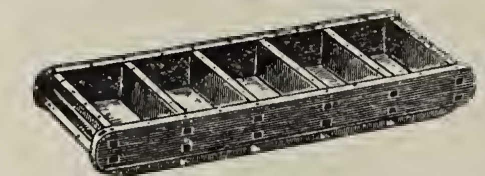
MANUFACTURERS OF ALL KINDS AND SHAPES OF

HAND and.... MACHINE MOULDS



We manufacture the the most substantial Moulds known, and guarantee every Mould to be first-class in material and workmanship.

A Special Discount on all orders received on or before March 1st.

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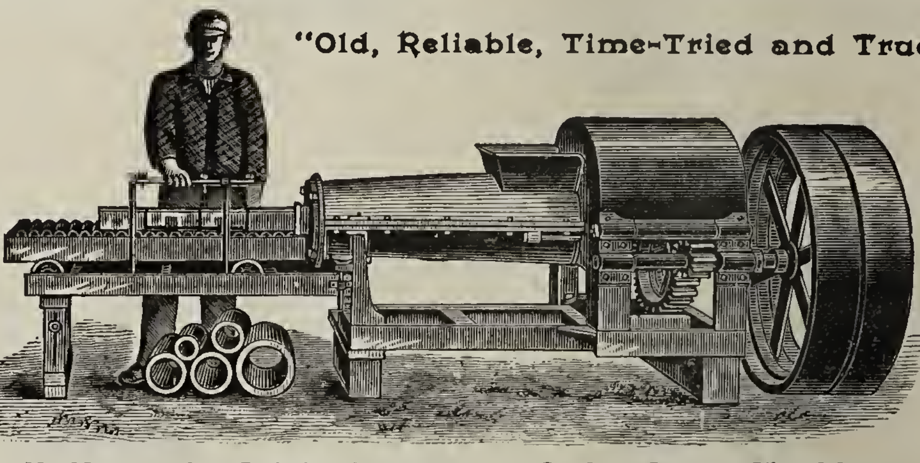
Commercial Intelligence Dep't, **ASSOCIATED TRADE & INDUSTRIAL PRESS,**

Rooms 9, 10, 11, 12 and 13, 610 13th Street, Washington, D. C.

ESTABLISHED NINE YEARS.

KELLS & SON'S IMPROVED BRICK AND . . . . TILE MACHINES.

"Old, Reliable, Time-Tried and True."



P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,

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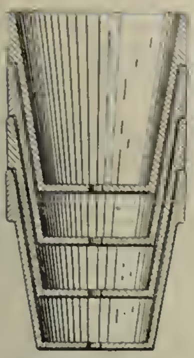
Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.



Make Money

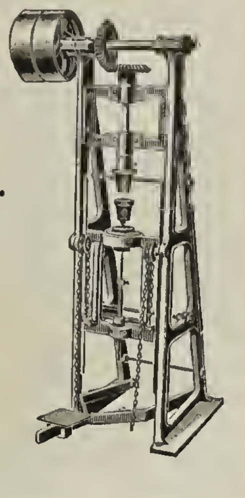
WITH THE ONLY SUCCESSFUL

Flower Pot Machine.

(PATENTED.)

No expert workmen required.
Capacity in 10 hours:
6,000 two-inch Pots; 3,500 five-inch Pots;
4,000 four-inch " 2,000 seven-inch "
Write for Circular and prices.

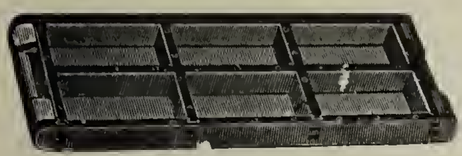
The Rockwood Mfg. Co.,
78 South Pennsylvania St., INDIANAPOLIS, IND.



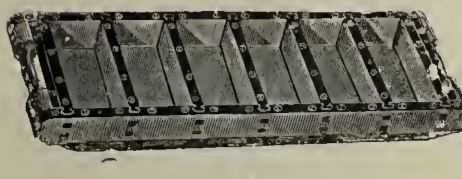
ARNOLD'S BRICKYARD SUPPLIES.

They are the Best that are Made.

3 Brick Hand Mold.



6 Brick Hand Mold



6 Brick Machine Mold.

Moulds. A large stock of Hand and Machine moulds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

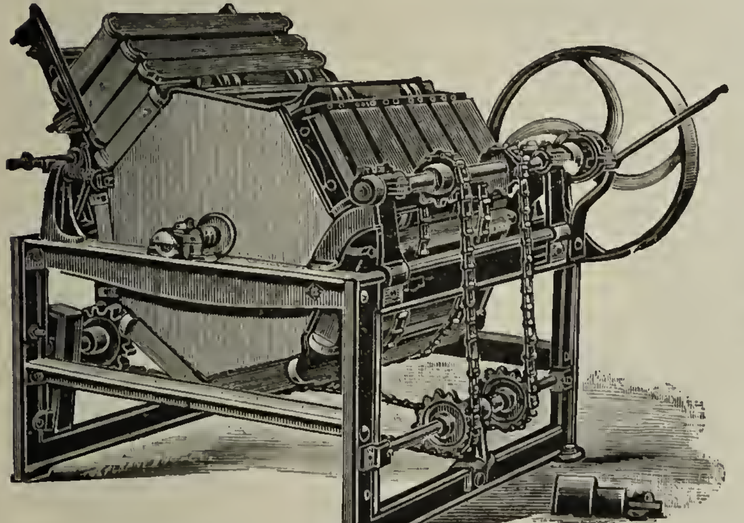
WHEEL-BARROWS For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc. **All-Metal** Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.

BUCK'S NEW CHAMPION Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.
WHITEHEAD BROS. & CO., General Agents, 517 West 15th St., New York City.

The F. F. V. Vestibule Limited via the Chesapeake & Ohio R'y, is the only Solid train with through Dining Car between New York, Philadelphia, Baltimore, Washington, Cincinnati and the West. Lighted with Electricity. Heated with Steam.

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Ass't Gen'l Pass. Agent.
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Solid Train Between
Sandusky and Peoria
—AND—
INDIANAPOLIS and MICHIGAN CITY,
FT. WAYNE and CONNERSVILLE.

LAKE ERIE & WESTERN RAILROAD. NATURAL GAS ROUTE

Through tickets sold to all points in the United States and Canada.

NORTH BOUND—LEAVES.

No. 20 Passenger	7:00 a. m.
*No. 22 Passenger	1:20 p. m.
No. 24 Passenger	7:00 p. m.

SOUTH BOUND—ARRIVES.

*No. 21 Passenger	10:20 a. m.
No. 23 Passenger	2:50 p. m.
No. 25 Passenger	6:20 p. m.

*Daily.

Union Depot connections at BLOOMINGTON and PEORIA for points WEST, SOUTHWEST and NORTHWEST.

Direct connections made at LIMA, FOSTORIA, FREMONT or SANDUSKY for all points EAST.

Immediate connections at TIPTON with trains on Main Line and I. & M. C. Div., for all points NORTH, SOUTH, EAST and WEST.

For tickets, rates and general information, call on A. H. SELLARS, Agent, Lake Erie & Western R. R.

C. F. DAILY, Gen. Pass. Agt.
INDIANAPOLIS, IND.

Indiana, Decatur & Western RAILWAY.

Short line between **INDIANAPOLIS** and **KANSAS CITY**. The only line running **Reclining Chair Cars** between **INDIANAPOLIS**, and **DECATUR, SPRINGFIELD** and **JACKSONVILLE, ILLINOIS.**

TIME OF TRAINS AT INDIANAPOLIS:

LEAVE.

Mail and Express	8.30 a m
Accommodation	3.25 p m
Fast Express	11.20 p m

ARRIVE.

Fast Express	3.30 a m
Accommodation	10.40 a m
Mail and Express	4.50 p m

JNO. S. LAZARUS, Gen. Pass. Agent.

TAKE THE
BIG 4
TO
ST. LOUIS

TO CHICAGO THE WEST and NORTHWEST

MONON ROUTE

LOUISVILLE, NEW ALBANY & CHICAGO R.R.

TIME TABLE IN EFFECT SEPT. 13.

3 DAILY TRAINS

LEAVE INDIANAPOLIS,

7:00 am, 3:35 pm, 12:55 Night

ARRIVE CHICAGO

12:00 Noon. 8:20 pm. 7:20 am.

Lv Chicago	2:45 am.	11:50 am.	8:58 pm.
Arr Indianapolis	7:45 am.	4:37 pm.	3:30 am.

Indianapolis Sleeper returns on 2:45 am. train.

SHORTEST AND FASTEST LINE.
LATEST EQUIPMENT.
ALWAYS "UP-TO-DATE."

TICKES OFFICES: 2 West Washington St., Union Station and Massachusetts Ave. Depot.

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FOR A CHANGE IN LOCATION?

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FINE SITES FOR NEW MILLS

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CLOSE PROXIMITY TO

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INTELLIGENT HELP OF ALL KINDS

MANY KINDS OF RAW MATERIAL

For full information write the undersigned for a copy of the pamphlet entitled

100 Cities and Towns WANTING INDUSTRIES

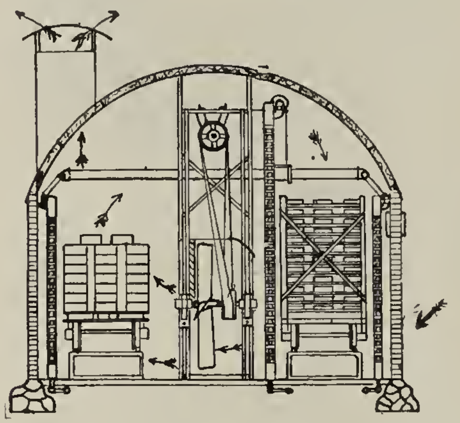
This will give you the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries, desired, etc.

To sound industries, which will bear investigation, substantial inducements will be given by many of the places on the lines of the Illinois Central R. R., which is the only road under one management running through from the Northwestern States to the Gulf of Mexico. GEO. C. POWER, Industrial Commissioner I. C. R. R. Co., 506 Central Station, Chicago.

The Safety Dryer,

Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.

SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.

WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

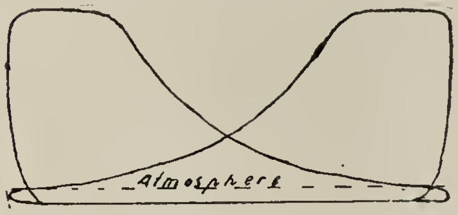
WASHINGTON, D. C., June 7th, 1895.

S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our —— You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."



FORDS, N. J., April 9th, 1894.

MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

"And Met the Requirements in Every Case."

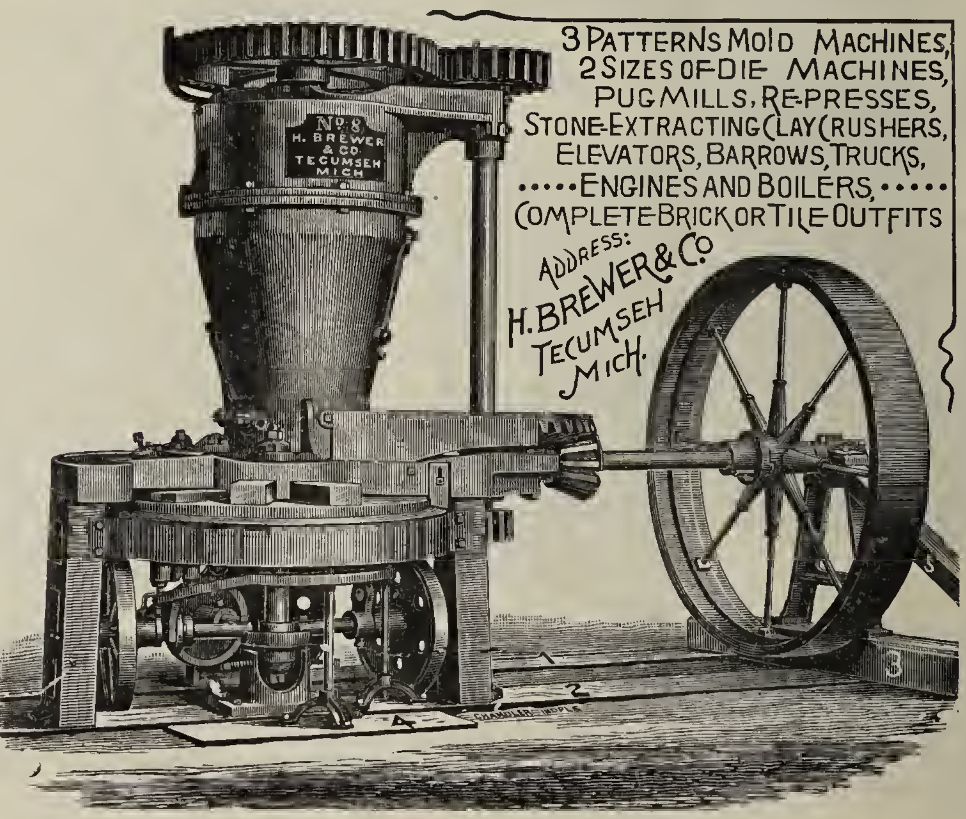
PHILADELPHIA, December 14, 1892.

MR. S. G. PHILLIPS, Woodbridge, N. J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

Yours respectfully,
CHAMBERS BROTHERS CO.,
J. H. Chambers, Gen'l Mgr.

S. G. PHILLIPS.
Agent and Patentee,
161 Grand Street.
Rahway, N. J.



Prof. Dr. H. Seger and E. Cramer,

6 Krupp Street, BERLIN, GERMANY,

CHEMICAL LABORATORY FOR THE CLAY INDUSTRY.

Raw materials and products of the Brick, Stoneware, China, Lime and Cement industries examined and advice given.

Flaws in the methods of manufacture corrected.

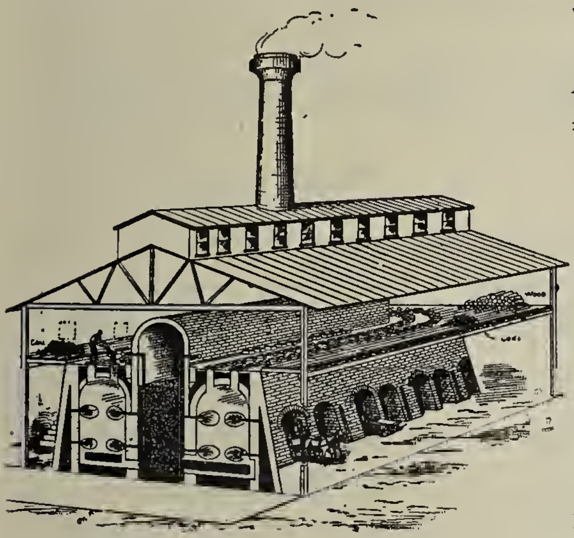
Many years experience.

Laboratory for the German Association of Refractory Clay Ware Manufacturers.

Manufacturers of the Seger pyrometrical cones.

Publishers of **Die Thonindustrie Zeitung**, the leading Ceramic weekly of Germany.

Organ of the German Association of Brick, Clay Ware, Lime and Cement Manufacturers; of the German Association of Refractory Clay Ware Manufacturers; of the Association of German Portland Cement Manufacturers, and of the Brick Trade Assembly.



Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

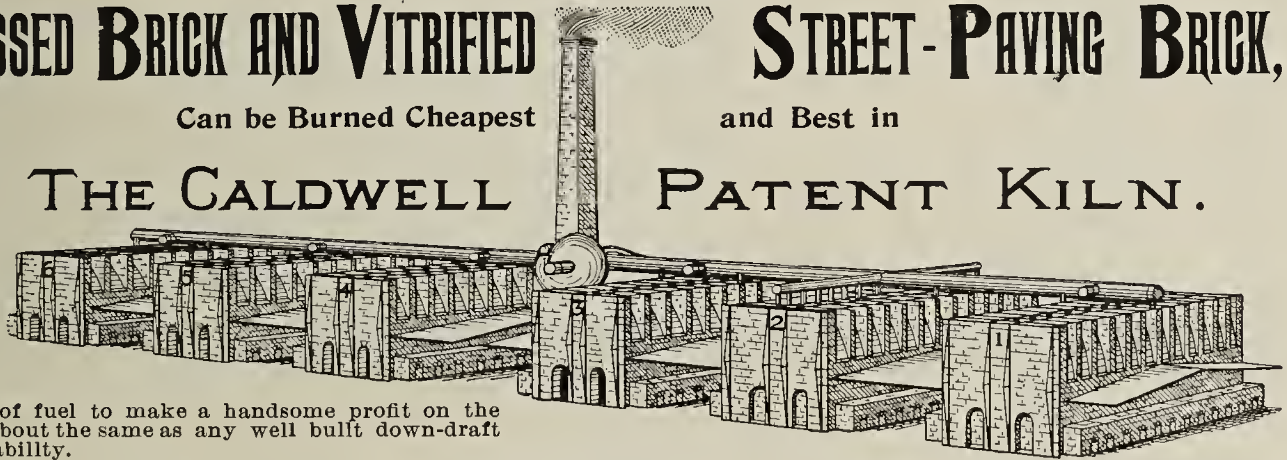
First: Saving of fuel.

Second: Equalizing the drafts.

Third: More perfect combustion.

Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

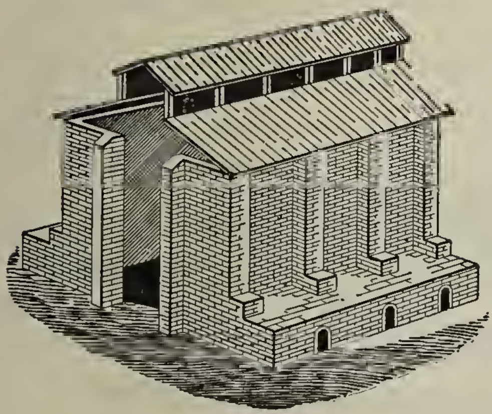


J. K. CALDWELL, 319 Hennepin Ave., *Minneapolis, Minn.*

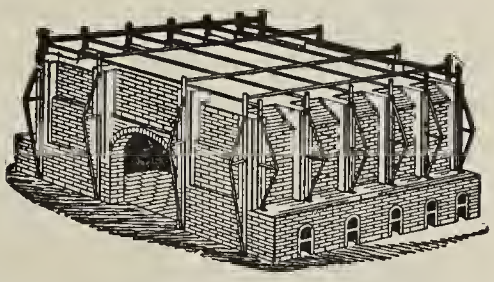
LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Up-Draft Kiln.



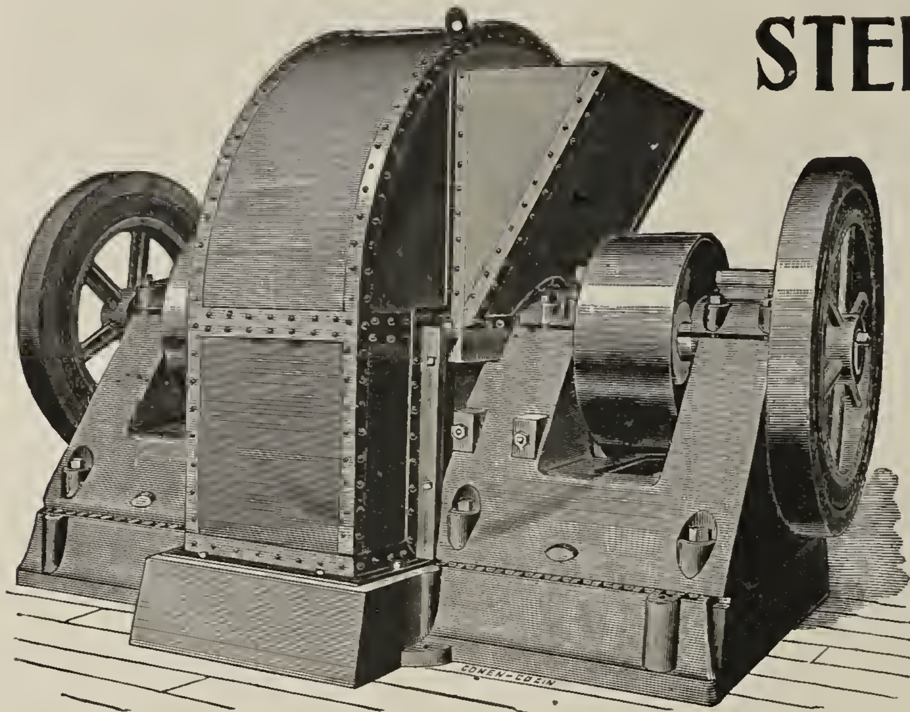
Down-Draft Kiln.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., *Kansas City, Mo.*



STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

There. Are . . . Others

But If you want the Best, the most Modern, the most Scientific, the most Profitable Equipment for Brickmaking, you will patronize

W. D. Richardson & Co.,
Engineers,
809 Cuyahoga Building,
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Manufacturers of . . . . The RICHARDSON DOUBLE-PRESSURE REPRESS, The RICHARDSON AUTOMATIC HOPPER and FEEDER, The RICHARDSON SHAKING SCREEN.

SEND FOR DETAILS.

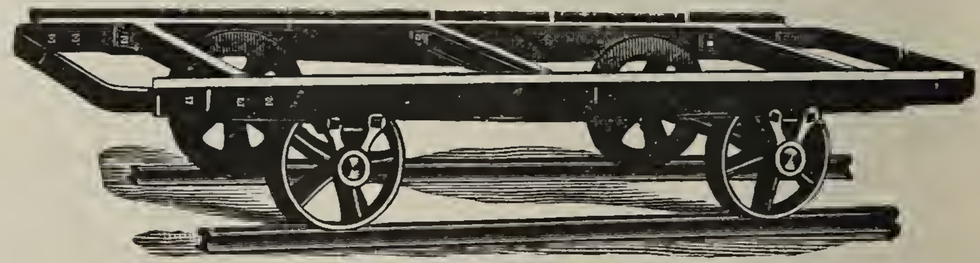
BRICK CARS.

THE BEST. NO EXPERIMENT.

Thirty styles of our cars in use in all parts of the United States and Canada. Nearly 2000 of our cars are in use in Cleveland alone by the following Brickmakers:

F. H. Eggers,
C. G. Barkwell,
Standard Brick Co.,
Peter Cullen,
Collinwood Brick Co.,
Cleveland Brick Co.,
Canadian Copper Co.,
George Gynn,
Warren Farr,
John Cullen.

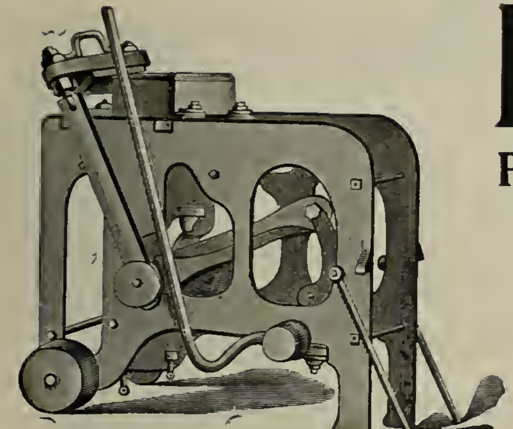
Write Them,
Then Us.



Style 28.

Catalogue and Price List sent on application.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.
NEW BRUNSWICK FOUNDRY CO., New Brunswick, N. J.



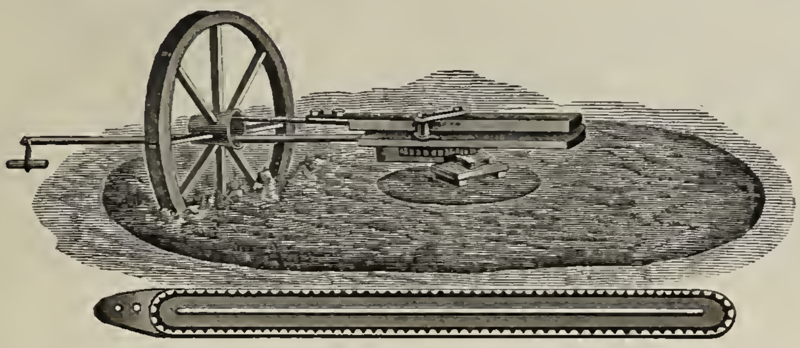
RED BRICK PRESS.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

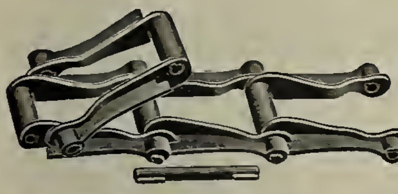


GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

Send for Circular and Price-List.

These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

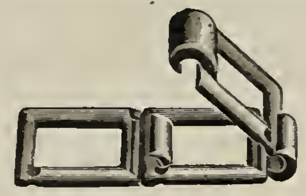
F. H. C. MEY,

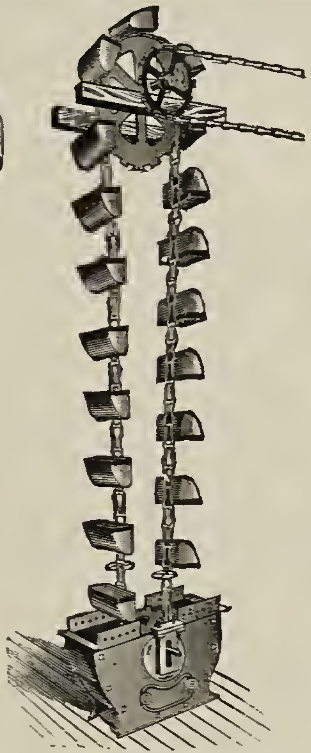
Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.





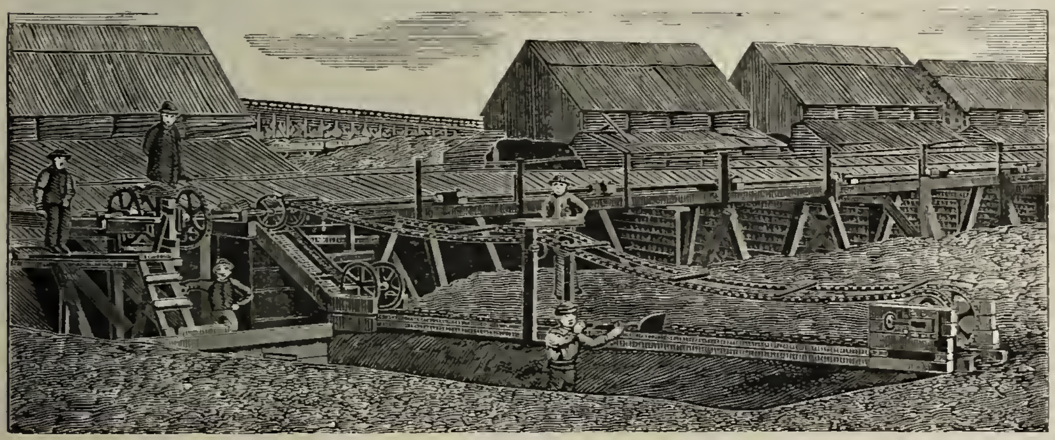
THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker.

It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.

Send for Catalogue



MEY PATENT CLAY ELEVATOR.

THE STANDARD BRICK MACHINES

MANUFACTURED BY

A. M. & W. H. WILES,

Grassy Point, Rockland County, New York.

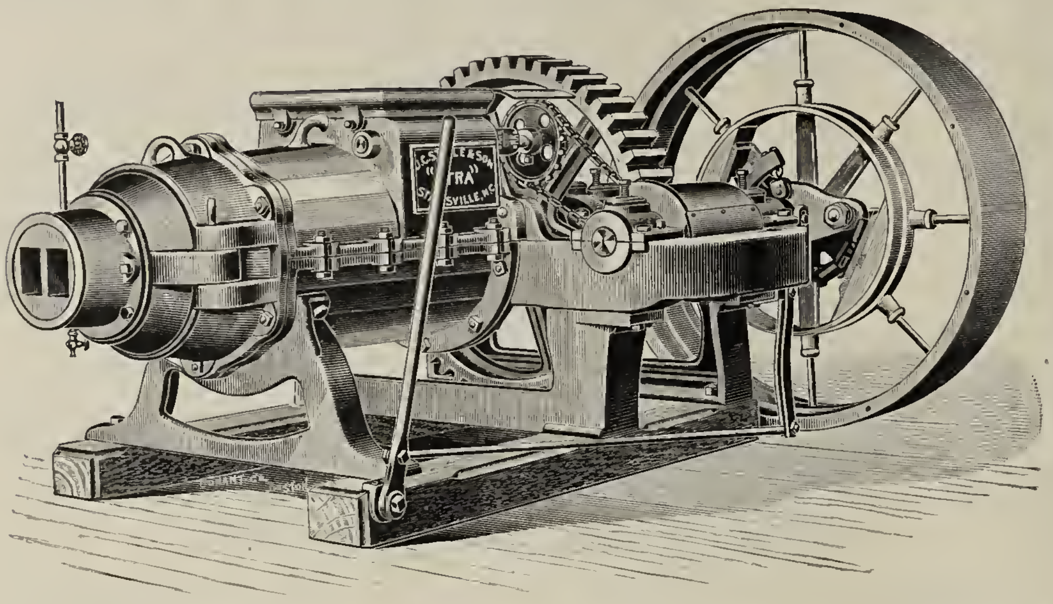
These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

The New South Brick Machinery



X-tra Machine. Capacity 25,000.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with indigestion or constipation. No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

DANVILLE, VA., Sept. 22, 1896.

J. C. STEELE & SON, Statesville, N. C.

Gentlemen:—Answering your query as to how we are pleased with the outfit furnished us by you of brickmaking machinery and implements, we would say that it has given us good satisfaction. The brick machine does all that you claimed for it. The trucks are great labor saving implements and the winding drum and cars equally so. In our system we could hardly dispense with either the trucks or cars and drums. Respectfully,

DON VALLEY BRICK CO.

(This company is using the "X-tra" machine and make 30,000 brick per day.

Strictly modern machinery at the lowest price. Send for Catalogue.

J. C. STEELE & SON, Statesville, N. C.

---

15 New Machines.

Brick Machines, Represses. Tile Machines, Pug Mills, Crushers, Disintegrators, Automatic Cutters, etc., etc., our own make for prompt delivery.

• • •

12 Second Hand Machines.

Brick Machines, Represses, Tile Machines and Pug Mills of different makes, in good working order, cheap for cash. Send for list.

LEADER MANUFACTURING CO

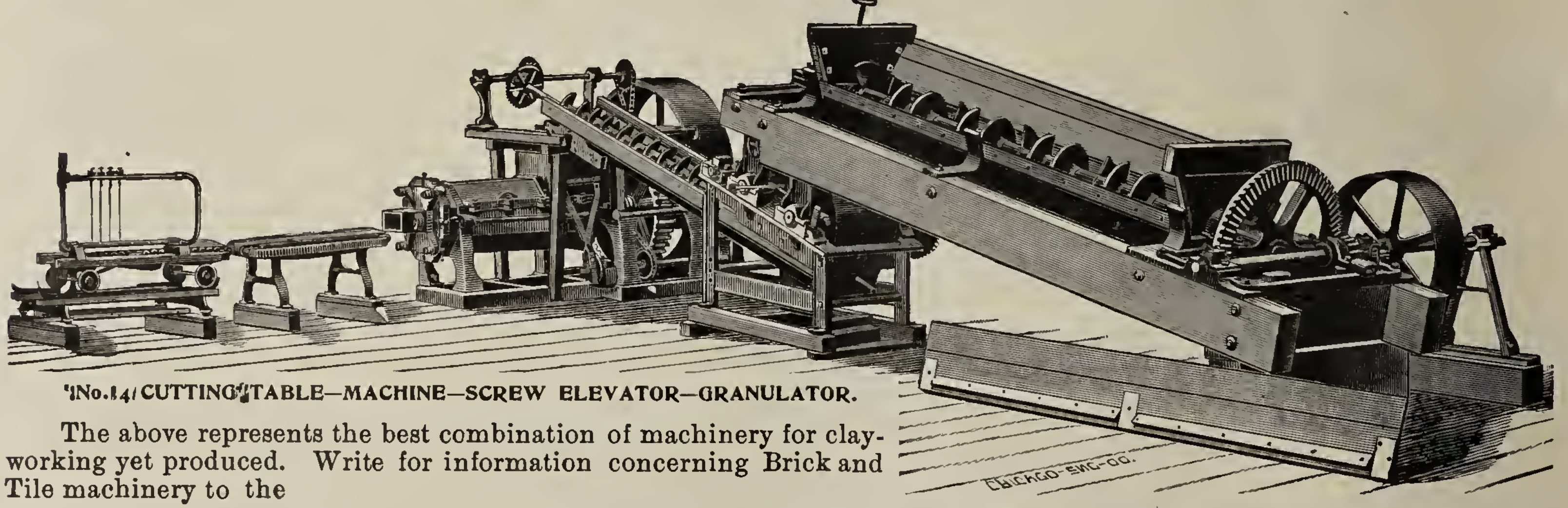
DECATUR ILL.

MANUFACTURERS OF

BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.

SEND FOR PRINTED MATTER.

ADRIAN BRICK AND TILE MACHINE CO.



No. 14 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

LEVIATHAN BELT.

"LEVIATHAN."

"Upon Earth There is not His Like."

....................Sept. .. 1896.

MAIN BELTING CO.,
248 Randolph st., Chicago, Ill.

GENTLEMEN:—Please ship us via freight, 146 feet x 18″ 8 ply "Leviathan" Belting. The reason you have not heard from us of late is, we have been trying the "just as good for less money" belting. You can count on our future orders for "**LEVIATHAN.**"

Prompt shipment of the above will oblige.

Yours very truly,
....

Manufactured under Special Process.

....A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum.

Main Belting Company,

Sole Manufacturers LEVIATHAN BELTING.

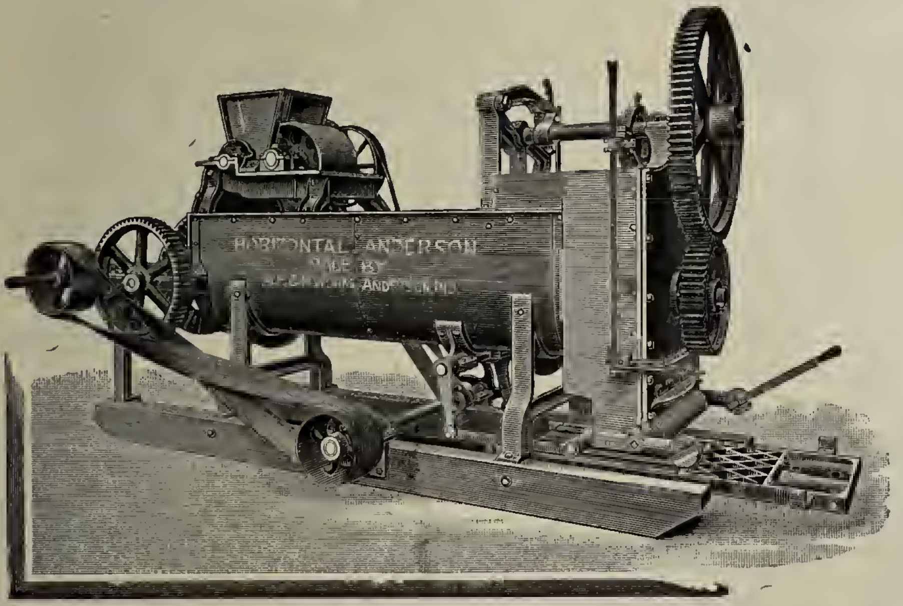
PHILADELPHIA:
1219 Carpenter Street.

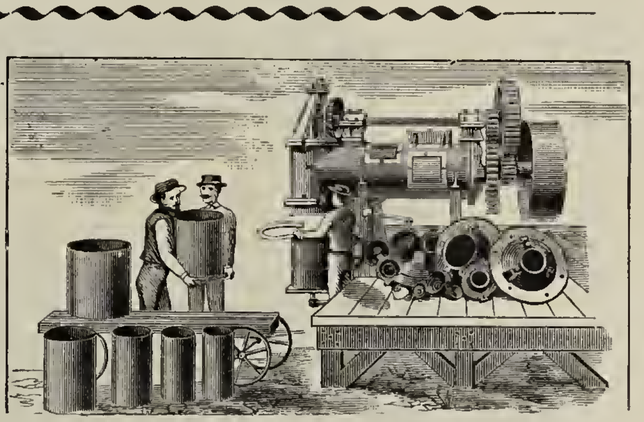
248 Randolph St., CHICAGO, ILL.

BOSTON:
120 Pearl Street.

The HORIZONTAL ANDERSON.

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY**; simple in construction and durable.





NEW DEPARTURE TILE MILL,

The only Machine for Tile from 3 to 24 inches.

DISINTEGRATORS, PUG MILLS, ELEVATORS, and BRICKYARD SUPPLIES.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.

Would You Buy

A BRICK MACHINE
.....A DRY PAN
....A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King

A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

The Woolley Pug Mill,

All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
...AND...
SLIP PRESSES

For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

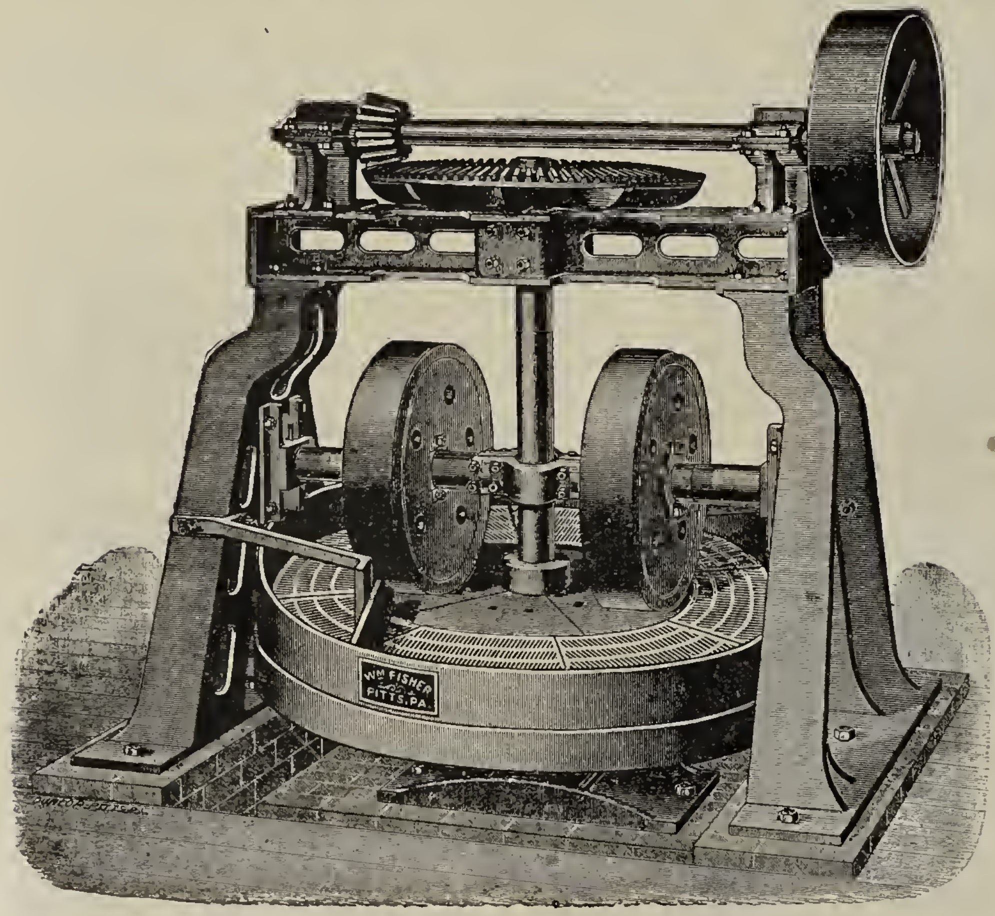
Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Proprietors,

23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

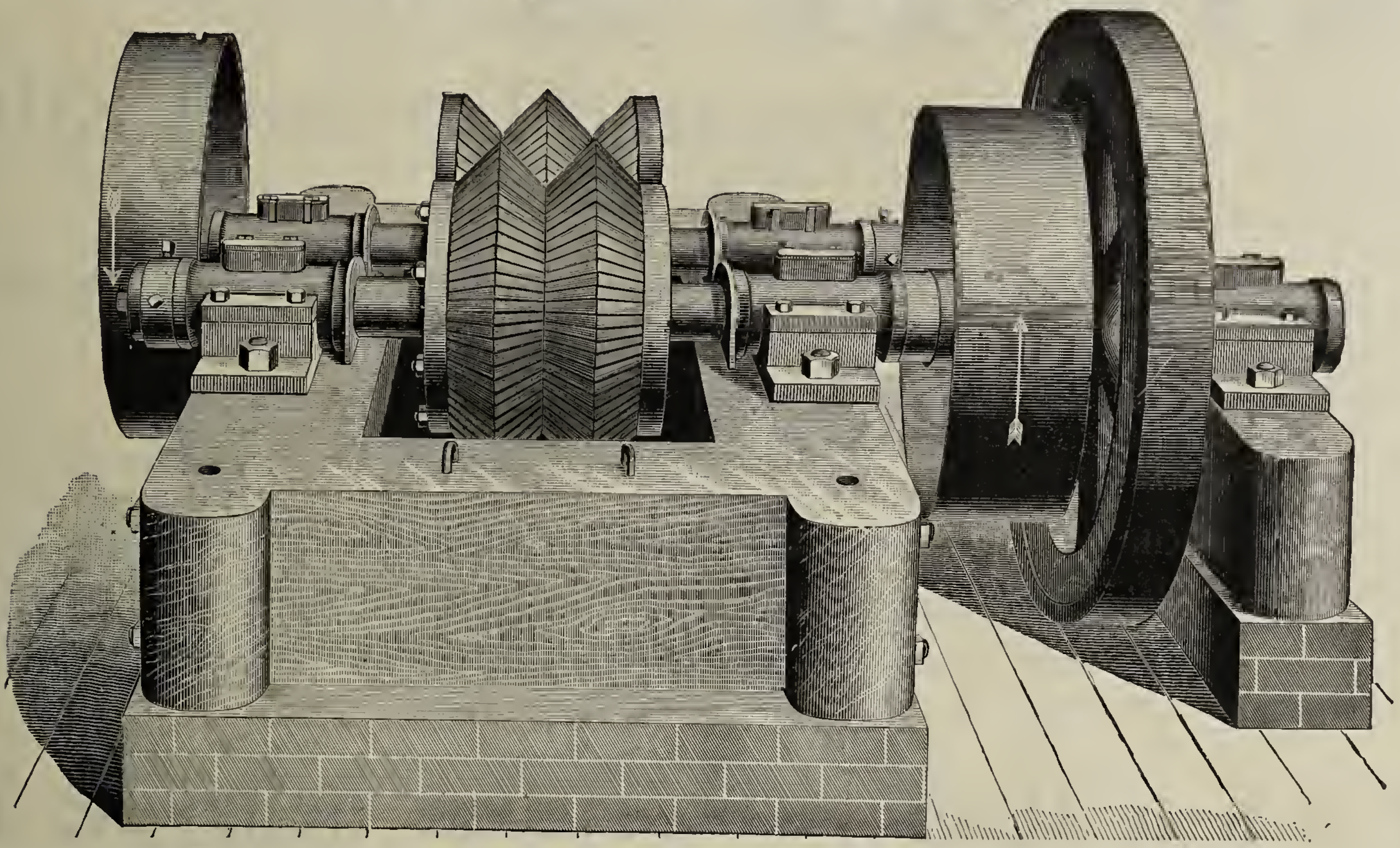
We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required

NEWELL IMPROVED CLAY PULVERIZER

Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.

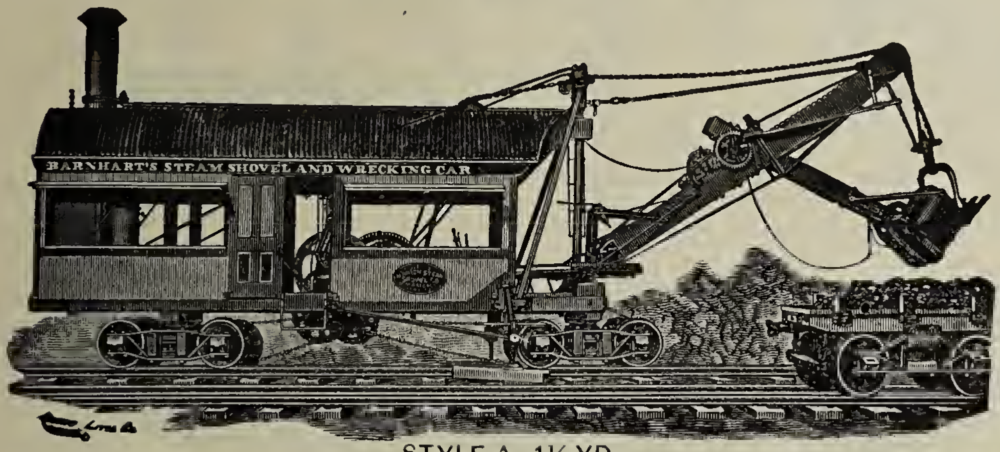


Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building
26 Cortland and 21 Dey Streets, **New York, U. S. A.**

Steam Shovels for Brickyards.

OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

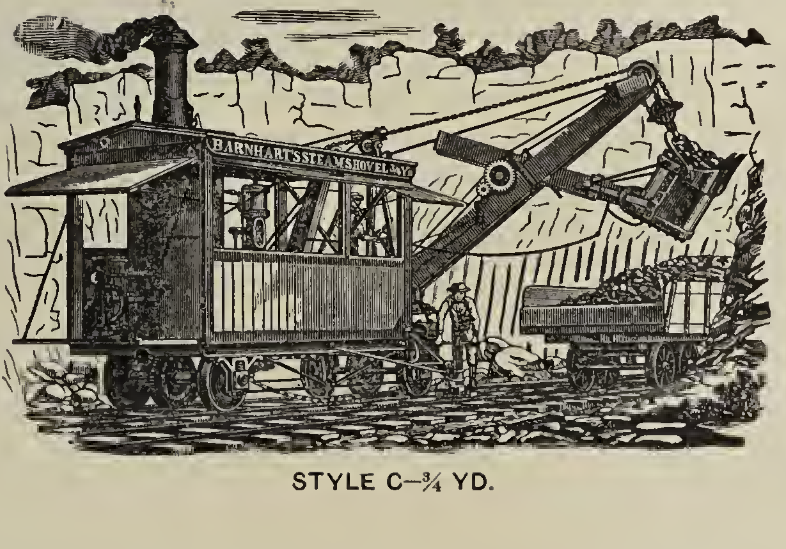

BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,
603 West Center Street, - **MARION, OHIO.**



STYLE C—¾ YD.

ALSIP'S LATEST IMPROVED

Down and Up=draft Kiln.

The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**

CONLEY AND WOLFE
IMPROVED KILN COMPANY
of
TARKIO,
MO.
PATENTS:
Nº 477,993, JUNE 28. 1892.
Nº 477,994, JUNE. 28. 1892.
Nº 487,174, NOV. 29. 1892.
Nº 491,037, JAN. 31. 1893.
Nº 491,038, JAN. 31. 1893.

OFFICERS:

DAVID RANKIN, PRESIDENT,
TARKIO, MO.

JOSEPH CONLEY, VICE-PRESIDENT,
MOUND CITY, MO.

W. F. RANKIN, SEC'Y AND TREAS,
TARKIO, MO.

J. M. WOLFE, GEN'L M'G'R,
TARKIO, MO.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

Morrison's Latest Improved Kiln,

FOR BURNING BUILDING BRICK.

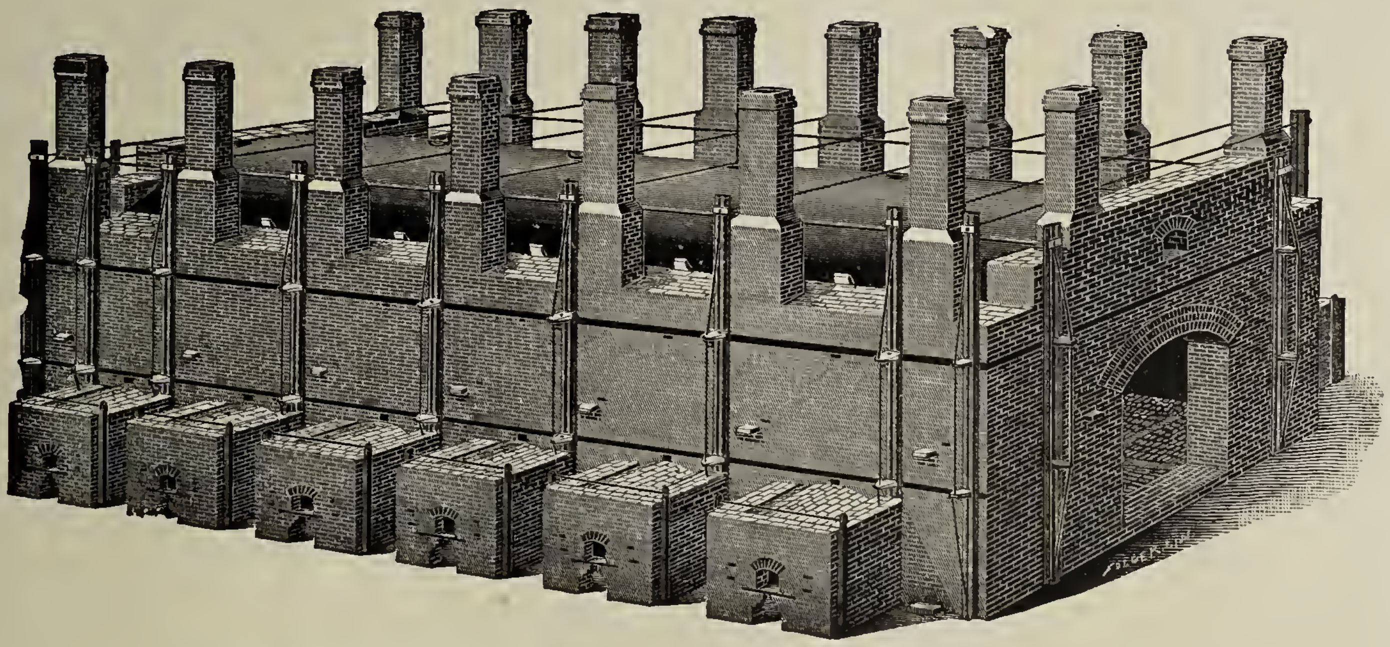
IT has no rival. Some of the largest brick plants in the country use it exclusively. Cost of construction within reach of every brickmaker. Price for license to use so reasonable that no one can object.

Write us for descriptive pamphlet, prices, etc., address

R. B. MORRISON & CO.,

P. O. Box 335. *ROME, GA., U. S. A.*

The EUDALY IMPROVED .... DOWN-DRAFT KILN.



A very large number of manufacturers are now using the EUDALY KILN for burning all kinds of clay wares, especially front, ornamental and paving brick. We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of large capacity on account of economy in cost of construction and space occupied on the plant; while the Round Kiln is better adapted to plants of small capacity, drain tile, sewer pipe and fire brick in small quantities. These Kilns have gained a reputation for burning all hard and uniform. This Kiln is easily controlled and is in every way practical and desirable. We will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY, 509 Johnston Bldg. **Cincinnati, Ohio.**

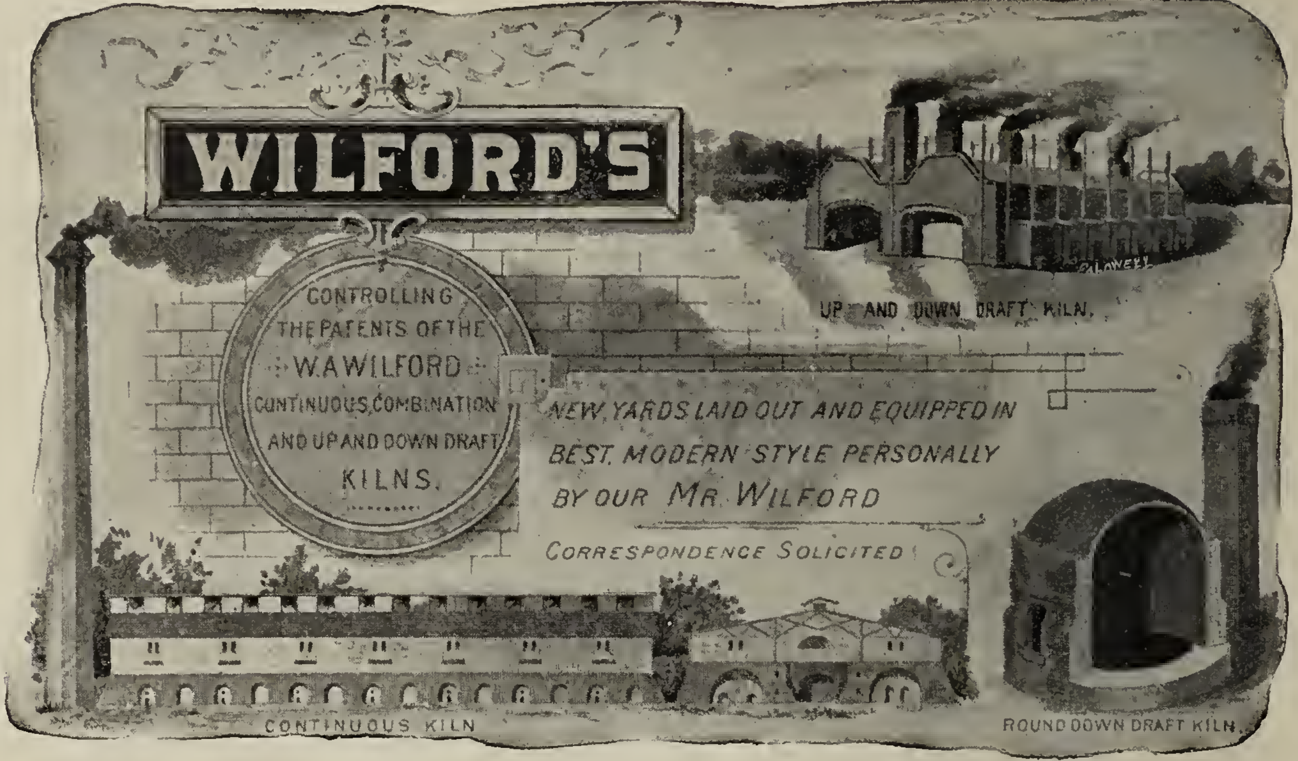
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W. A. WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
UP AND DOWN DRAFT KILN.
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

ROCHESTER BRICK & TILE M'F'G. CO.,
Brick and Drain Tiles, Hollow Brick, Etc.
243 *Power's Block.*

ROCHESTER, N. Y., June 19, 1896.

WILFORD PATENT KILN CO.

Dear Sir:—In answer to your inquiry as to what we can say in reference to your kiln recently constructed on our yard, we are very much pleased with it.

At the present time we have burned once and a half round, and we not only find it to be very economical in fuel, but the brick are coming out well burned, in first-class condition and very little waste.

After a little longer use we hope to make a still better showing.

Truly yours,
ROCHESTER BRICK & TILE M'F'G. CO.,
Per IRA L. OTIS, Pres.

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and* 2 *Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago. The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

Let us give you full Particulars.

The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

Clay Glazes and Enamels.

THEIR COMPOSITION AND APPLICATION.

A PLAIN, practical treatise on the subject by Henry R. Griffen, who is at once a scientist and a successful clayworker as attested by the superior character of the ware produced under his direction for the American Terra Cotta and Ceramic Co., during the past two years.

The Processes of Glazing and Enameling Brick, etc., which have heretofore been guarded as valuable trade secrets by the few possessing the knowledge, are fully explained and the formulas and mixtures given in plain terms with full instructions for their manufacture and use

A Book for American Clayworkers by an American Clayworker that is invaluable alike to experienced workmen, students and beginners in the clay arts. The most valuable addition to Clayworking literature of modern times.

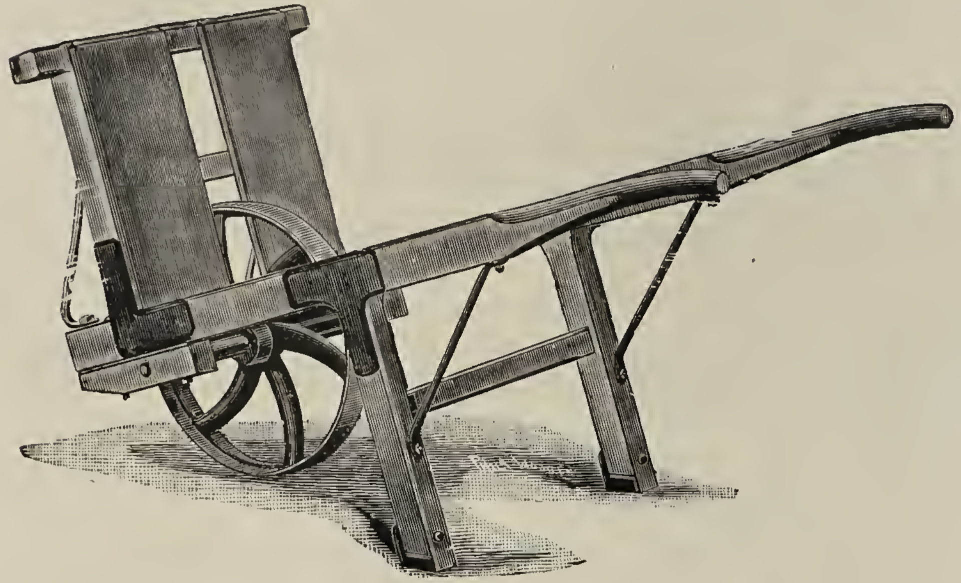
Mailed postpaid on receipt of price $5.00.

T. A. Randall & Co.,

PUBLISHERS,

5 Monument Place, INDIANAPOLIS, IND.

Use "Martin's" White Oak

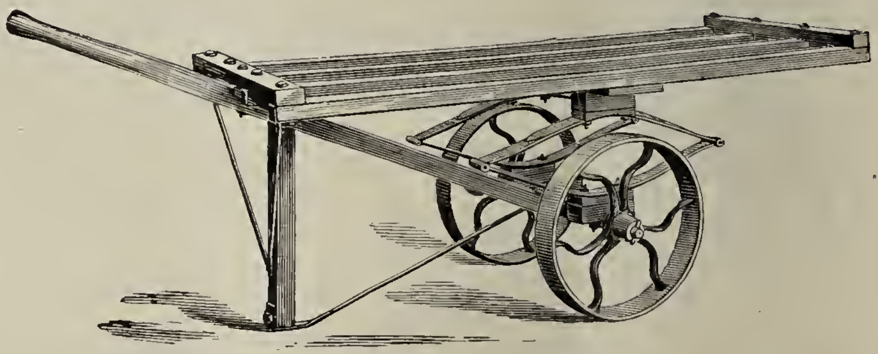


Barrows

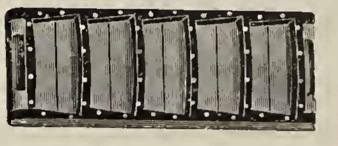
..and..

Trucks.

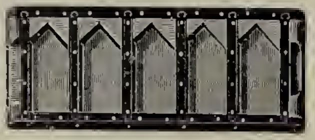
We respectfully solicit a trial order. . . . . . .

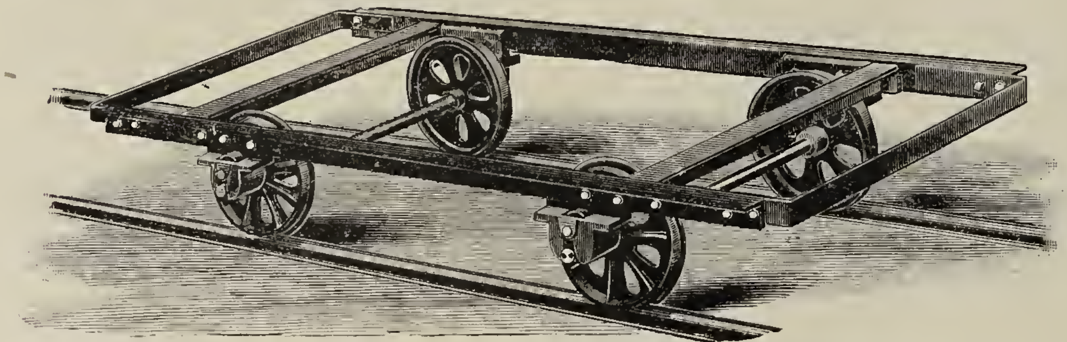


BRICK MOULDS.



ALL SHAPES AND SIZES,
With or without Panel Bottoms and Name Plates.





DRYER CARS

Of all Kinds

A Specialty.

The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

Manufacturers of the Famous "Henry Martin"
Brick Machines and Brickyard Supplies. . .

Lancaster, Penna., U. S. A.

THE above is a photograph of four cars loaded with Clayworking Machinery, manufactured by **C. & A. Potts & Co., Indianapolis, Ind.,** for the National Brick and Terra Cotta Co. at Passaic, N. J., this was shipped July 18th, and consisted of

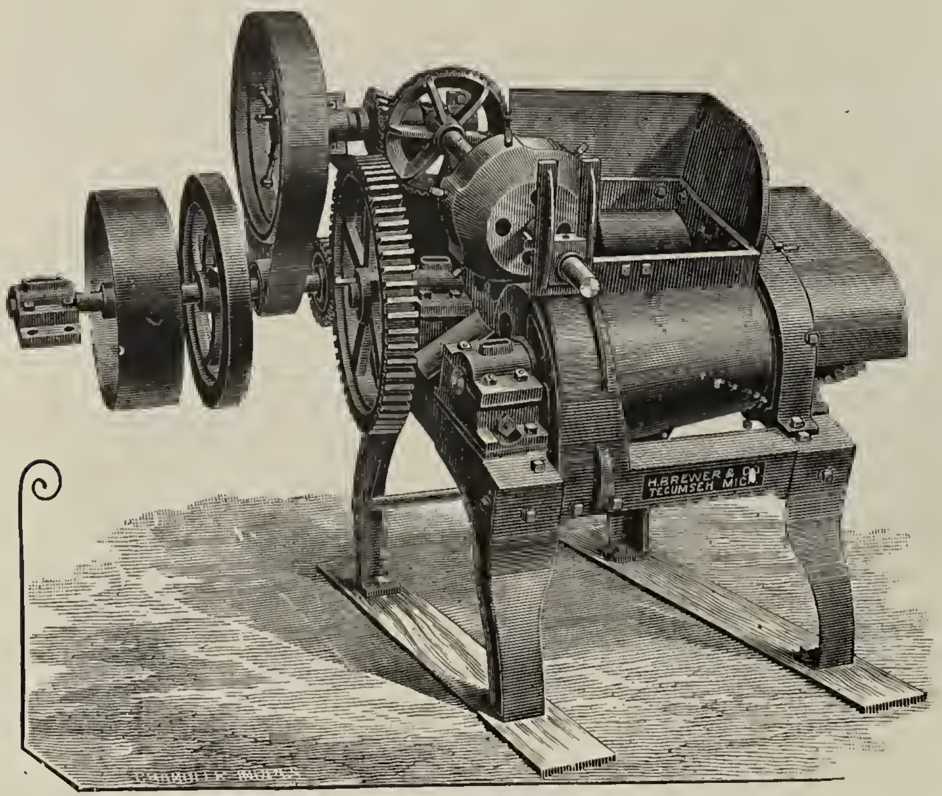
One Iron Horizontal Stock Brick Machine, Disintegrators,
Granulators, Winding Drum, Wire Rope Mould Sanders,
Clay Cars, Barrows, Trucks, Moulds, "T" Rails, Switches,
Shafting, Hangers, Pulleys, Belting, 100 H. P. Engine,
Two 100 H. P. Boilers. Making a Complete Plant.

We are prepared to make estimates on complete plants of any desired capacity. We being manufacturers can save you money, as there are no commissions to pay.

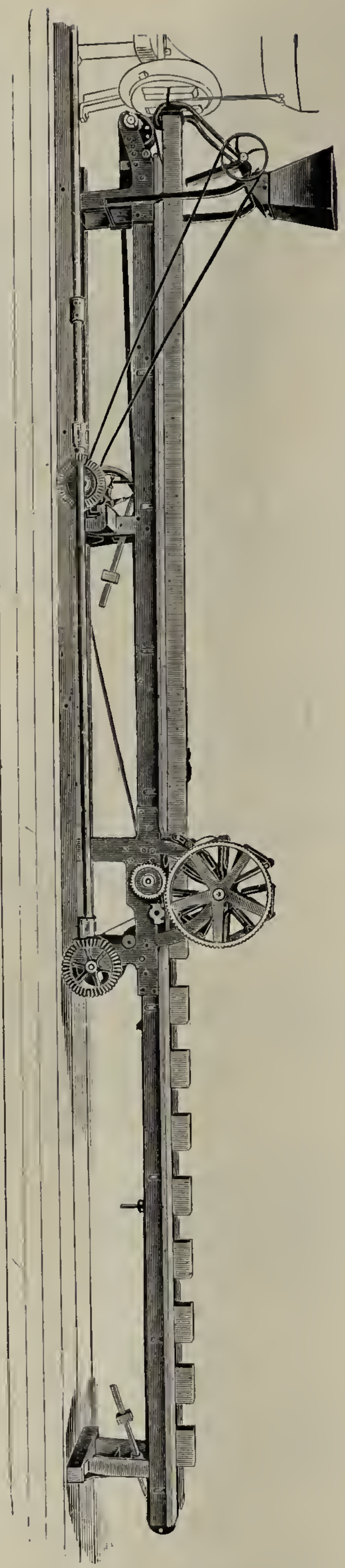
We guarantee results and erect subject to guarantee and trial. It will pay to have our Catalogue and Prices. We are always pleased to quote prices on anything you need.

C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.



STONE EXTRACTING CLAY CRUSHER.

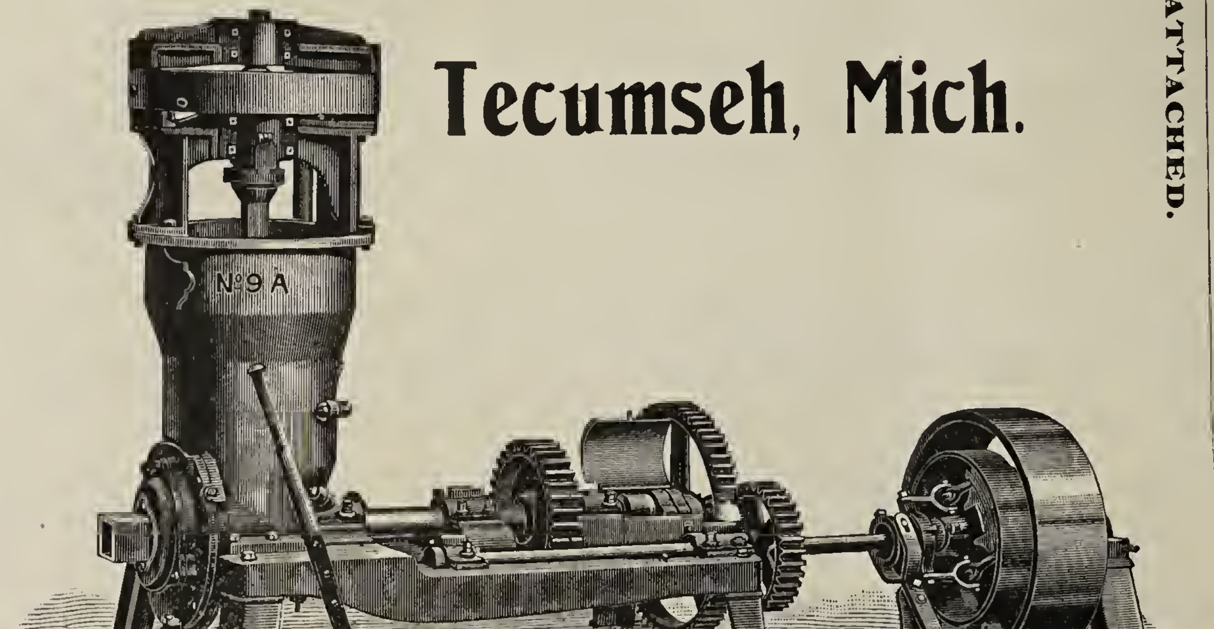


AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

Manufactured by

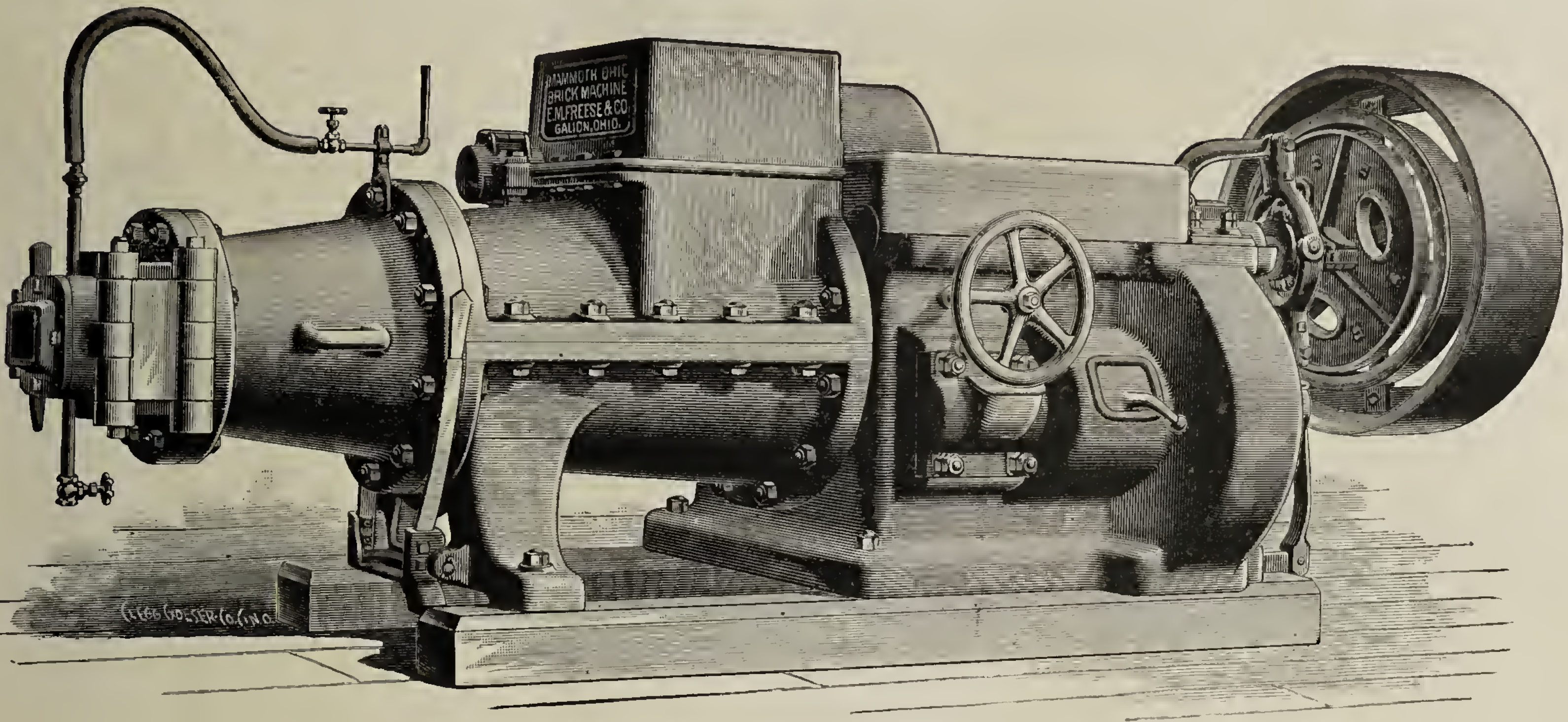
H. Brewer & Co.,

Tecumseh, Mich.

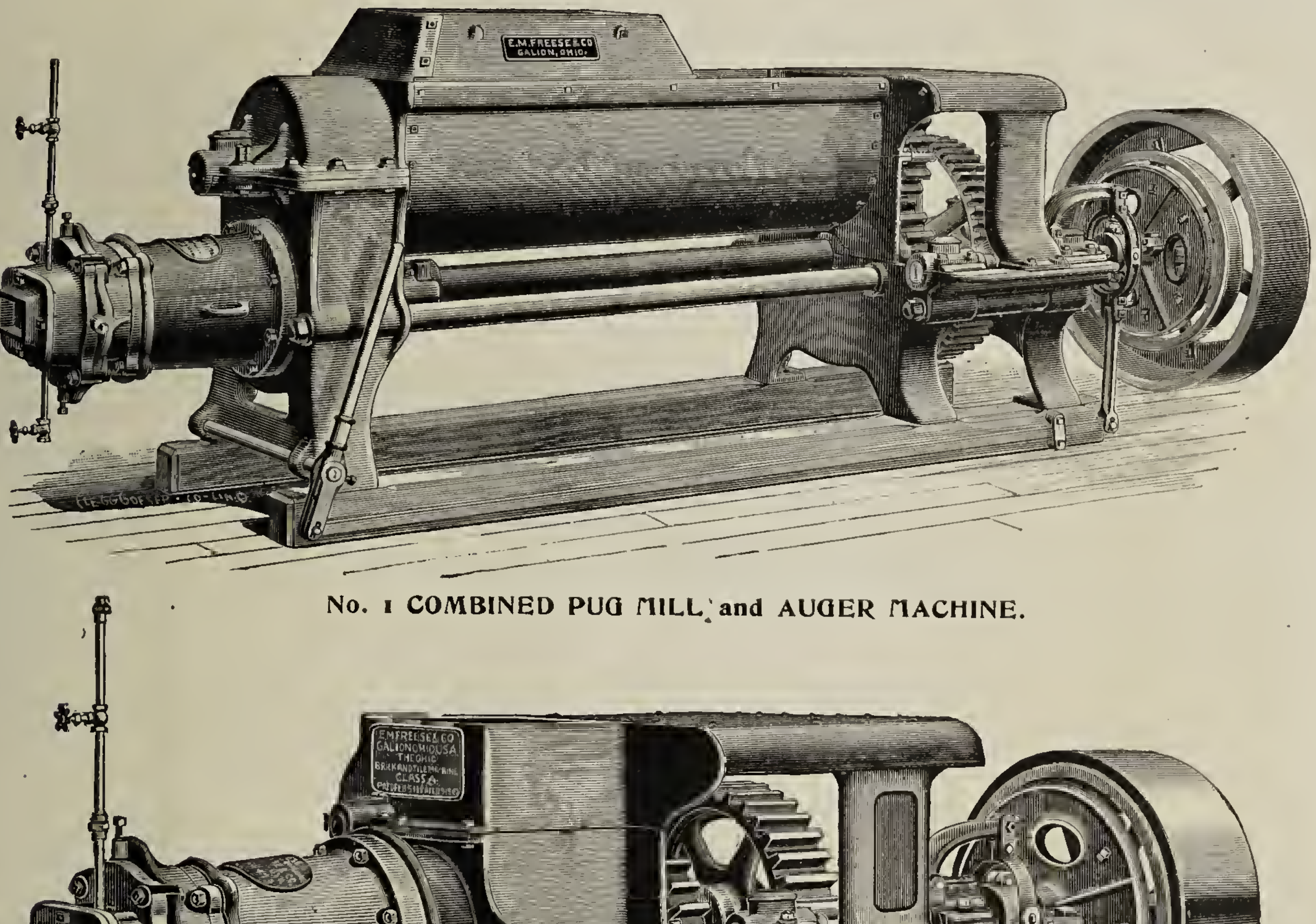


No. 9 "A" BRICK MACHINE.

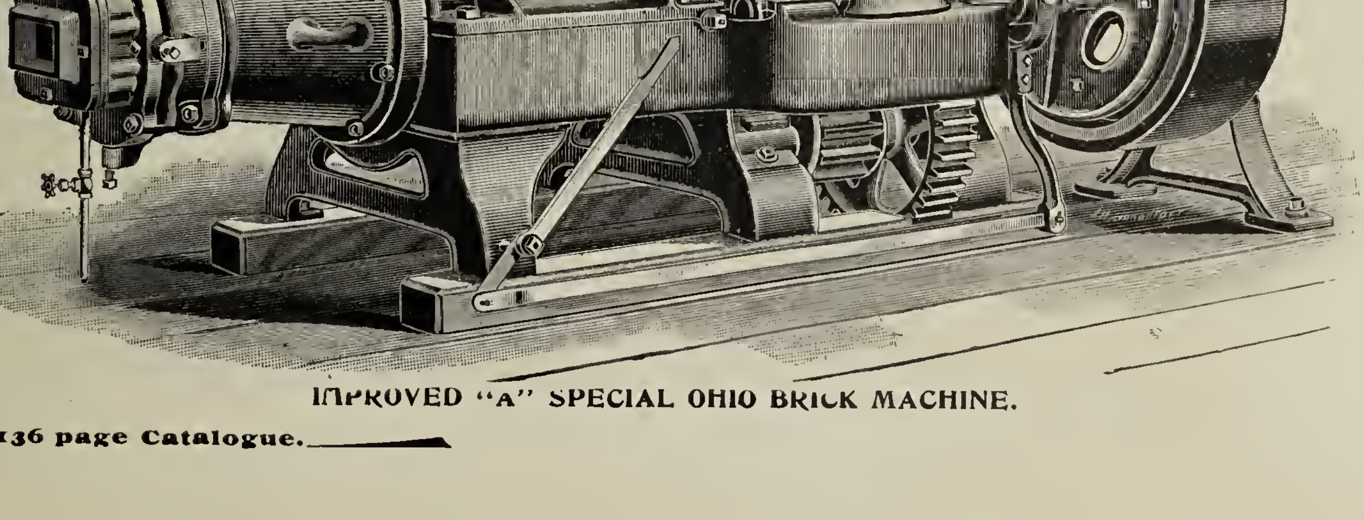
E. M. FREESE & CO., GALION, OHIO.


MAMMOTH OHIO
BRICK MACHINE
E.M.FREESE & CO.
GALION, OHIO.

MAMMOTH BRICK MACHINE.



No. 1 COMBINED PUG MILL and AUGER MACHINE.



IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.

SALUTATORY OF

The American Clay-Working Machinery Co.,

Bucyrus, Ohio,

Successor to
The FREY-SHECKLER CO., Bucyrus, Ohio,
. . and . .
J. W. PENFIELD & SON, Willoughby, Ohio.

To THE TRADE:—

We extend hearty greetings to you, and solicit your correspondence and patronage.

Our combined works at Willoughby and Bucyrus form by far the largest and best clay machinery establishment in the world. Our facilities are the most complete of any. Our perfected system of manufacture enables us to produce the highest grade of clay-working machinery at the lowest cost consistent with good goods.

Our line of Clayworking Machinery is the most comprehensive and complete, in existence. We make an almost endless variety of styles and sizes of Auger and Plunger Brick or Tile Machines, Dry-Press and Semi-Dry Press Brick Machines, Steam and Horse Power Sand-Molding Brick Machines, Automatic, Semi-Automatic and Hand Power Cut-off Tables for brick and tile, Steam and Hand Power Brick Represses, also Dry Pans, Wet Pans, Pug Mills, Granulators, Disintegrators, Crushers, Sewer Pipe Presses, Horizontal Steam Presses, Reduction Mills, Clay Conveyors and Elevators, Winding Drums, Dryer Cars, Clay Cars, Transfer Cars, Turn Tables, Barrows and Kiln Castings,—in fact almost every conceivable form of clay-manipulating and clay-handling appliances. We produce a superior line of Gas and Gasoline Engines. We handle the celebrated Bucyrus Steam Tunnel Brick Dryer, also improved Systems for Brick Burning. We can furnish the right equipment for handling **any** material suitable for the manufacture of clay products.

We are practical Clayworkers, Consulting Engineers and Designers and Equippers of Complete Brickmaking and Clay-working plants. Having the necessary experience, facilities and varieties of patterns at our disposal, we can make a proper selection of machinery and appliances for any condition of circumstances, ensuring a complete, well planned and properly equipped plant, labor-and-fuel-saving, convenient and effective, and fully adequate for the purposes for which it is designed.

WE KNOW HOW.

WE HAVE THE FACILITIES.

OUR PRICES ARE RIGHT.

OUR GOODS ARE GUARANTEED.

Let us hear from you and figure on your requirements. Address

The American Clay-Working Machinery Co.,

BUCYRUS, OHIO, U. S. A.

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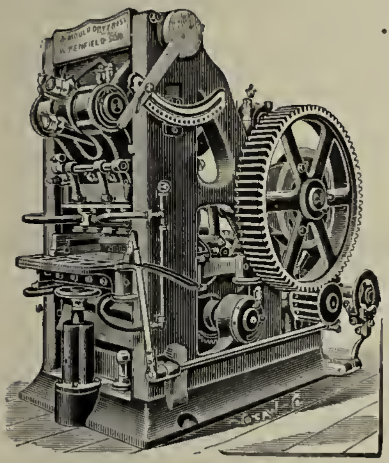
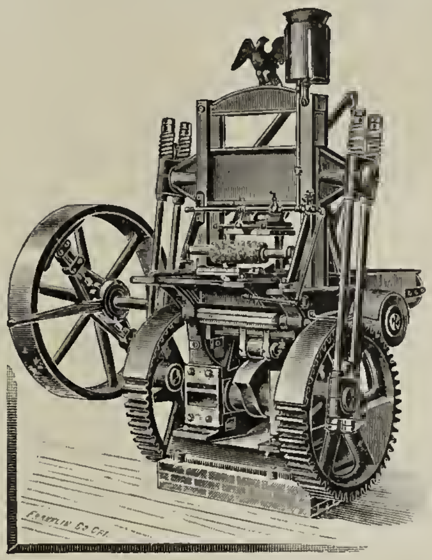
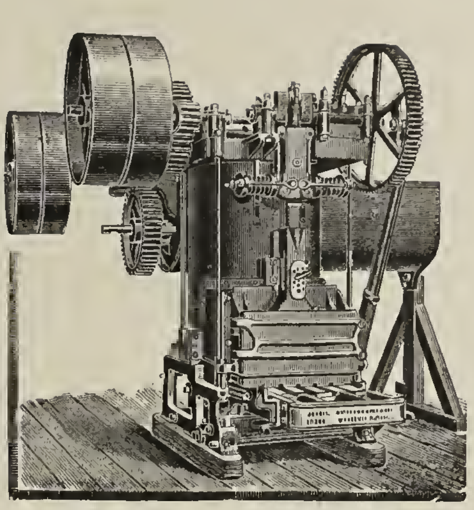


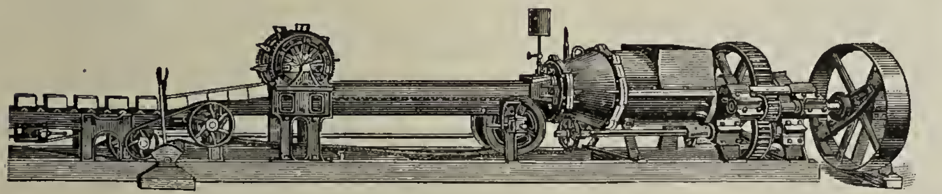
Dry Press Brick Machines.



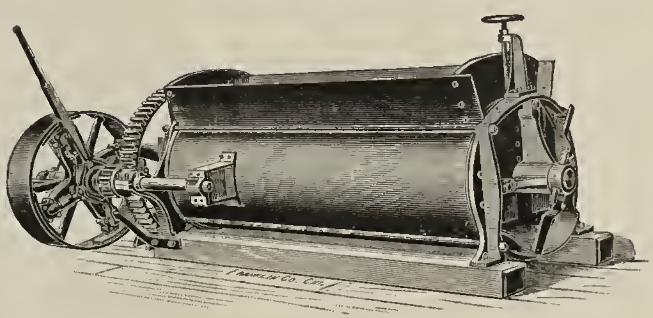
Brick Re-Presess.



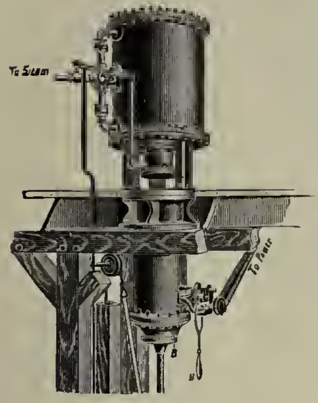
Sand-Mold Brick Machines.



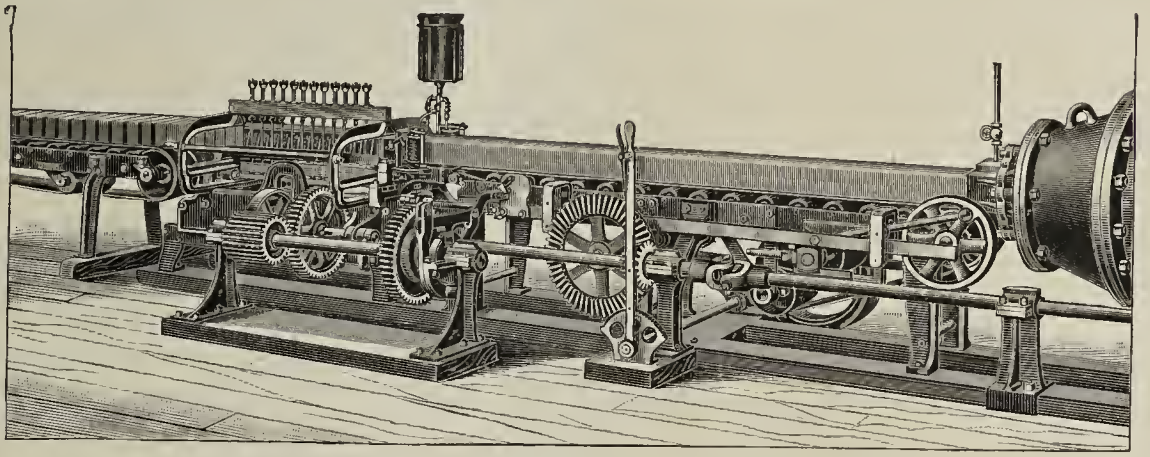
Auger Brick and Tile Machines.



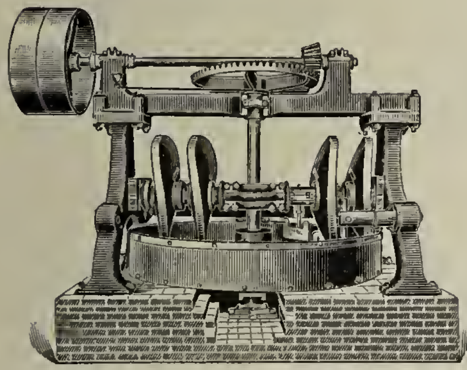
Pug Mills.



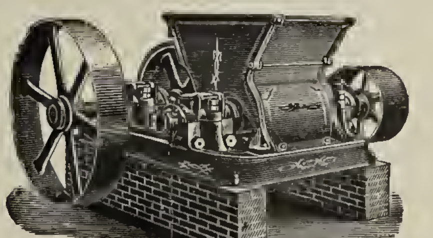
Sewer Pipe Presses.



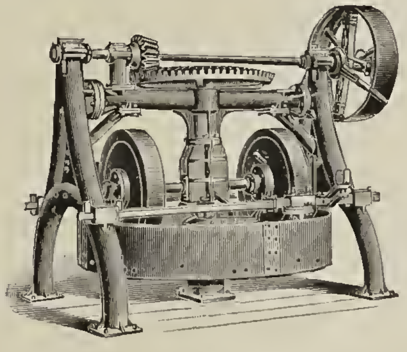
Automatic and Hand Power Brick Cutters.



Special Clay Grinding Mills.



Disintegrators.



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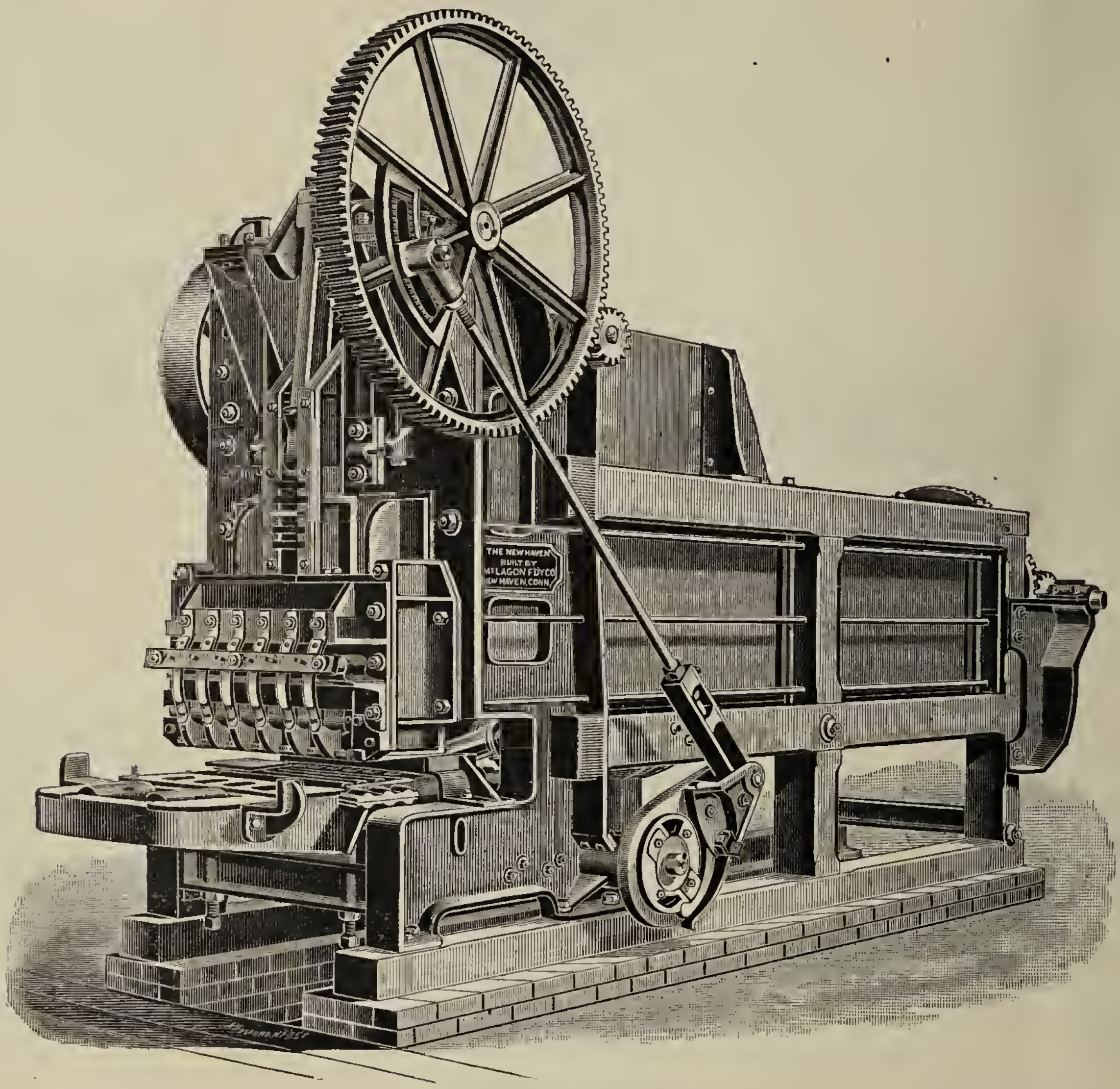

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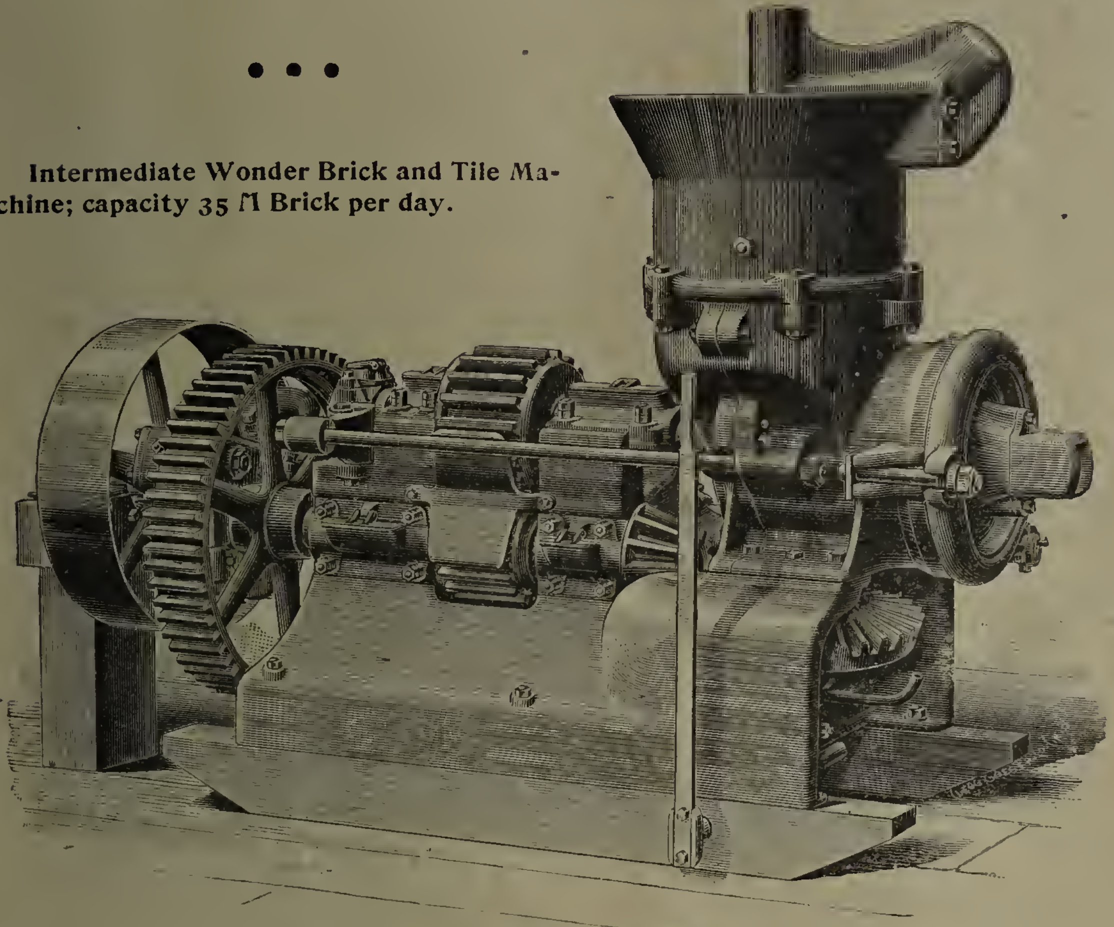

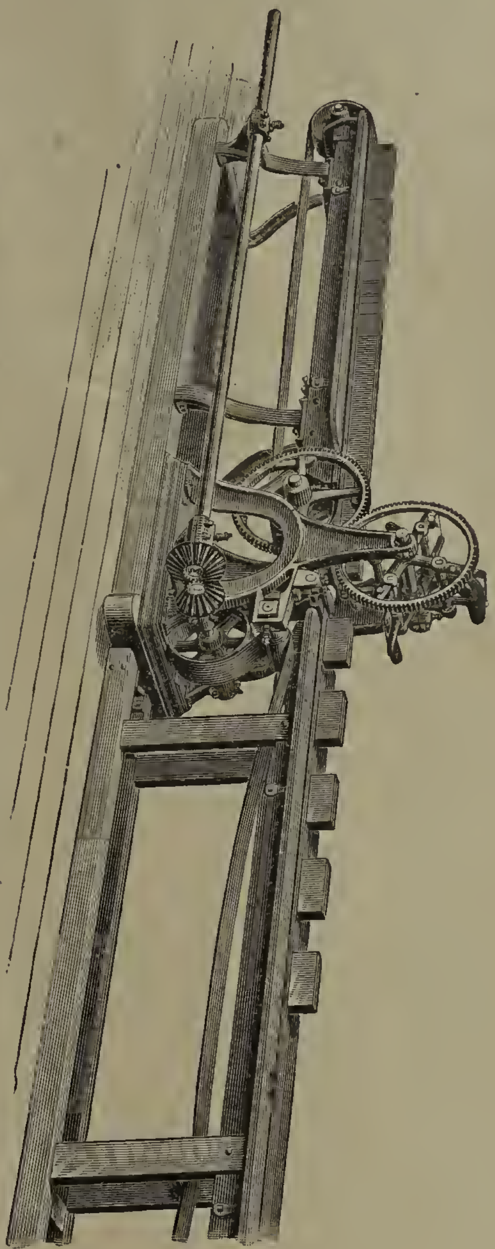

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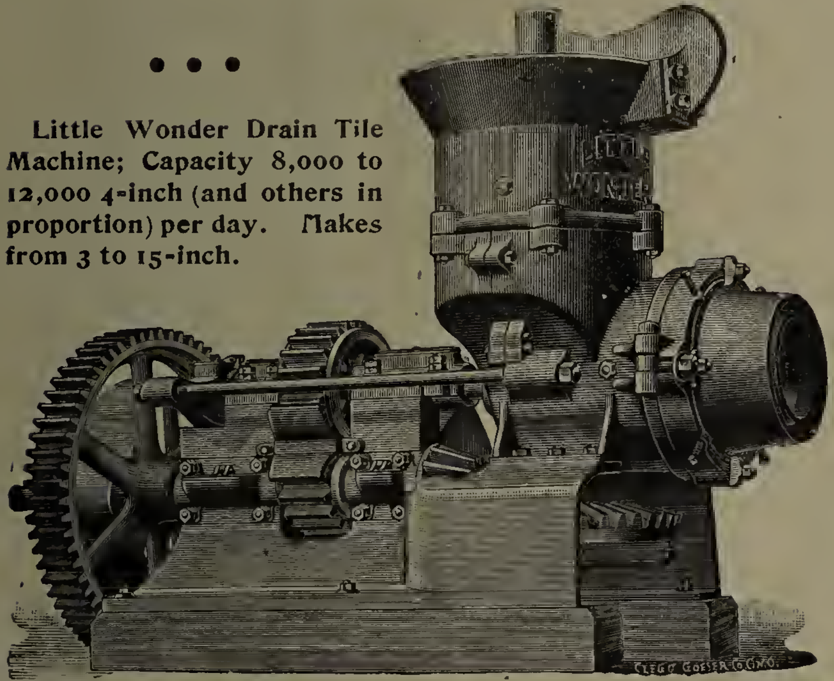

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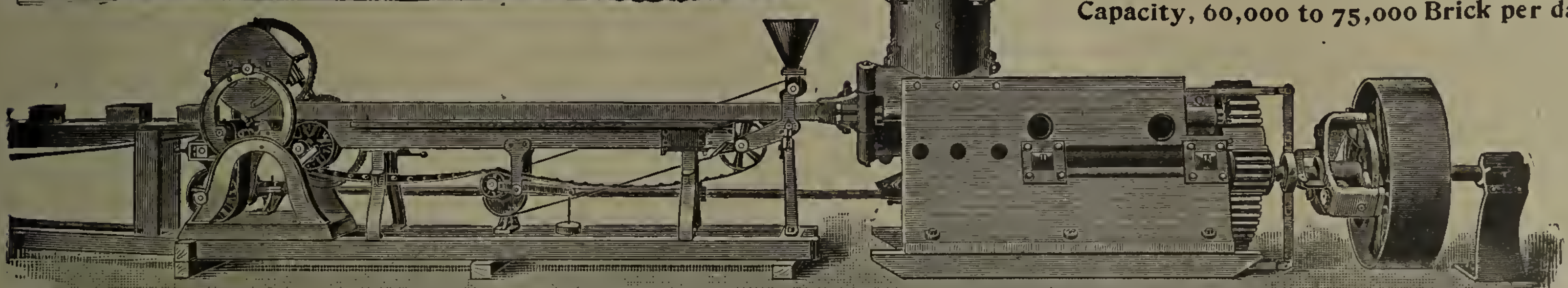

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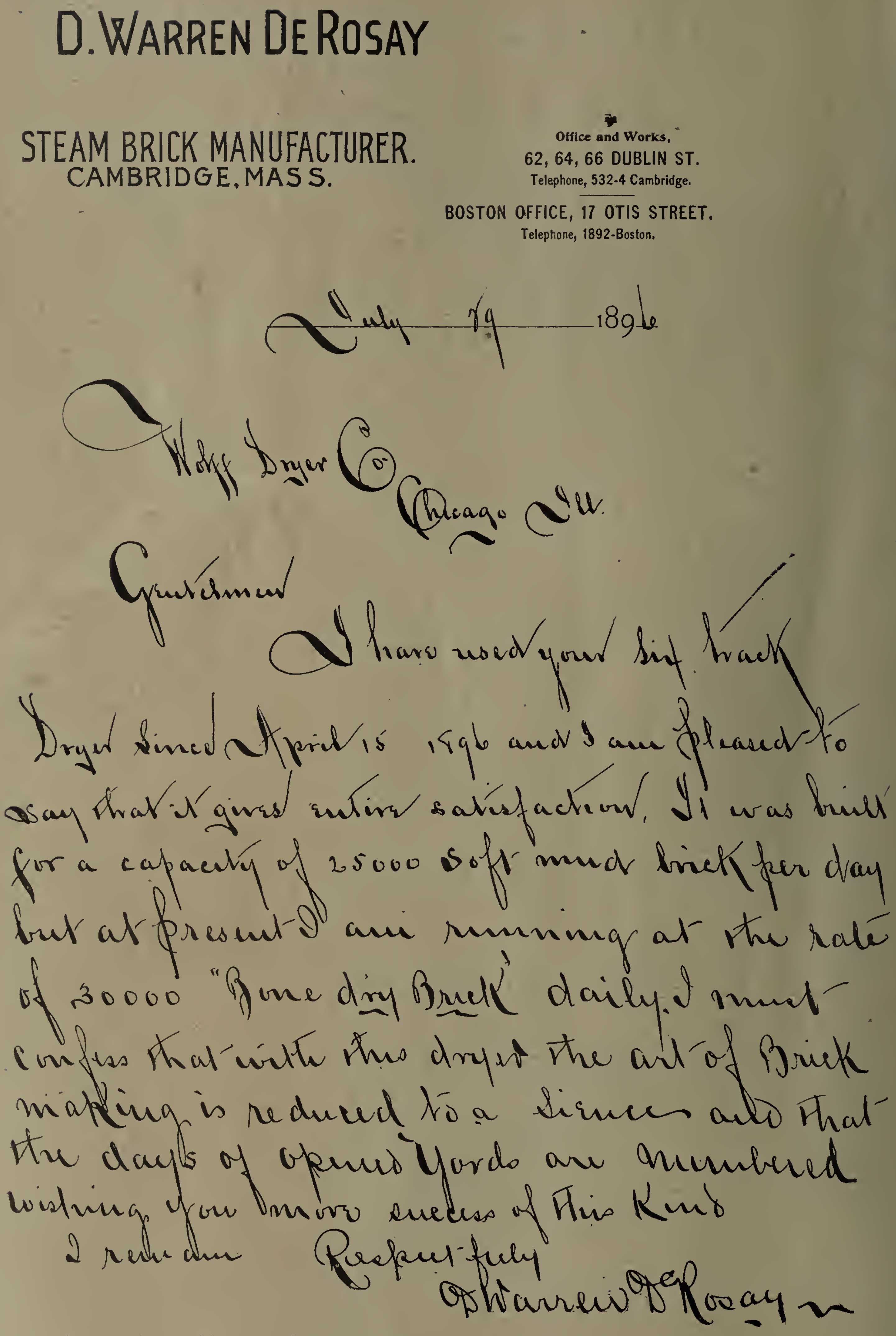

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VOL. XXVI, No. 5. INDIANAPOLIS, IND., NOVEMBER, 1896. $2.00 a Year in Advance

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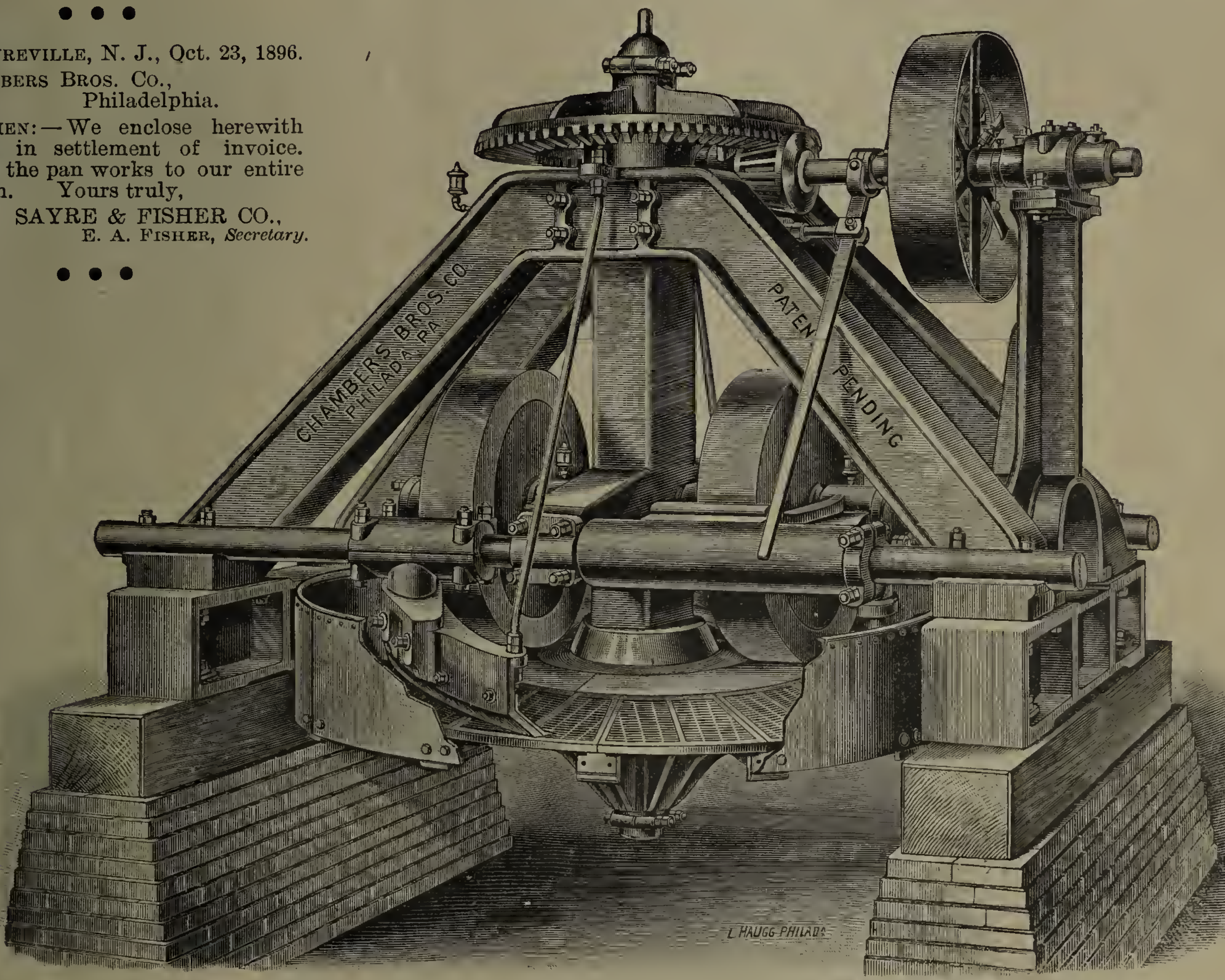

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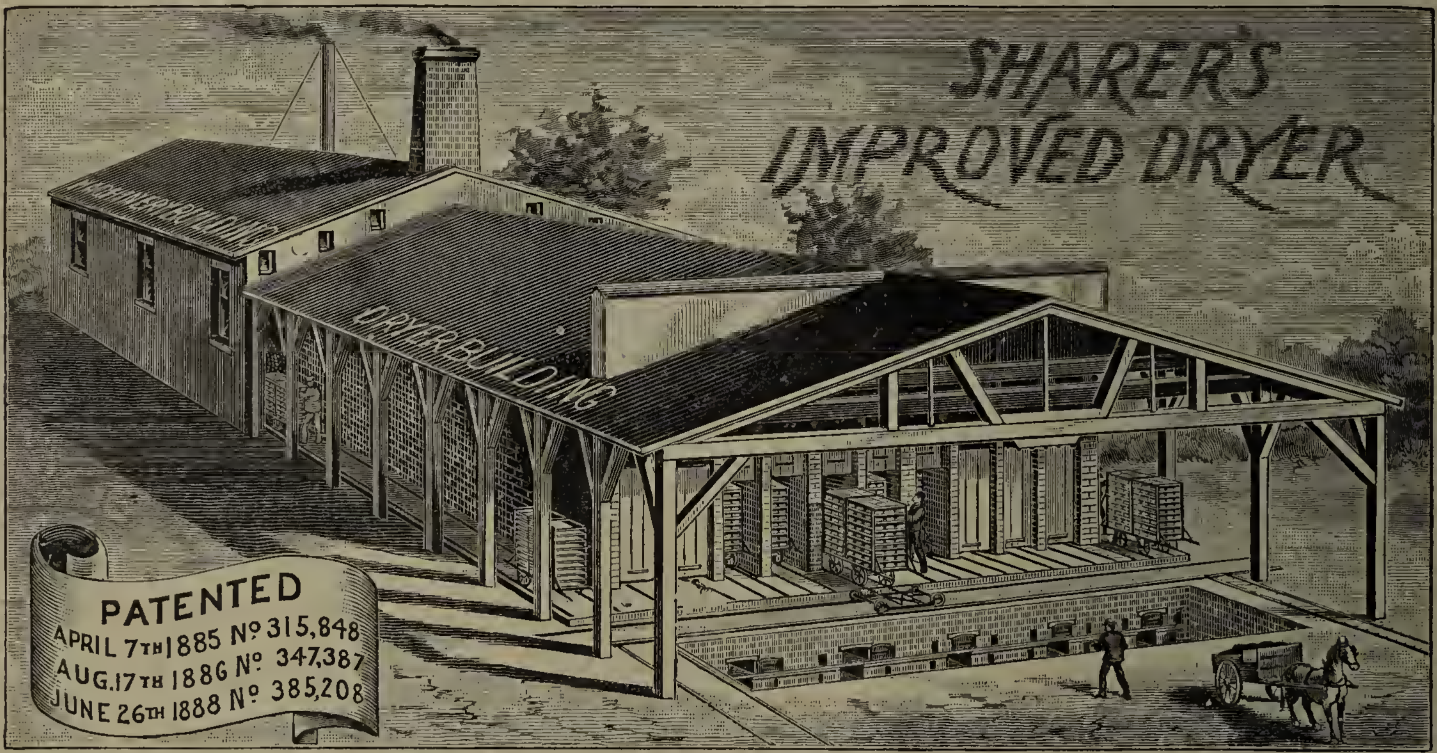
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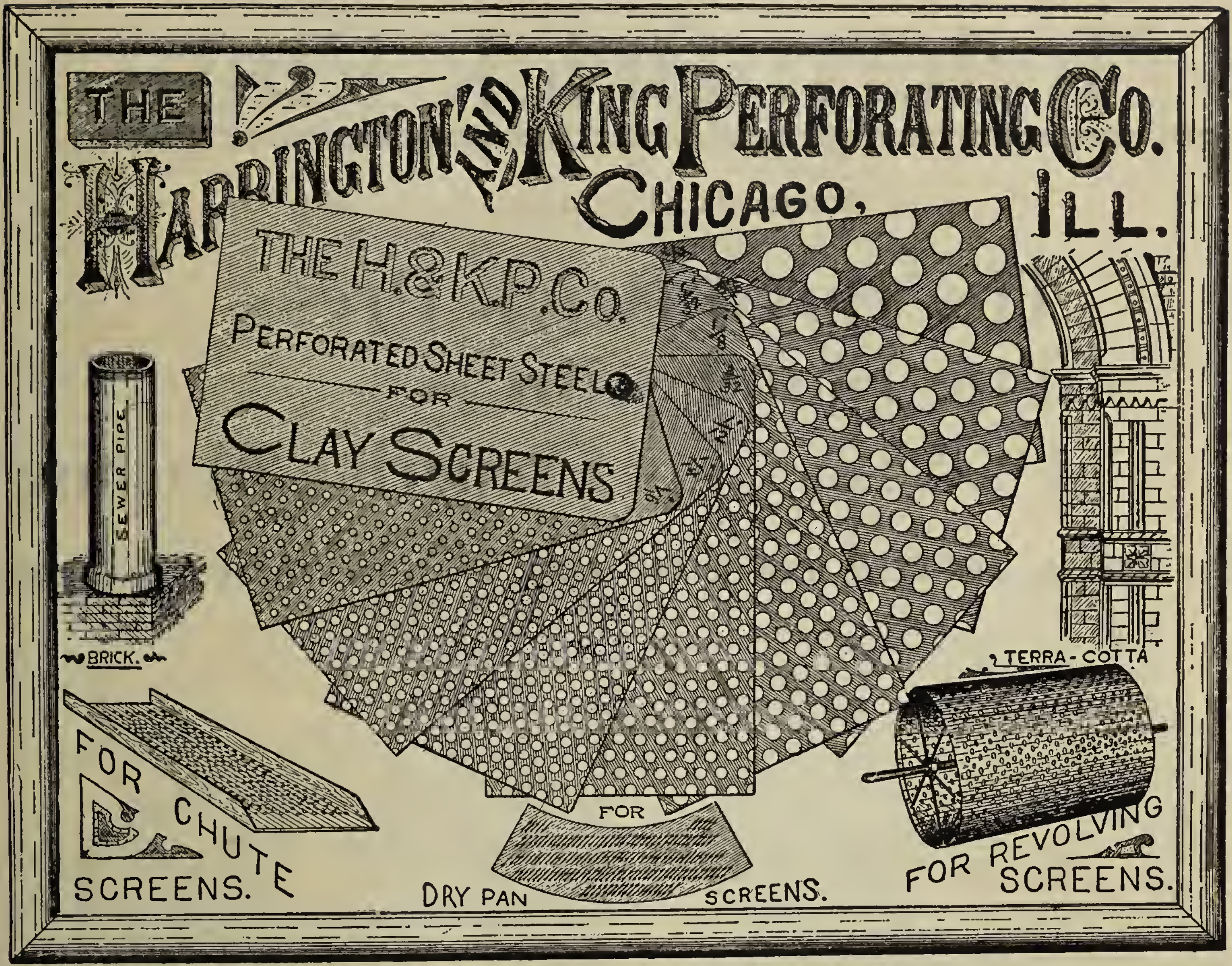
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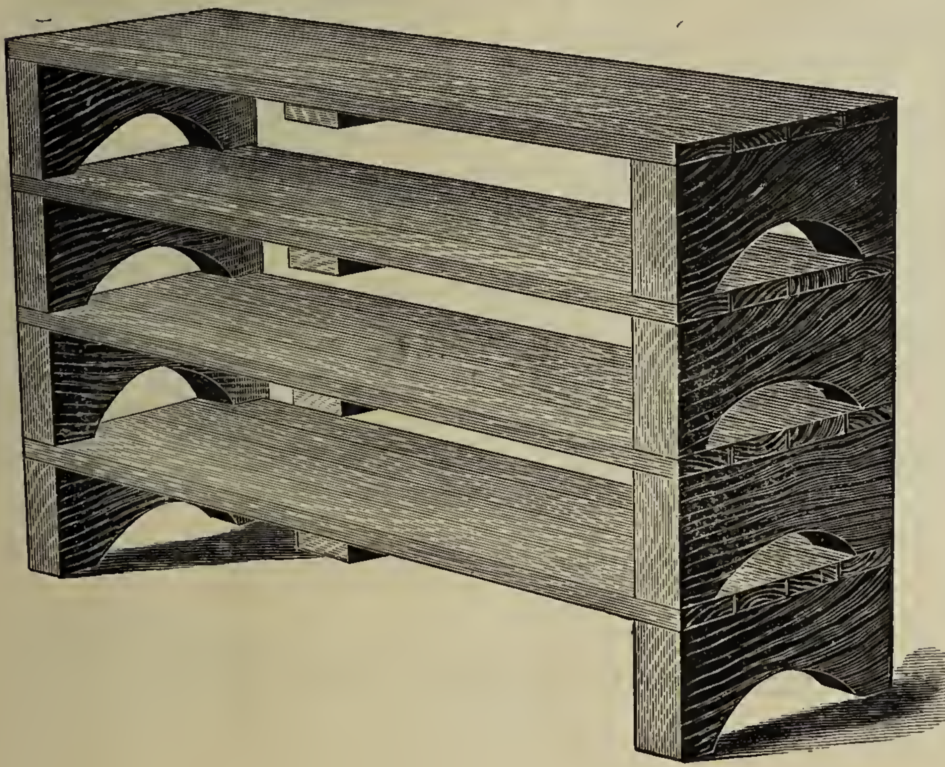

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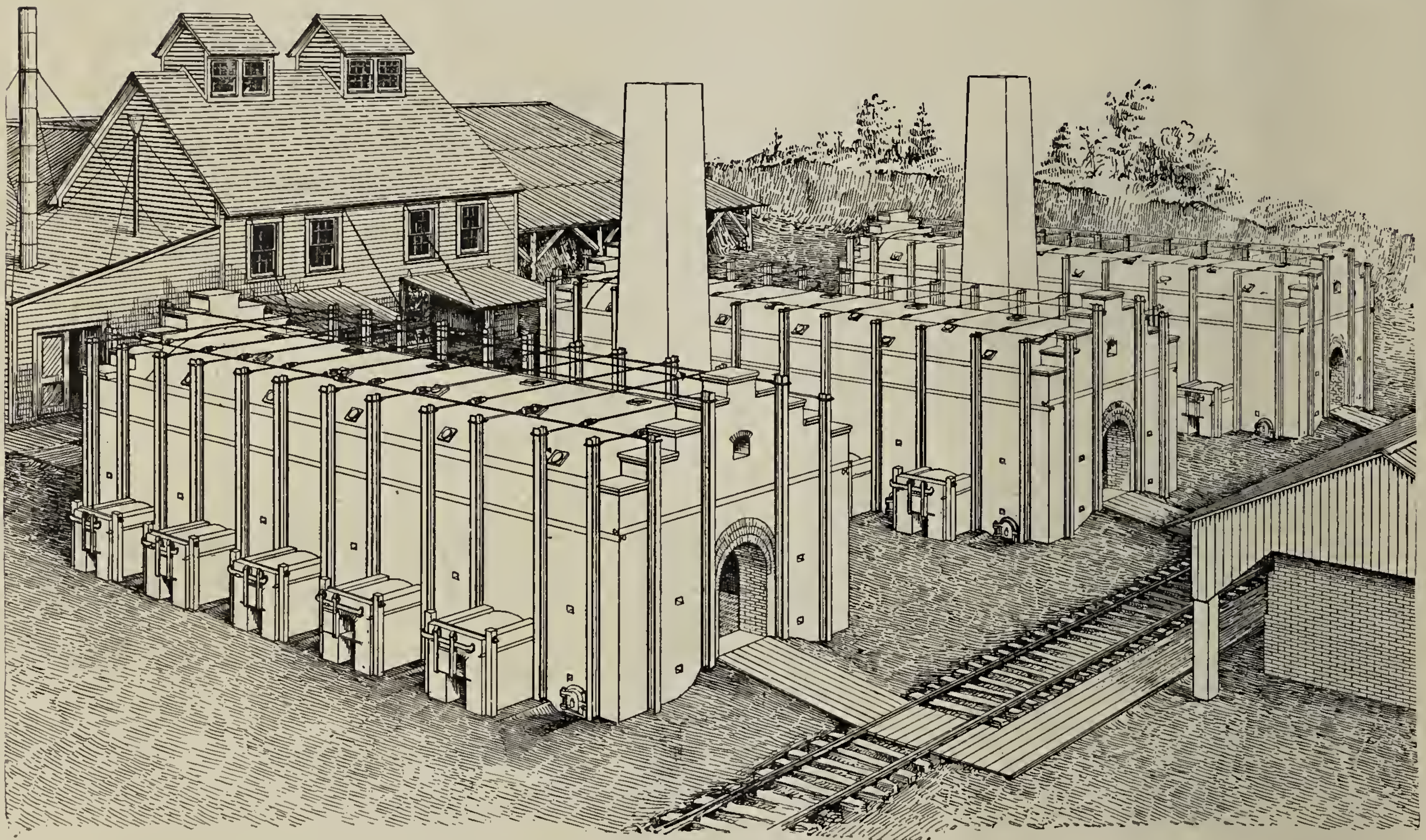
WILL MAKE 95 PER CENT. HIGH GRADE BRICK IN REGULAR EVERY DAY WORK.



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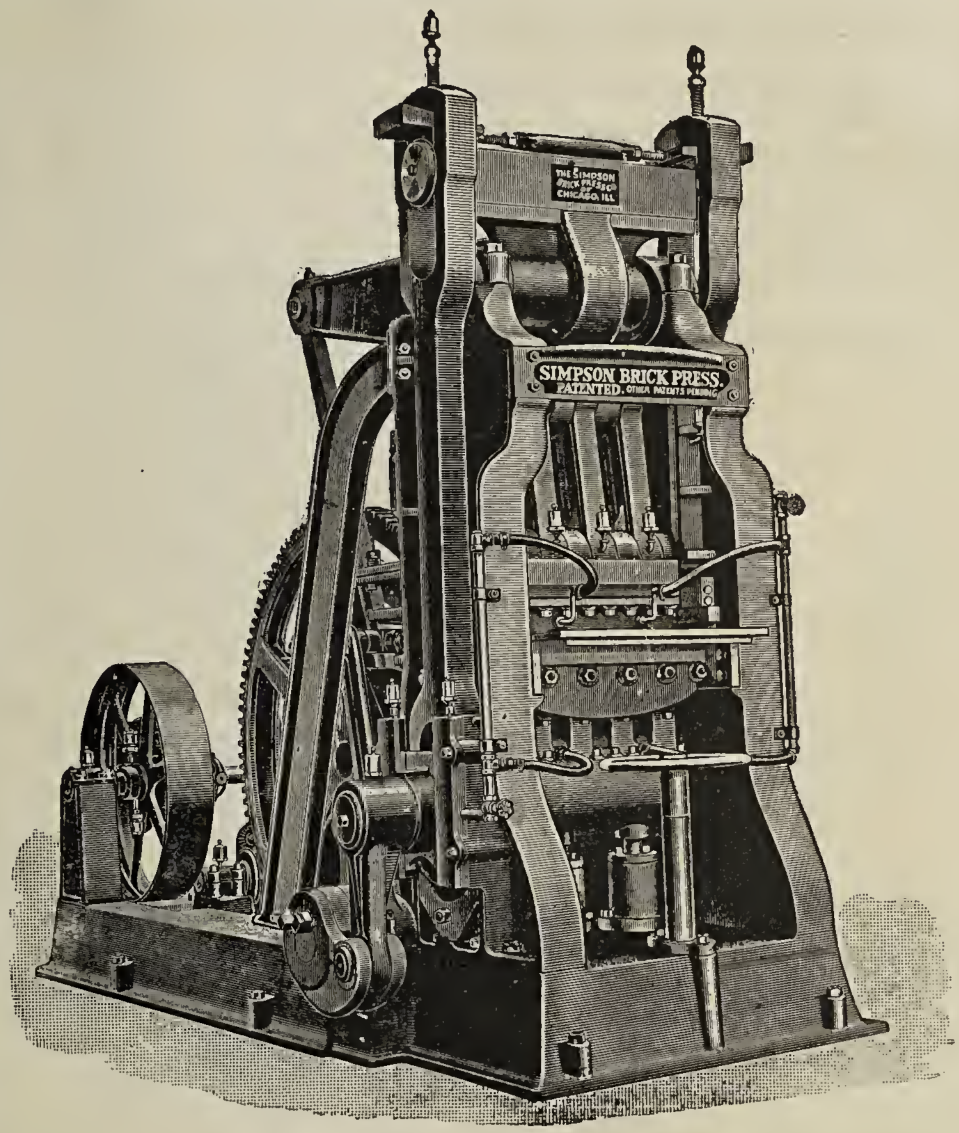

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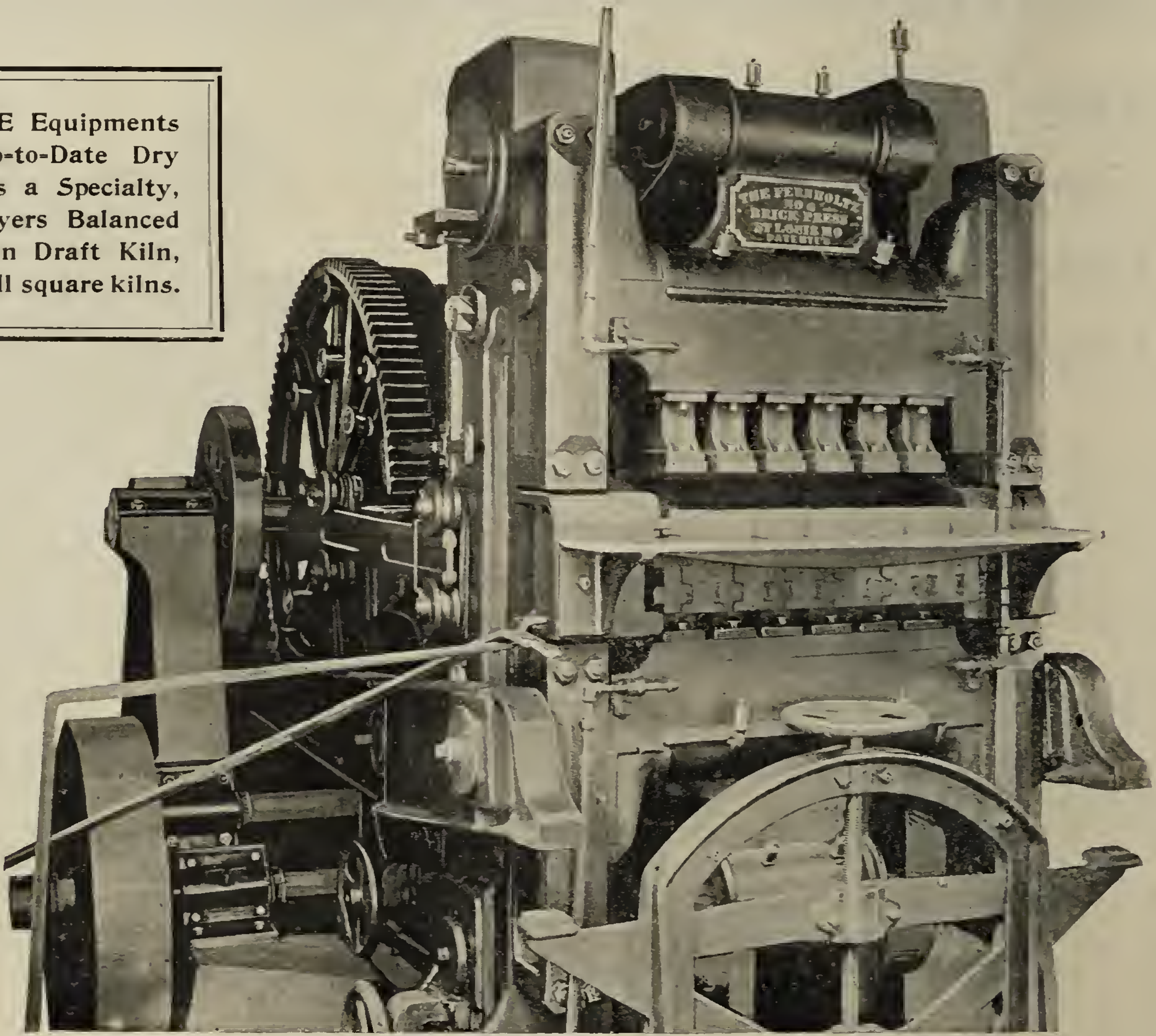

The Fernholtz Six-Mold Brick Press.

We manufacture this press and other machinery in our own shops and guarantee it fully. Our two-mold press is especially designed for ornamental brick of all kinds. **Prices and terms reasonable.**

The opinion of those using our press and full information on application.

The Fernholtz Brick Press Co.,

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Ross-Keller TRIPLE·· PRESSURE Brick Machine.

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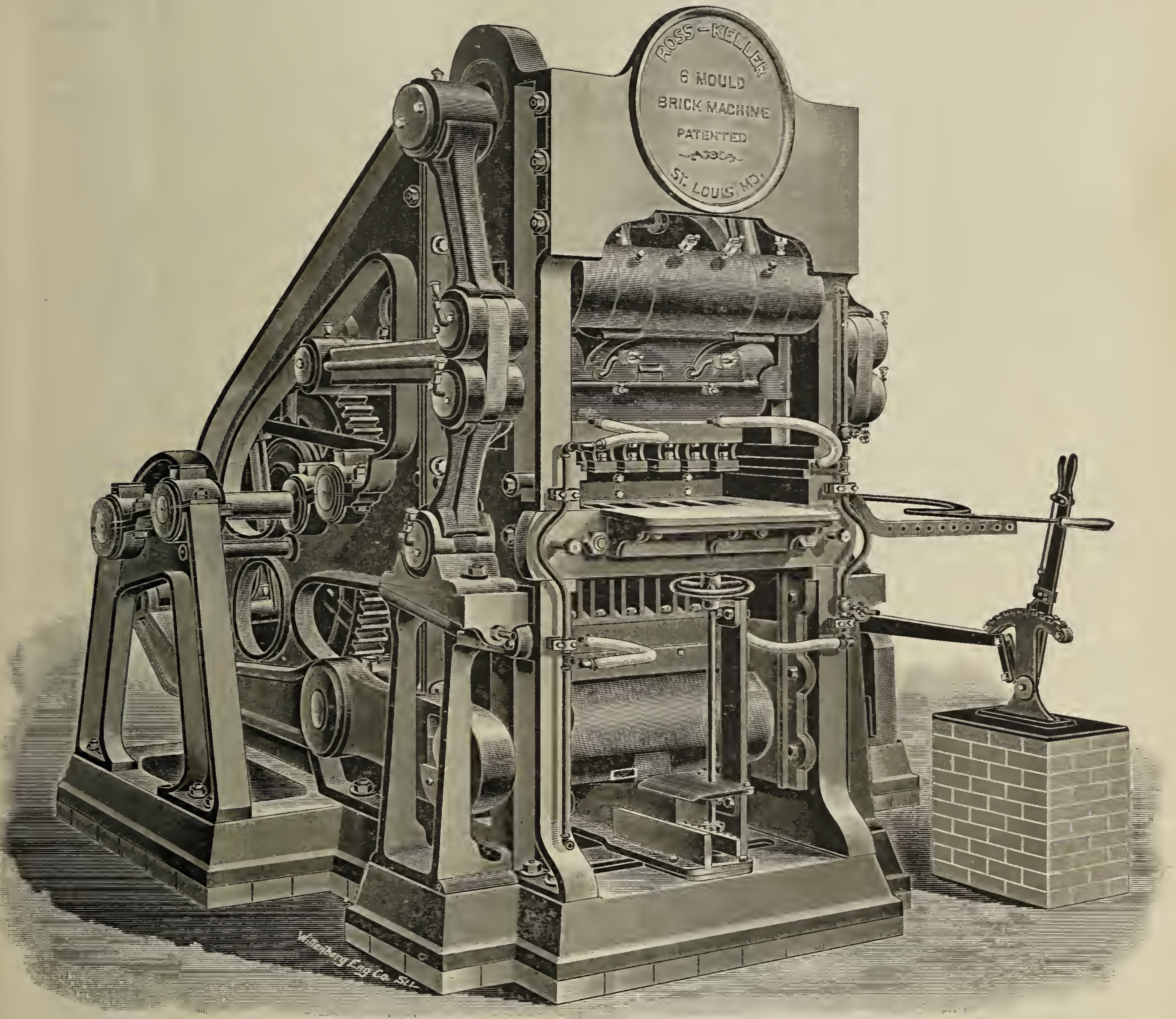

The triple pressure movement of this press, is the best ever embodied in a machine for making pressed brick. Our mould box is 9 inches deep, thus enabling us to make all kinds of ornamental and shape brick, also Roman and edge brick. Requires but one minute to change the brick from one thickness to another. Has twice the pressing power of any other machine, and sufficient strength to stand up under this great strain. Especially adapted for working shale and other similar materials. Presses the brick equally on both sides, and removes every semblance of granulation from face of same. No other machine does this. We guarantee this press and its product superior to any other made.

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All working parts are made of Steel.

The pressure is exerted from both top and bottom; consequently there is no lateral strain on the machine.

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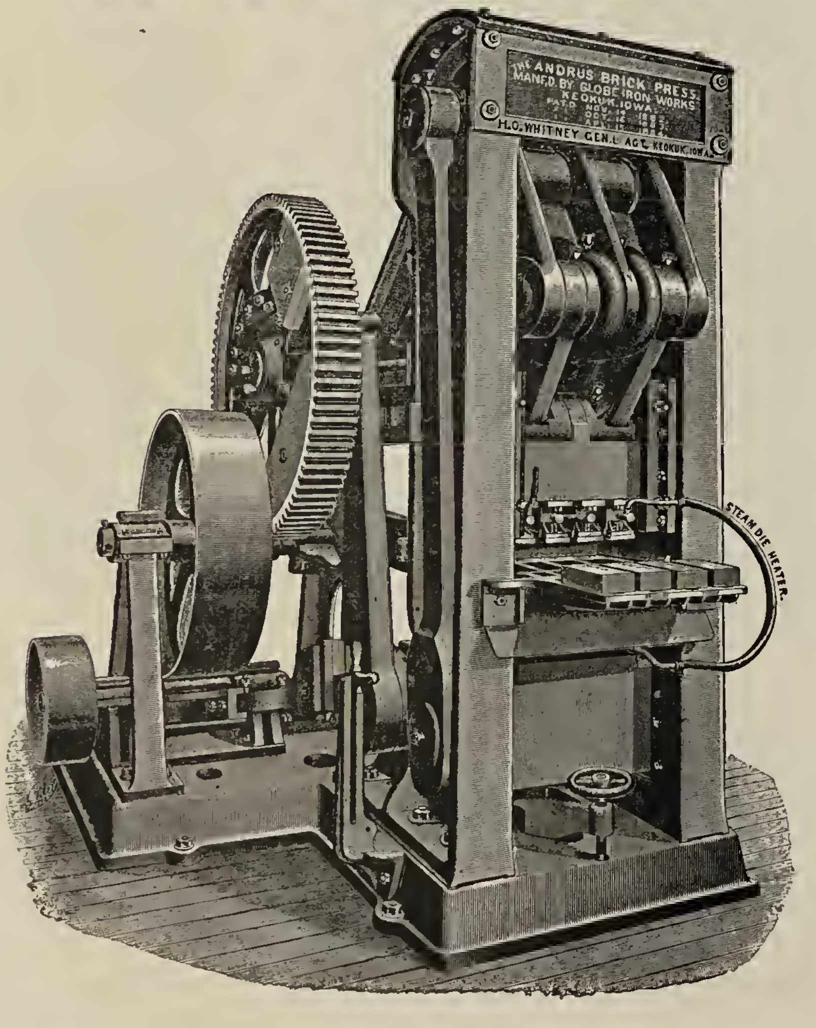
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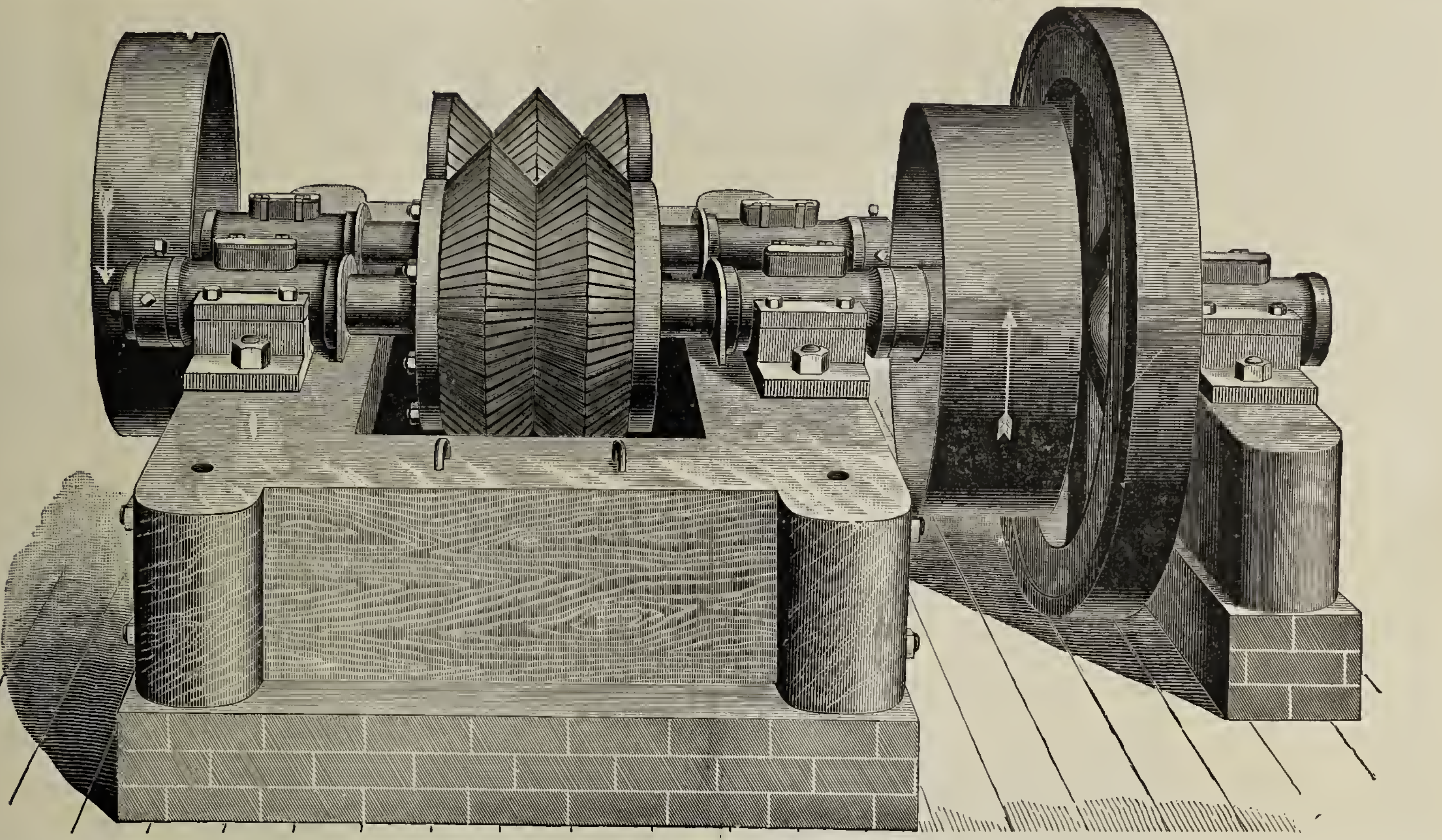

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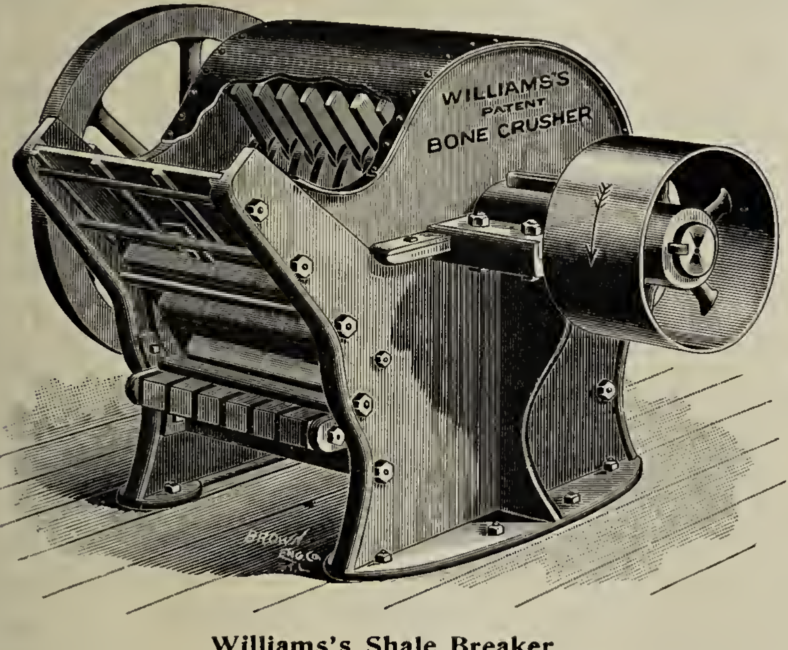

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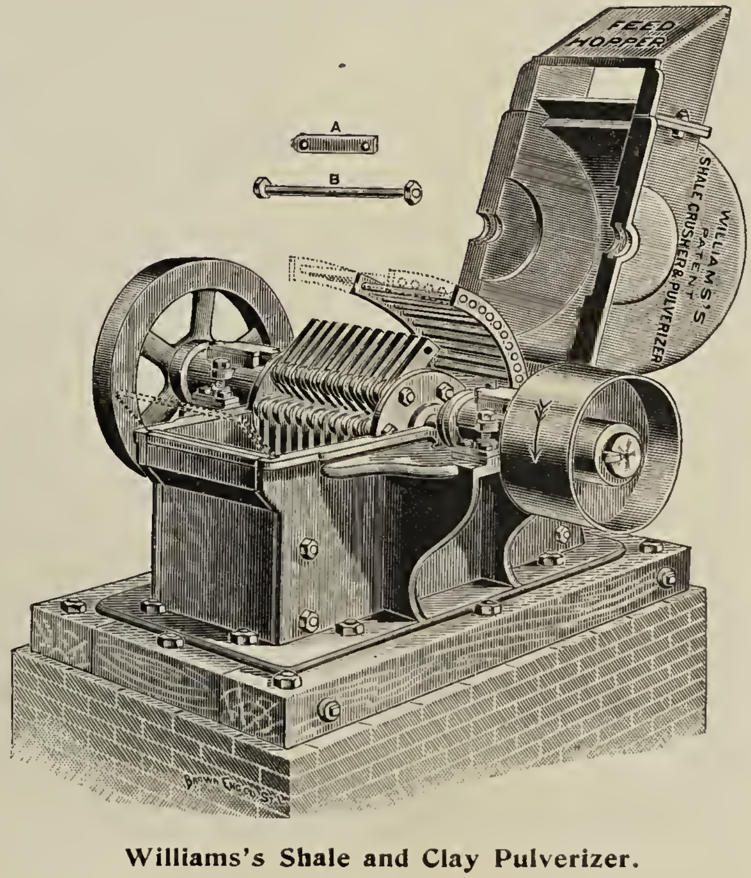
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THE above machines will handle shale and clay to better advantage with less power and less cost for repairs than any other machine known.
Will guarantee them under any and all circumstances.

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Improved Brick and Tile Drier

Is conceded to be the most modern of **ALL** modern Driers.

Its installation will enable you to dry your clay satisfactorily, no matter how tender it may be, and moreover will aid you materially in converting your product into **Gold Dollars,** or their equivalent in the **least possible time.**

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The Standard Dry Kiln Co.,

186 South Meridian St.,
INDIANAPOLIS, IND.

THE CLAY-WORKER

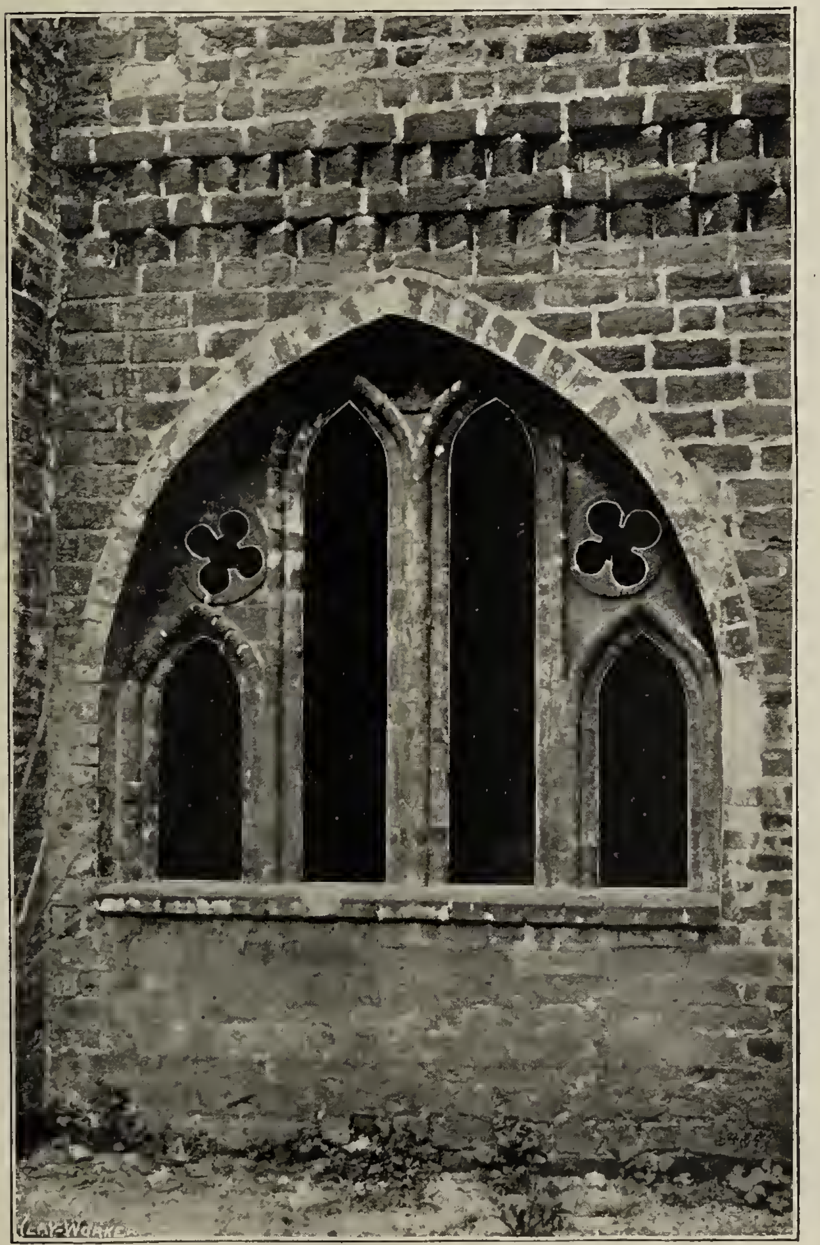
The Official Organ of the National Brick Manufacturers' Association of the United States of America.

Vol. XXVI. INDIANAPOLIS, IND., NOVEMBER, 1896. No. 5.

Written for the CLAY-WORKER.

IN DEUTSCHLAND. No. 9.

LEAVING THURINGIA, our route took us due south into Franconia, the northern province of Bavaria, a pleasant, fertile country, with gently sloped hills, which are covered with vineyards. A number of old towns were passed, as Wuerzburg, a university town; Bamberg, a city celebrated for its ancient churches and ecclesiastical institution, and last, but not least, Nuernberg, a city full of life and energy, the industrial center of Bavaria. However, our destination was Munich, the capital of the kingdom, a city famous for art interests, manifested by its magnificent galleries of paintings and sculpture, its academy, which has given rise to the Munich school of modern painting, and its many buildings of classic architecture. But it was a source of regret to us that brick and terra cotta are not made use of to any liberal extent, the great majority of the modern public buildings being built either of stone, or of brick with stucco facades. In this respect southern Germany differs from the north, where the use of face brick and terra cotta is constantly increasing. Yet there are a number of brick buildings which are worth mentioning. We might name St. Joseph's and St. Anne's Churches, both of them splendid specimens of the Gothic style. In the former buff brick are used, in the latter red brick. Other brick buildings of note are the City Hall, the Central Depot, the custom house, and others.



A 500 YEAR-OLD BRICK WINDOW AT BELZIG.

Munich, like all other European cities, is a city of tenements. Everybody lives in flats, which are from two to six stories high, and are divided and subdivided into suites of from three to ten rooms, of different dimensions, to suit the various classes of the population. Of course, the wealthy have their own exclusive streets. It must be confessed that to a person accustomed to an American city of homes this tenement system seems highly comfortless, and presents a sharp contrast to the cities of our own land, where the majority of families are enabled to enjoy homes in the true sense of the word. The residence streets, lined with the monotonous rows of plaster facades, have a peculiar, cheerless aspect, and one prefers the older parts of the city, where the houses are at least picturesque and diversified, though not built in accordance with modern European ideas of tenement architecture and sanitary laws. However, the old houses are being pulled down, and one historic relic after the other is disappearing.

The landmark of Munich is the old Cathedral, a church, being about five hundred years old. This venerable edifice, rendered conspicuous by its pair of steeples three hundred feet high, which are crowned by odd-looking cupolas, is built of brick, and, to all appearances, is as substantial as ever, furnishing a good proof for the durability of hand-made brick. It is clearly shown that the old fellows understood the art of making good brick. It seems that they paid much attention to the preparation of the clay, for the regulations of the old guild prescribe careful "treading." On close examination such an old brick showed a fine grained structure. Few brick on the outside of the church walls seem to be vitrified, but all are burned hard.

The Tutzing Roofing Tile and Brick Works, Tutzing.

The brick for the Munich market are furnished by a large number of hand-molding yards on the east side of the city. These yards offer very little of interest to the observer. The brick are made in the usual manner and burned in continuous kilns. Of the products it can only be said that they are, as a rule, poor specimens of brick; that is, they are badly molded and are burned in various degrees of hardness. The brickyard work is mostly done by Italians, who come in gangs every spring to work through the season, and return to Italy in the fall with their savings. These people lead a life unworthy of human beings, living in sheds and subsisting upon the coarsest food. On venturing into a den inhabited by them we did not care to stay longer than a few minutes, for the place was simply awful. The furniture consisted of straw ticks, serving as beds, rude benches and tables. The cooking was done in immense kettles, and cleanliness did not seem to be considered necessary for comfort.

There are only two or three brick works near Munich which produce high grade brick. One of these is the Munich Brick Company, having its factory at Bogenhausen, just outside of the city limits. This concern is a large and well-established one, and stands comparison with the best factories in northern Germany, such as described in the preceding papers. The clay they work is of a very pliable nature, but very strong. It is prepared by running it through crushers and pug mills provided with sieves at the discharging end. The brick are made with auger machines. Besides brick, roofing tiles are manufactured. Three auger machines were in use at the time of our visit, one for brick, one for roofing and one for sidewalk tiles. For the repressing of the roofing and paving tiles two power represses and one hand press are in use. In transporting the green and burned goods tram cars are employed. The establishment has four continuous kilns, one of which is fired with gas by the Mendheim system. In the latter the paving tiles are burnt. Of the other kilns, two are provided with Haedrich fire walls. Thus the roofing tiles can be burned with less waste than could be done in the ordinary kiln. In order to obtain uniformly colored roofing tiles they are coated, when green, with a clay slip, containing a large percentage of ochre. The works are kept in excellent condition, and only native workmen are employed.

Another concern which has been celebrated for its fine buff brick and terra cotta, used in the construction of the City Hall and a number of other buildings, are the Polling Clay Works, situated at Polling, a small place south of the city. A visit to this factory proved, however, disappointing, as we found the factory in a dilapidated state, being, as we were told, only a shadow of its former prosperous condition. The material they use is a calcareous clay, similar to our Milwaukee clay.

A striking difference is noticed between the North Germans and the Bavarians. While the former are of a calculating, cool and reticent disposition, the latter are jovial and frank to bluffness. The Bavarians are very attached to their country and anxious to keep up their old customs. For this reason they are ever suspicious of their neighbors, the progressive Prussians, and it can safely be asserted that Bavaria, especially upper Bavaria, is the most conservative part of Germany.

—A Paving-Tile Factory.—

Near Munich, situated down in a deep gorge, between the swiftly running River Isar and a steep bank, is a flourishing clayworking concern, the Grosshesselohe Paving-tile Works, making a specialty of sidewalk tiles. As to the products of this factory, we can only say that they enjoy a wide reputation, which they richly deserve. In fact, we cannot remember having seen any ware better adapted for this purpose, excepting the expensive Mettlach tiles.

The tiles, which are made in different sizes and patterns, the ordinary ones being about eight inches square and one and one-half inches thick, are thoroughly vitrified, and of a peculiar bluish color, resembling that of the English blue ironstone brick, have almost the hardness of steel and it is almost impossible to break them. Though completely vitrified, they do not exhibit a glassy luster, but show a dense, dull-colored structure. These tiles have been manufactured for the last thirty or forty years, and millions of them are put down in the streets of Munich and other cities, giving excellent satisfaction.

A visit to the factory proved quite interesting. The clay they work is a strong, plastic material, mined out of the bank of the river. The clay is allowed to weather, being dug and exposed to the frosts of one or two winters. We have been told that it is treated with liquid manure in order to facilitate the process of weathering, but we cannot take the responsibility for this statement, as we did not see it done ourselves. After being crushed and pugged, the clay is shaped into slabs and pressed into tiles by a powerful hydraulic press. The drying is done on racks, with steam heat. The kilns are small, oblong, down-draft kilns, holding about eight or ten thousand tiles each. A high temperature is applied, and the ware is subjected to the influence of reducing gases from time to time. This is, of course, done by limiting the supply of air to the furnaces. It is claimed that brown iron ore is mixed with the

The Von Miller Roofing Tile Works, Eirenberg.

clay, but we were not able to verify this statement. Besides being put down for sidewalks, the tiles are extensively used for the floors of stables, breweries and similar places, where they are always in contact with ammoniacal or acid liquids.

The strata of clay producing this excellent quality of material is not very extensive. Other clayworkers in the vicinity are endeavoring to imitate these tiles, but do not seem to meet with great success. Salt glazing is sometimes resorted to, but a few years' wear shows the difference between the true material and the imitations.

Fire Brick Works, Eisenberg.

—An Excursion to the Bavarian Mountains.—

On a leisurely excursion to the promontories of the Alps, the Upper Bavarian mountains, whose bold outlines are clearly seen from Munich, we were enticed by the beauty of a mountain lake, the Harnberg lake, to stop at Tutzing, a village nestled closely to its green waters. This place would be a truly idyllic village were it not for the ubiquitous summer resorts and pensions, which are numerous here.

At this place we came across a small clayworking concern, the Tutzing Tile Works, whose products, roofing tiles, are quite celebrated for their excellent quality. The factory, which is situated about a mile from the village, is built down in a narrow valley, and presents quite a picturesque aspect. The material, a plastic clay, is conveyed to the factory in wheelbarrows, the bank being within a hundred feet of it. The interlocking tiles are made in the usual manner and burned in a continuous kiln, fired with gas distilled from peat, which is a material abundant in this vicinity. Peat is a dark brown organic substance resulting from the decay in water of a luxurious moss vegetation. This substance is of a fibrous structure, but at its lowest depths is changed into an even spongy mass. Moist ground is absolutely necessary for its formation, and the lake region of upper Bavaria is well adapted for its growth. The peat, or, as it is sometimes called, turf, is dug in a systematic manner, either by digging it with spades into somewhat regular pieces or by shoveling it into auger machines and molding it into brick. In both cases the material is dried thoroughly. A peat bank is highly interesting. The moss growth at the surface gradually loses its vegetable character, and beneath the surface of the water assumes the peaty structure. The depth of a turf bank varies from fifteen to eighteen feet. Peat seems to be an excellent fuel, and it has the great advantage of being cheap. As a gas producing material it also seems to be satisfactory. The only obectionable feature about the kiln was the strong creosotic odor of the peat gases.

This factory appeared to us to be a characteristic type of the average Bavaria clay plant. Everything was done at a leisurely rate, and even the engine seemed to be inclined to go at an easy pace. In the way of a novelty we observed a drain pipe press, worked by hand power, a crank being attached to it. We could not learn the capacity of the machine, but it seemed to be an easy problem to compute. At the time of our visit some brick were being made by hand at the rate of 1,200 per man and day.

—Old Brick Buildings.—

Scattered all over this part of Bavaria are old buildings, some of them being highly interesting from the historical standpoint, and even from the standpoint of the brickmaker. Most of these ancient, generally ecclesiastic edifices, are built of limestone, but occasionally a brick building is discovered, showing some excellent work on the part of the bricklayer and brickmaker. Our cut shows the brickwork of a window in a convent building at Belzig over five hundred years old.

—Leaving Upper Bavaria.—

In due time we were compelled to start on our return journey towards the North sea. On this trip we intended to take in western Germany. Thus we left Munich for Mannheim, stopping en route at Augsburg and Stuttgart, the latter city being the capital of Wurtemberg. At Mannheim it was our intention to visit a large stoneware concern in the vicinity making a specialty of chemical ware, but fate seemed to be against us, for we were not admitted. By the way, that factory has a large export trade with the United States. It is to be hoped that the time will soon come when our country will have no need of foreign clay goods of any description.

—The German Railroads.—

Having had occasion to make use of the German railroads quite a little, it will, perhaps, not be out of place to touch briefly upon their characteristics.

The roadbeds are of the most substantial kind and are kept in a splendid condition. At frequent intervals along the line houses are built for the guards, whose duty it is to patrol the track and to attend the gates, which are to be found at every crossing. The stations are nearly always built of brick, with spacious and comfortable waiting rooms, with which a restaurant is connected. Even small places boast of substantial station buildings. The railroads being owned by the government, no expenses are spared in this respect, and some of the depots are veritable palaces.

Clay Mines near Gruenstadt, Palatinate.

American passengers have much fault to find with the rolling stock. The passenger coaches are short, divided into compartments, which are poorly ventilated, and have an unpleasant way of shaking and pitching, totally unlike our smooth-rolling cars. This, however, does not apply to the through trains, which have cars of the American style.

—In the Bavarian Palatinate.—

At Mannheim we crossed the Rhine and invaded the Bavarian palatinate, making stops at Landan and Gruenstadt. At the latter place we looked up Messrs. Schiffer & Kircher, extensive miners of high grade fire clays, of whom we had heard that they intended to launch into the brick business. We were kindly received by the firm and told that a Simpson dry press had been ordered from Chicago.

Gruenstadt is celebrated for the excellent fire clays found in its vicinity, which are largely used in glass works. In company with Mr. Schiffer, we visited the clay mining region at Hettenbeidenheim, a small place about four miles southwest of Gruenstadt. The kaolin-like clay occurs in pockets deposited upon tertiary limestone at a depth of from thirty to ninety feet. The pockets are from five to twelve feet in thickness. The mode of mining the clay is extremely primitive. Vertical shafts are sunk to the required depth, and horizontal ones for a short distance. Buckets, raised by means of crank and windlass, bring the clay to the surface. Over the mouth of the mine a thatched roof is put up.

—A Prosperous Roofing-Tile Factory.—

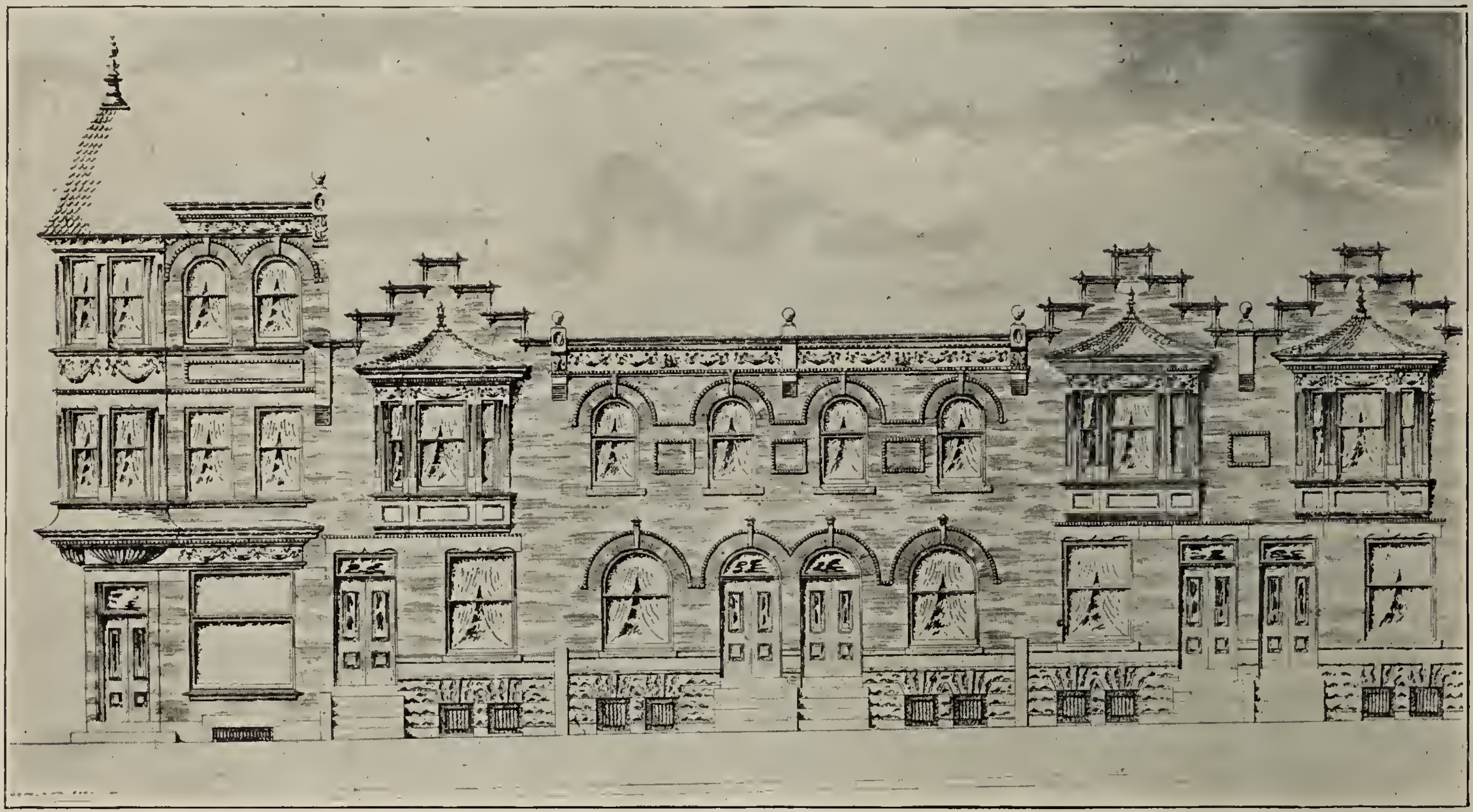
We next proceeded to Eisenberg, a small but very pretty place, about six miles from Gruenstadt. This town can boast of two clayworking establishments, a roofing-tile factory and a fire-brick concern. The first one, the Von Miller Roofing-tile Works, has an established reputation, and at the time of our visit was running overtime, being crowded with orders. The clay, which is exceptionally rich in iron, is very difficult to work. Their crushing machinery consists of roller crushers and a dry pan. After having passed through these, the clay is carefully tempered and made into slabs with three auger machines. Five revolving roofing-tile presses are in use, each pressing three thousand interlocking tiles per day. In setting the tiles they are set in tiers between fire-brick stands in order to lessen the weight resting upon the lower tiles, as the clay easily softens. Nearly all the tiles are glazed, the glaze, a lead glaze, being ground in a ball mill. Speaking upon the relative merits of glazed and bluesmoked tiles, the Superintendent of the works declared himself most emphatically in favor of glazed goods. In his opinion, they are a much better roofing material, and are easier to manufacture than the bluesmoked tiles.

The burning is accomplished in two gas kilns and one semi-gas kiln, built according to the Escherich system, in which the gas is being led into the kiln space proper, and there mixed with the air for combustion, instead of in flues, as in the Mendheim system. The results obtained in burning are very satisfactory.

The Eisenberg Fire Brick Works offered very little of interest, and a description of them would simply be a repetition of previous ones.

A UNIQUE ENTERPRISE THAT WILL CALL FOR A VAST QUANTITY OF DRAIN TILE.

A striking illustration of the great undertakings of this age is to be found in the work a lumber company is quietly carrying on in the southern part of Georgia. The ultimate idea of the company is nothing less than the drainage and redemption for farming purposes of the whole bed of the great Okefinokee swamp. It covers many thousand square miles. Its soil is a vegetable mold of great depth. When drained and brought under cultivation it will give homes and farms to more than 100,000 people.



Modern Homes for Workingmen in "The City of Homes."

At present Okefinokee swamp is the most wonderful gaming ground in North America. A correspondent of the St. Louis Globe-Democrat says you can bag anything you want in it, from an alligator to a humming bird. The drainage will be easy, as the great swamp is 102 feet above St. Mary's river, into which it empties.

Before the draining can be accomplished, however, the timber must be cut away, and that is the part of the task now engaging the company's attention. No horse or ox power could drag the huge cypress logs across the swamp to the sawmills. Floating engines are affixed firmly upon tugboats that steam along canals. From the engine chains are stretched a mile away and hooked around the log that is to be brought in. Then the engine is set to work turning the steam windlass, and through the mud the log is dragged to its destination.

Written for the CLAY-WORKER.

THE CLOSE RELATIONSHIP OF BRICK AND TERRA COTTA—WORKINGMEN'S HOMES IN PHILADELPHIA.

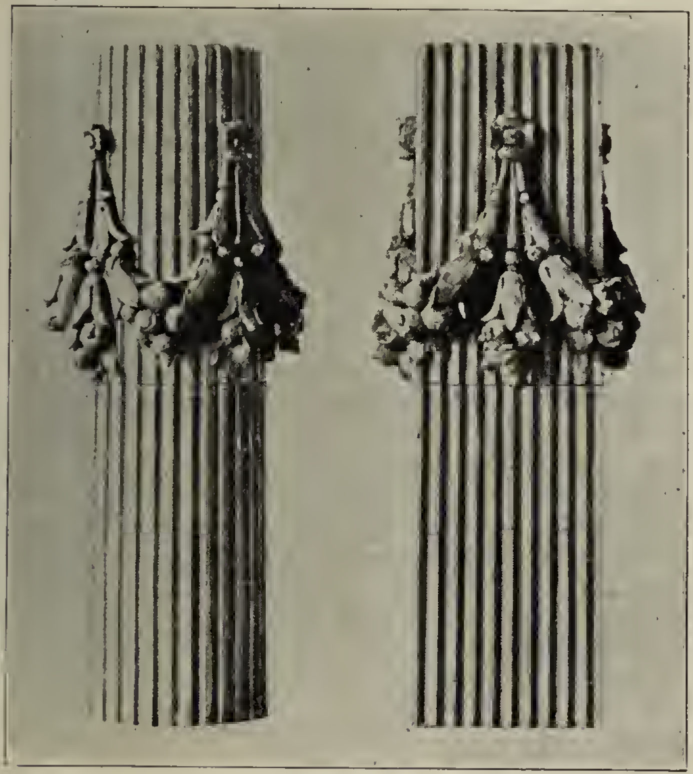
BY W. P. LOCKINGTON.

PHILADELPHIA, for the past eighteen years, has born aloft the emblem, "The City of Homes." Is it? "I pause for a reply." Significant it is that since 1878 Quaker City has made strenuous efforts to lead the van, and, contrasting its increased population, the marked improvements in its industries with other cities, we that live here readily accept the much vanted boast that the emblem is an established fact.

Twenty years ago this city held lines and miles of houses that were as severe in aspect as the tenants that occupied them. Dark red stretcher brick, relieved by marble trimmings, formed a blinking mass, without relief, minus ornamental detail and devoid of anything but monotony. As the characteristics of a people change so does its architecture. That gravelike and solemn dignity which perpetuated the glory of the Quakers communicated itself to their houses. Substantial it was, but oh, my, how severe!

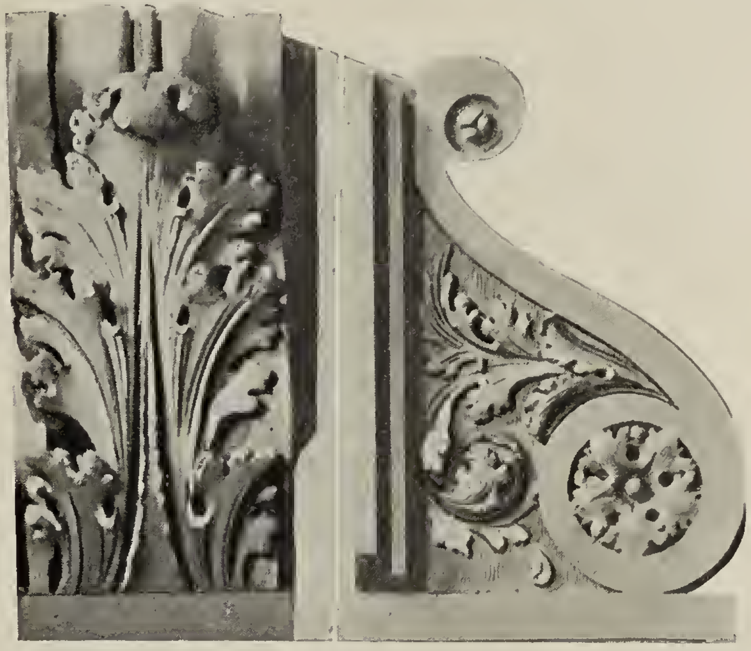
The centennial year of 1876 brought about the first whisperings of an architectural revolution, due, doubtless, to the open timber and pebble dash work country house of England—the Elizabethan and the Jacobite examples, the German brown stone facades, the Flemish and French renaissance, all were important factors and heralds of a complete change for this city.

Within two years its move was noted by the annihilation of brickyards that stood near the city's center, and the rapid advance of real estate. Cautiously, it is true, real estate speculators consented to accept designs which were of too radical a departure from the old style. But the change was marked here and there by the addition of a porch front, a spandrel of terra cotta, a corbel, or a panel by way of denoting when the house was built, were among the accepted innovations until it has reached the period when the medium priced homes of our professional men, merchants and mechanics disdain wholly the use of stone in trimming or details, and bricks, light buffs, brown, stone color and mottled (Pompeiian), with terra cotta reliefs and tiling, stand in close relationship to one another. True democrats of Mother Earth.



Brickmaking forms a native industry for every city and State, and Philadelphia and Pennsylvania have a strong combination of yards and plants, which have been graphically and truly described in the columns of the Clay-Worker. It is within the knowledge-clasping interest of every man, with a scholarship in brick, to know the history of brick from the time it is delved from the earth until it reaches its final destination.

A physician of Baltimore once said to me that he believed the final resting place of the soul or spirit of the body might be found in the corner bricks of a dwelling house, and proceeded to justify his remark by a recital of how, at one time, he had two patients, a man and his wife. The one died within three months of the other, and both were buried in the same grave. Some four years after, a son or a daughter, I forget which, who had been absent many years from home, waited upon him—the physician—with a view to having the bodies disinterred. This was done, and an examination of the bodies proved to the physician that in the case of the wife ossification had set in, and the liver had already turned to stone. In after years the cemetery was taken and worked as a brick plant, and the house in which the physician then resided was built of the brick made at that particular plant. His theory was formed or based on that fact, and he concluded by saying: "I've no doubt whatever in my mind that the soul or spirit of that patient of mine lies imbedded in one of the bricks used in the construction of this or my neighbor's house." If true, the knowledge should be comforting to many. How much nicer than to believe that the poor spirit is wandering aimlessly about, borne on the wings of an equinoctial storm.



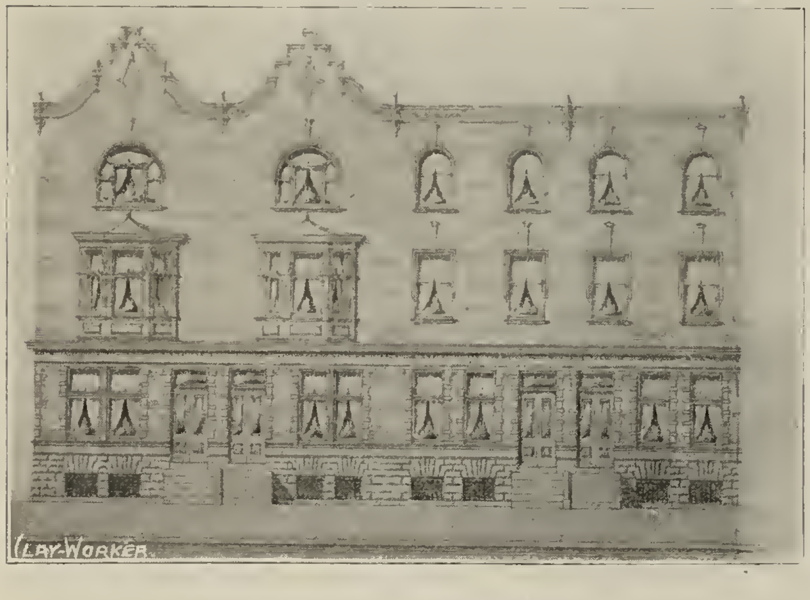
In dealing with brick and terra cotta and their close relationship, it is here necessary to switch off from the old road and run along the new, where many of your subscribers will have a possible chance, as they push hurriedly along, to exclaim: "That is one of my operations;" "Every brick in it, barring, perhaps, the face brick, are mine;" "Why, I supplied close upon four million bricks for that operation;" or "See that double row of two and three-story houses there? Well, sir, every brick in 'em came from our plant," etc.

Mark the accompanying illustration. Well, this is a fair sample of the medium priced dwelling house for a medium price paid man in the city of Philadelphia. This is a dwelling monument to a recent live brickyard, and covers two sides of a block, each having a frontage of eighteen feet and depth of fifty feet, faced with mottled brick, trimmings and reliefs of terra cotta, voissoirs, keystones, string course, and Flemish tops. All serve their purpose in a harmonious and judicious manner.

Another operation of good proportions, numbering forty-eight houses, stand at Twenty-third and Twenty-fourth and Nicholas streets, each having a frontage of sixteen feet, with a depth of forty-eight feet, and two stories high. The mottled bricks used for facing are those of the Eastern Hydraulic Brick Company, over one million being used in this single operation, without counting the millions of hard stretchers and filling in of salmon, both brought from the plants of J. E. Dingee and Flood's yard. The terra cotta trimmings, supplied by Stephens, Armstrong & Co., are good examples of what is used on these comfortable but unostentatious dwellings, the contract price not exceeding, perhaps, $6,000.

By comparison with some of the early attempts of using terra cotta, the latter-day cornices, panels, spandrels and string courses of the same material show strongly marked degrees of improvement, both in the hands of the draughtsman and the designer, and, one may add, the firing. The faults previously were that the draughtsman very crudely gave out his detail sheet, with the sketch or suggestion roughly drawn out in charcoal. The modeler or designer did as well as he could under the circumstances, and he, in turn, trusted to the "firing" to make rough, smooth or wrong right. Anyway, insufficient firing was often the base of the trouble, and tone and color gave way to a garish red tone that was not even barbaric.

Doubtless the architect to-day quietly pockets a good deal of the credit due to the terra cotta man. The architect is prone to say: "See that terra cotta work? I designed that." He really did not. He probably called in the terra cotta man, who, after inspecting the Cupid design of the architect, nearly has an oaphoretomical fit, courteously volunteers to take the design and "set it up a bit," does so, only to return with a first-rate finished drawing. The work goes through and the architect takes the credit.



A Row of Brick Tenements.

The engravings, on a preceding page, of a decorated column and pilaster used on the facade of a residence at Twenty-second and Walnut streets illustrate part of the work done by Armstrong & Conkling, of Philadelphia. In dealing with this subject I want to assure the readers of the Clay-Worker that my object primarily is to show them not the brickwork and terra cotta in detail, but in the "altogether." We most of us know how terra cotta and bricks look separate. But, with Mr. Randall's consent, we have here an illustration of a master mechanic's home, showing well the combination of the two clays, the useful and the ornamental. Finials, cornices and panels are all set with a fitting sense of harmony and a fitting relief to the plain-faced brick. Here the architect has broken away from the usual red in brick and terra cotta, and has given his client a symphony in grays, using the Eastern Hydraulic Company's shade 69, which is almost a limestone in color, with terra cotta of a darker hue. This, while being very soft in effect, is scarcely a safe innovation, as our strong Quaker element might adopt the quiet gray as a universal tone for the city, and this would be slightly worse, I am thinking, than the old-time stretcher brick and marble trimmings.

Scarcely a fear, however, need be entertained from this quarter, since the rising generation, with touch and go of other cities, has broken away from the solemnity of the Quaker element, to place in the foremost locations reliefs in the brightest colors, both as regards house fronts and dressing.

Philadelphia contains an area of 129½ square miles, 1,110,000 inhabitants, has 1,150 miles of streets and 250,000 houses, or one in four. The average building of two and three-story houses for the past ten years covers 8,700.

The readers will readily understand that while there is an enormous stretch of relationship between the brick and terra cotta, there is apt also to be such a multiplicity that the writer has taken note of those erected during the past three or four years by way of illustrating what may be termed the workingman's home, and that, in my humble judgment, should be in monthly rental one-fourth of his monthly pay, and no more.

In conclusion, I trust there is still room to present to the readers of the Clay-Worker one more illustration of this city's three-story residences.

The interior is as compact as the exterior is harmonious, and the judicious combination of the mottled brick, with the well-burnt shades of the terra cotta reliefs, reflects credit on the architect, H. E. Flower, and must prove a source of pride to the tenant, be he merchant or master mechanic.

Ere another issue of the Clay-Worker takes place the anxiety of the country will be pacifically settled, and let us all hope that the issue will be the cause of rejoicing in every department that pertains to the prosperity of clayworkers, since every country may be termed prosperous and rich that can give its workingman a comfortable house to live in.

PAVING BRICK MADE FROM COAL ASHES AND OTHER REFUSE.

During the fore part of October a series of tests were made at the shops of the American Clayworking Machinery Company, Bucyrus, O., which have proven such a success that it is no exaggeration to say that the making of paving brick will be revolutionized.

The patentee of the process is George W. Averill, of New York State, and the trip was made to Bucyrus to demonstrate to the representative of a gigantic stock company the feasibility of the patent. The representative of this company, Mr. William Wirt Chapman, also of New York, is watching carefully the experiments and tests, and is thus far entirely satisfied with the invention.

The process embraces the making of paving brick and fireproofing, the material used being largely composed of common coal ashes, to which are added a few chemicals, the whole being put through a brick machine which will differ but slightly from the machines now built by the Bucyrus Company. The bricks require no burning, and five hours after being made are ready to use. They are as good as any paving brick now manufactured, and in the test in the rumbler at the machine shops were found superior to the "Bucyrus paver" in its most palmy days.

The success of this invention opens a large field to the company which is back of it with ample capital. They figure that it will require eleven plants to take care of the waste ashes of New York city alone, and these eleven plants kept running constantly would not be able to use all of the material. The ashes are practically valueless, and can be had for nothing, giving the company very cheap raw material. In addition to the New York plants, it is the intention to equip factories in other large cities. The ashes used are either of hard or soft coal. Marble dust can also be used to splendid advantage. —Toledo Blade.

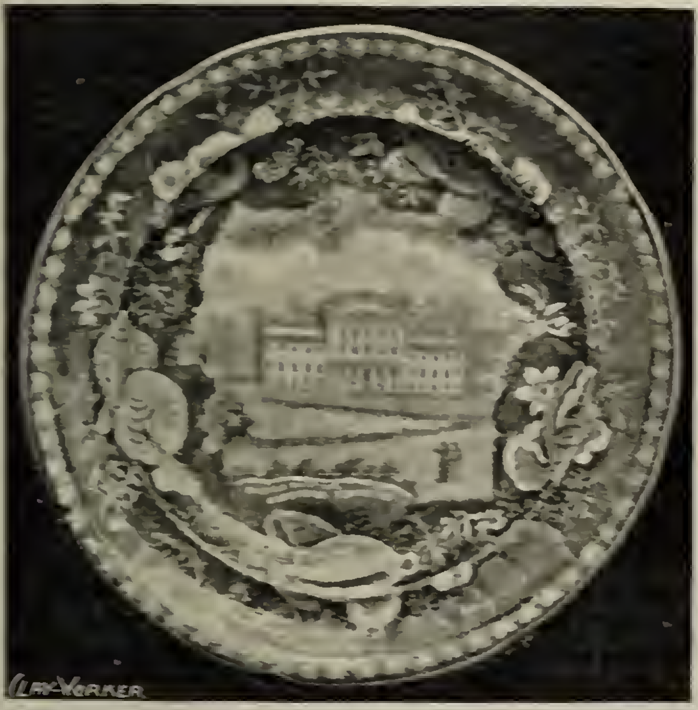
Written for the CLAY-WORKER.

AMERICAN PUBLIC BUILDINGS ON OLD ENGLISH CHINA—KENTUCKY VIEWS.

BY EDWIN ATLEE BARBER.

NO FEATURE in china collecting is more instructive than the historical. This applies particularly to the dark blue china bearing prints of old American structures. It is interesting to learn something of the purposes of these ancient edifices, and why they were deemed by the old English potter worthy of perpetuation on his wares. Let us take, for instance, the two Kentucky designs made by Enoch Wood, of Burslem, England, early in this century, one showing the Marine Hospital, Louisville, the other the Transylvania University, at Lexington. There are probably no two designs of this character which have produced more perplexity in the minds of collectors as to what they were supposed to represent. By some the Transylvania University is supposed to have been a Virginia institution, and the old Marine Hospital of Louisville, figured on china, is believed to be the same as the present United States Marine Hospital in the same city. Both of these ideas are erroneous, and it is the purpose of this paper to present the true facts in each case.

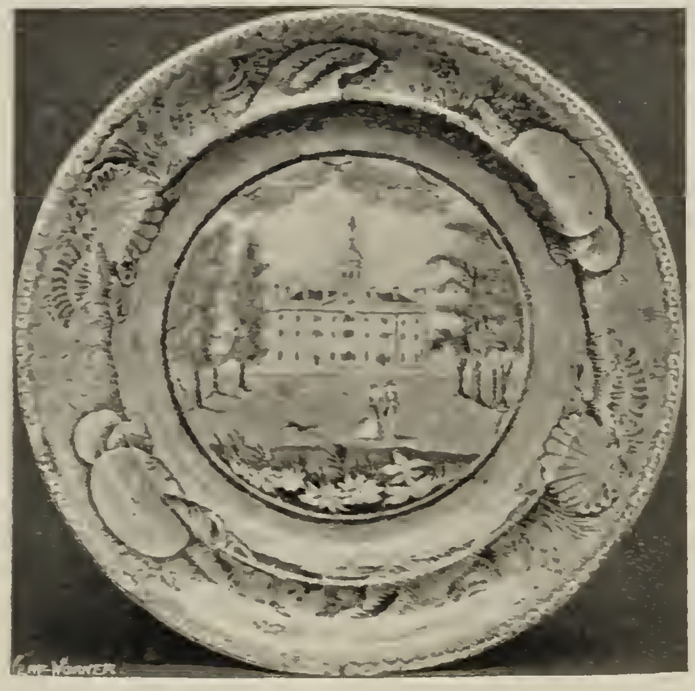
The old Marine Hospital, Louisville, was founded by act of the Kentucky Legislature, dated Feb. 5, 1817, an appropriation of $10,000 having been made, and work was soon after commenced on seven acres of ground donated by Thomas Prather and Cuthbert Bullitt. By an act approved Nov. 27, 1821, an additional sum of $6,000 was appropriated to complete the building. Thus it will be seen the Marine Hospital of Louisville was a State institution, but by an act approved Feb. 29, 1836, it was transferred to the city of Louisville and placed under the supervision of the Mayor and City Council, and today it is known as the Louisville City Hospital.



MARINE HOSPITAL, Louisville, Kentucky. (Founded Feb. 5, 1817.) Made by Enoch Wood.

The dark blue view on plates is that of the original structure, which was begun in 1817. It shows a central building, with columns in front and a smaller wing on each side. In the foreground are fences running to an angle at the right and two men apparently engaged in conversation. The name of the view, "Marine Hospital, Louisville, Kentucky," is printed on a rock in the lower left foreground. The original structure has been altered and enlarged from time to time, until it bears but little resemblance to the ceramic view. This information has been kindly furnished to me by Dr. John Cooke Laurens, the Registrar of the present Louisville City Hospital.

In 1847 a government Marine Hospital was established at Louisville, and the building was erected in 1852. This, it will be understood, is entirely distinct from the old Marine Hospital, which was merged into the Louisville City Hospital, probably in 1847, on the establishment of the United States institution. There are, therefore, two hospitals in that city, one the outcome of the old Marine Hospital, the other a United States Marine Hospital of more recent date, in no way related to nor connected with the former.



TRANSYLVANIA UNIVERSITY, Lexington, Kentucky. (Chartered Jan. 1, 1799.) Made by Enoch Wood.

Another interesting Kentucky design, in dark blue, is the view of Transylvania University at Lexington, Ky., with the same shell border, by Enoch Wood. Kentucky was admitted to the union of States in 1792, and previous to that date it was a portion of Virginia, known as Kentucke county. The word Transylvania means "across the forest," so called because the country to which it was applied lay beyond the wooded Alleghanies. In 1775 a colonization company was organized under the name of Transylvania, and when a seminary was chartered by the Legislature of Virginia in 1783 the same title was given to it. On Dec. 22, 1798, Transylvania Seminary and Kentucky Academy were united under the name of Transylvania University, the charter taking effect on Jan. 1, 1799.

Bacon College was another institution of learning, which was established at Georgetown, Ky., in 1836. Later it was removed to Harrodsburg, Ky., and in 1858 it became Kentucky University. In 1865 this institution was removed to Lexington and acquired the property of Transylvania University. It is now known as Kentucky University, and is under the control of the Church of Christ.

The old Transylvania University was justly celebrated in its day, as it had the first law college west of the Alleghanies, and its medical department was one of the best in the land.

The first university building was quite small, but a second structure was completed in 1818, at an expense of over $30,000. This was a fine brick edifice, three stories in height (see illustration), surmounted by a tall, colonial cupola, containing recitation and lecture rooms and sleeping apartments for the students. The building was burned down in 1829, consequently the ceramic view of it now possesses considerable historic interest and value. The drawing for the design was executed by the celebrated portrait painter, M. A. Jouott. From this the ceramic engraving was reproduced by the great English potter, Enoch Wood.

Another view of the same structure was executed by Enoch Wood & Sons, at a more recent date, perhaps about 1835, after the building had been destroyed, which appears on plates in black, brown and perhaps other colors.

Many men were students at Transylvania University who afterwards became eminent as statesmen, jurists, educators and scientists. Among these were Henry Clay, who was professor of the law department in 1805, and twice filled the place of curator of the museum; Jefferson Davis, President of the Confederacy; Prof. C. S. Rafinesque, the noted zoologist and botanist; Hon. Robert Trimble, LL. D., Chief Justice of Kentucky in 1810, and afterward Justice of the United States Supreme Court, besides numerous others known to fame.

It was here that General Lafayette was received when he visited Lexington in 1825, during his triumphal tour of the country, and he expressed his surprise and delight that such an institution should be flourishing in a section where all was a wilderness a few years before. The students gave him a royal welcome, and he was addressed by three of their representatives, in Latin, English and French.

Among the archives of the University is a subscription paper, dated June 2, 1795, which contains a list of subscribers to the young institution, with the amounts contributed. By this most interesting document it appears that many of the public men of the day were subscribers. George Washington, President, gave $100; John Adams, Vice President, $100; James Swan, $500; R. Morris, $100; John Nicholson, $100; James Wilson, $300; John Brown, United States Senator, $45; Aaron Burr, United States Senator, $40; Henry Tazewell, $40, while many others contributed liberally.

For much of the data relating to Transylvania the writer is indebted to Miss Wilhelmina Loos, whose father, Dr. Charles Louis Loos, is now President of the University.

Written for the CLAY-WORKER.

WAGES PAID TO BRICKMAKERS IN FOREIGN COUNTRIES.

THE STATE DEPARTMENT has for some time been prosecuting, through its consuls at the various ports, inquiries as to the rates of wages paid to various branches of labor in foreign countries. Among other facts that have been brought to light, the following may be of interest to our many readers:

Throughout the United Kingdom the average price paid to men employed in brick and tile works is $5.55 for a full week's time, exclusive of overtime; to lads and boys, $2.19; to women, $2.27, and to girls, $1.84 per week. The wages paid to a bricklayer vary from $8.64 in summer and $7.36 in winter. The wages paid in Belfast, Ireland, to $10.32. In Manchester bricklayers are paid by the hour, the rates running from 13 to 18 cents per hour, 16 and 18 cents being the price in the principal towns. The hours of labor are from fifty to fifty-six in summertime, fifty-two, fifty-three and fifty-four being the hours for the largest towns, while in winter the number of hours per week run from forty-five to fifty-four hours, those for the towns being from forty-five to forty-nine hours per week. These prices cover the year 1894 and later; previous to that time a bricklayer received an average of 50½ cents less per week than the prices quoted above.

The average price at which manufactured clay has been exported from the United Kingdom during the last ten years was as follows: In 1886, $5.20 per ton; this fell to $5.15 per ton in 1887 and 1888, increasing to $5.24 in 1889, $5.29 in 1890, $5.34 in 1891, $5.39 in 1892; in 1893 the price decreased to $5.15, increasing in 1894 and 1895 to $5.44 per ton. The prices for 1896 are not yet available.

The average wages paid to a bricklayer throughout Canada are not quoted, but in the province of British Columbia the price paid is $4 per day.

In Belgium the average price paid to men employed in building industries is $30.38 per month. The city of Ghent has lately established the following rates for the building trades: Masons, .06½ cents per hour; plasterers, .073 cents; pavers, .09 cents, and it is considered more than probable that other cities throughout Belgium will follow this example for fixed prices. In Brussels a bricklayer receives $4.56 per week and a brickmaker $4.25 per week.

Throughout the Netherlands, in 1884, a bricklayer received for his services .06½ cents per hour. In 1894 this had increased to 7 cents per hour.

The average wages of a bricklayer in Paris at the present time are 17 cents per hour.

The wages of a brickmaker or bricklayer in Germany have not been given, but the average prices at which some materials are sold is given. For instance: The price of clay pipes, unglazed and not water-proof, was, in 1886, .833 per 100 kilograms; in 1895 it had decreased to .714. The price of ordinary pottery, unglazed, decreased from $10 per 100 kilograms in 1886 to that of $2.34 in 1896. Architectural ornaments of clay are quoted as being valued at $30 per 100 kilograms in 1886, whereas in 1895 they are only valued at $7.14 for the same quantities. Flooring tiles, tiles for building, etc., glazed, have decreased from $5 to $1.19 per 100 kilograms; potteries, ordinary, glazed, from $6 to $1.42 per 100 kilograms; fine terra cotta wares from $60 to $14.28. In faience wares the reductions have been as follows: Uncolored or white, from $45 in 1886 to $10.71 in 1895; colored, etc., from $140 to $33.33, while in porcelain and porcelaneous wares the decrease in white goods was from $80 to $19.04, and in colored from $120 to $28.57.

The average price at which clay ware was exported and imported into Austria-Hungary in 1886 was $11.70 per 100 kilograms; in 1896 it is $8.12. In 1886 imported white chinaware was valued at $19.50, and in the same year it was exported at an average value of $13.65 per 100 kilograms. In 1896 the import price had increased to $20.30 and the export price to $14.21 per ton.

In the City of Mexico the average price paid to a bricklayer this year is from 51 to 76 cents per day. In Matamoras his salary is 75 cents.

In British Guiana the wages paid to a bricklayer vary from $4.80 to $7.20 per week.

Turning our attention at home, the average wages paid to a bricklayer in the year 1891 was $21.18 per week. In 1895, in Montana, bricklayers and masons received an average of $5.33 per day. In Baltimore, during the present year, a bricklayer is earning from $3 to $3.50 per day; in Boston, from $3.15 to $3.36 per day; in New York, from $3 to $4; in Philadelphia, from $3.75 to $4.05; so that American workmen are, in the main, far better paid than are those of other countries.

A. F. T.

ENGLISH MONEY IN FRENCH CLAY WORKS.

It is announced that an English company, called the "Societe Internationale de Ceramique," is about to establish a large plant at Bordeaux. The company, which is said to have large works in operation elsewhere, is the owner of valuable patented processes, by the use of which the cost of manufacture—of hollow ware, particularly—is greatly reduced, in comparison with ordinary methods, the machinery in use by them being designed to produce several pieces of ware at one and the same time and to partly reduce the necessary amount of handwork. This company will be capitalized at 1,500,000 francs, and reckons on a production of 300,000 dozens of miscellaneous ware and 50,000 dozens of "compartment plates." A fund of 15 per cent. of the profits will be set aside so as to pension the workmen, while the general arrangement and installation of the plant will be on the most elaborate scale.

Written for the CLAY-WORKER.

THE DEVELOPMENT OF THE AMERICAN BRICK—NEW JERSEY'S GREAT PLANTS.

WHILE SOME STATES are noted for their production of coal, some for gold or silver and others for manufactures, none stand so high in the production and development of clay and clay products as the State of New Jersey.

The clays of this State are used not only within its own borders, but hundreds of thousands of tons are shipped annually into other States for making pottery, fire brick, hollow brick, ornamental brick, terra cotta, drain tile and miscellaneous purposes.

The first extensive use to which these clays were put was in the manufacture of common earthen and stoneware pottery, about the beginning of the present century. Clay from Morgan's clay banks at South Amboy was used in making stoneware at Van Wickle's pottery at Old Bridge, now Herbertsville, about 1800.

Ebenezer Price and his two sons purchased the property at the Roundabout, now Sayreville, on the Raritan river, in 1802, and began making stoneware pottery, using clay from Morgan's banks at South Amboy. The use of stoneware clay for pottery gradually extended, and is now carried to potteries everywhere along our Atlantic coast.

Interesting as it would be to follow the development of New Jersey's pottery, drain tile and kindred interests, the author must confine himself to the subject of these articles, and will therefore lay them aside, perhaps to be taken up at some future time.

—Jersey Building and Fire Brick.—

The use of New Jersey clays for making building and fire brick was taken up in earnest after the war of 1812. Mr. Price, of New Brunswick, carried a vessel load of fire clay from Woodbridge to Boston about 1816. It was dug on Mr. Cotheal's property, and was probably the first clay sent from Woodbridge for this purpose. Mr. Samuel Dally, of Woodbridge, says the white Woodbridge clays were known to the soldiers quartered at Perth Amboy before and during the revolution. They called it "Fuller's earth," and used it for cleaning their buckskin breeches. About 1820 Jacob Felt, of Boston, bought fifty tons of the clay of Jeremiah Dally. He paid 25 cents a ton, in the ground, for it. This was shipped to Boston, and it was sent on regularly to the same place for many years.

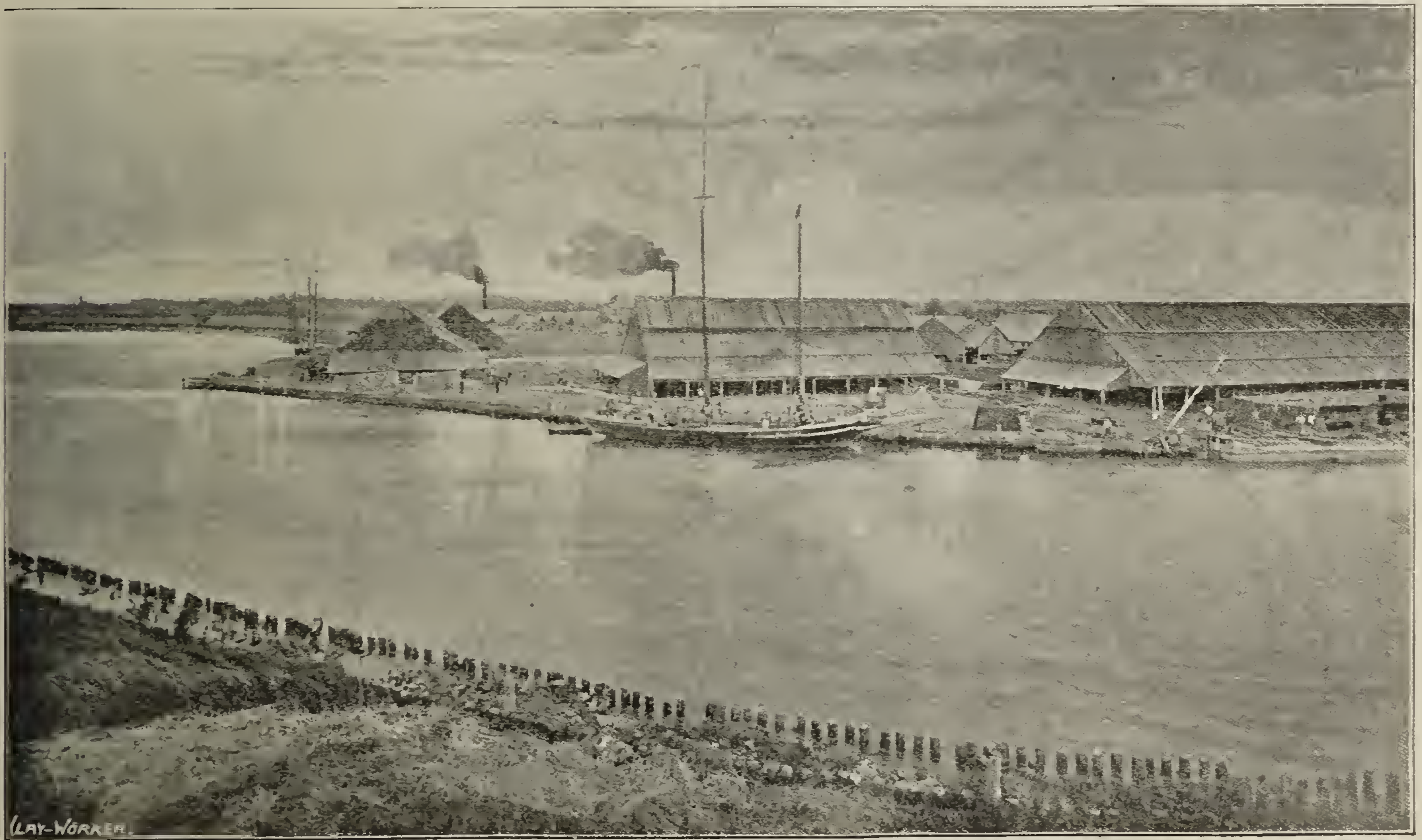
A large share of the brickyards of New Jersey are situated in Middlesex county, along the Raritan river, at South Amboy, Perth Amboy and Woodbridge. Large numbers are also made at Keyport and Matawan, and also at Trenton.

One of the principal industries of Middlesex county is the exportation of the raw clay to all parts of the country for the manufacture of ornamental pressed brick, as well as all other clay productions. The supply seems well-nigh inexhaustible; at least, it will last several hundred years. The only process necessary for the clay to undergo before it is ready for shipment is sorting and washing, although, in some instances, washing is not required. Shipments are made both by rail and by water, the greater portion probably being sent by water.

—A Great Brick Plant.—

At Sayreville, N. J., is situated the immense plant of Sayre & Fisher. Here, for over forty years, this firm has carried on the manufacture of ornamental, common and fire brick. The common-brick works of this firm extend along the Raritan river for more than a mile, and present, in the height of the season, a very lively appearance. This firm supplies brick for many of the largest public and private buildings throughout the country, and wherever used their brick have always proved entirely satisfactory. Their annual output of ornamental, fire and front brick is enormous, while their output of common brick exceeds 200,000 per day. Their brick are shipped largely by water, as their wharves will accommodate boats drawing fourteen feet, and during the busy season all kinds of craft may be seen here, loading for different cities all along the Atlantic seaboard.

Two miles distant from the plant of Sayre & Fisher, at



Brick Sheds at Common Brickyards of Sayre & Fisher, Sayreville, N. J.

South River, is situated the works of the American Enameled Brick and Tile Company, a comparatively new concern, whose business and reputation have already assumed large proportions. When the concern was first organized, with a capital of $20,000, they made their brick at the plant of B. Kreischer & Son, at Kreischerville, Staten Island, N. Y. Within a year the sample brick produced were so good that the stockholders decided to increase the capital stock to $100,000 and erect a plant of their own to carry on the business, and the fine works at South River is the outcome of this decision. The machinery is nearly all Penfield's make, and includes an auger brick machine, dry pan for grinding grog, wet pan, and a press of new design, also some Raymond represses. A Penfield steam drier is used, and the brick are burned in muffle kilns of a Trenton pattern. An Erie City boiler furnishes steam for the large Corliss engine which drives the machinery. Go where you will, and you will not find a plant more thoroughly complete with everything that goes to make up a modern brick and tile factory.

A large addition has recently been built for track room to allow the presses more space. A switch enters the works on a trestle to dump clay into the sheds near the pan, and another switch on the opposite side allows the loading of the finished product directly into the cars for shipment all over the country. A wharf has also recently been built on the South River, adjacent to the plant, where boats are readily loaded.

A novel experiment was recently tried at these works to test their strength and durability. A large brick chimney was erected, and the entire top was built with enameled brick. Immense volumes of gas and smoke are continually passing out of the stack, and it is exposed directly to the elements, yet a recent examination found the brick, after a year of service, apparently as perfect as when they were laid. This may be considered a positive proof that the brick will not crack or scale. These works are very busy this season, and will probably beat their record of production, which was a million and a half of enameled brick last season.

—Works of the Staten Island Terra Cotta Lumber Company.—

At Spa Springs, just outside of the city limits of Perth Amboy, is situated the works of the Staten Island Terra Cotta Lumber Company. This concern, which, by the way, is said to be the largest of its kind in the United States, makes all sizes and shades of front brick, fire brick and hollow brick, as well as terra cotta and drain tile. The company owns 160 acres of clay of all kinds.

The fire brick department is the oldest part of the works, having been started by Mr. Chas. Annis, who ran it for years, when Mr. Robert Lyle joined Mr. Annis. Afterwards the Staten Island Terra Cotta Lumber Company was organized, when the works were enlarged to the present tremendous scale. In all departments of this great plant there are used thirty pieces of machinery, all furnished by J. W. Penfield & Son. This mass of machinery is driven by four large Corliss engines, which require sixteen tubular boilers to furnish steam. The kilns used in the fancy brick department are mostly of the old Dutch pattern, some of Strusholm style and some of mongrel breed, but all have their place.

—Making Hollow Brick on a Large Scale.—

The hollow brick department is a most complete plant by itself. Ten minutes after a carload of clay is dumped overhead it has passed through the clay pan, up the conveyor and out of the machine in some of the many shapes of hollow brick. The hollow brick are burned in immense down-draft kilns, using crude oil as fuel. An arrangement has been put in whereby the heat is drawn from these kilns into the tunnel drier, and is utilized to dry the green brick.

It is almost impossible for one who has never seen these works to realize their immense proportions, and the following facts may help in that direction:

The plant covers nearly ten acres. There are, all told, fifty-five kilns. The works employ over seven hundred men and boys. The services of seventy horses are required to haul clay, etc. The company has a large fire engine to protect its property in ease of fire, besides an extensive system of water pipes for fire purposes. The total output is six hundred tons per day, embracing architectural terra cotta, flue lining and sewer pipe, terra cotta lumber, hard tile fire-proofing, ornamental brick of every description and about ten million fire brick per year.

The concern enjoys unexcelled shipping facilities, having the Pennsylvania Railroad on one side and the Central Railroad of New Jersey on the other, while Woodbridge creek gives a waterway direct to Staten Island sound.

Space will not permit of a full description of every plant in this vicinity, interesting as it would probably be. There is the Perth Amboy Terra Cotta Company, known the country over, which employs five hundred men, and requires over forty kilns to burn its product. Then there are Henry Maurer & Son, employing 250 men; the Raritan Hollow and Porous Brick Company, also employing 250 men; the immense Ostrander Fire Brick Plant, and many others equally well known.

—In and About Trenton.—

About seventy years ago a man whose name was Embly came to Trenton, N. J., from New England and commenced the manufacture of brick. He was not, however, without a competitor, as a farmer named Beak made and burned a kiln of brick each year from that time till about 1840, and a yard was started by one Hutchinson three miles south of Trenton, also a yard by a Mr. Smith about four miles north of the city.

In 1832 Peter Grim and Joseph Himer came to Trenton from Philadelphia and established a brickyard, which they continued to run on quite a large scale for several years. After them came George, Philip and Joseph Kulp, Thomas Howell, Peter Fell & Bro., J. P. & C. Fell and Heil & Fell.

Up to 1865 the makers in Trenton had confined themselves to the manufacture of common brick, but in the spring of this year (1865) George E. Fell commenced making both common and front brick, and made a special effort to compete with Philadelphia for the New York trade in front brick. Thus revived, the brick business of Trenton began to grow, and continued to do so, until three years ago the highest record was made, the brickyards of Jersey's capital city turning out thirty millions of front brick and forty millions of common brick.

Most of Trenton's front brick are shipped to New York, although they have a large trade as far west as Chicago and Milwaukee, while the common brick all find a ready market within a few miles of where they are made.

At Matawan, N. J., there are eight brickyards, which turn out a large number of common brick annually, and at Keyport is situated the New York and New Jersey Fire-proofing Company, formerly the Lorillard Brick Works.

R. N. BUELL.

CONSOLIDATION FOR ECONOMY'S SAKE.

A recent visit to the Frey-Sheckler Company—we mean the Bucyrus works of the American Clayworking Machinery Manufacturing Company—found them pursuing the even tenor of their way, quietly but industriously attending to the demands of their trade, which is exacting, even in dull times like the present. There was nothing to indicate that any important change had been made in their affairs, and the consolidation with an equally extensive manufactory was seemingly a very ordinary occurrence, hardly worthy of commenting upon.

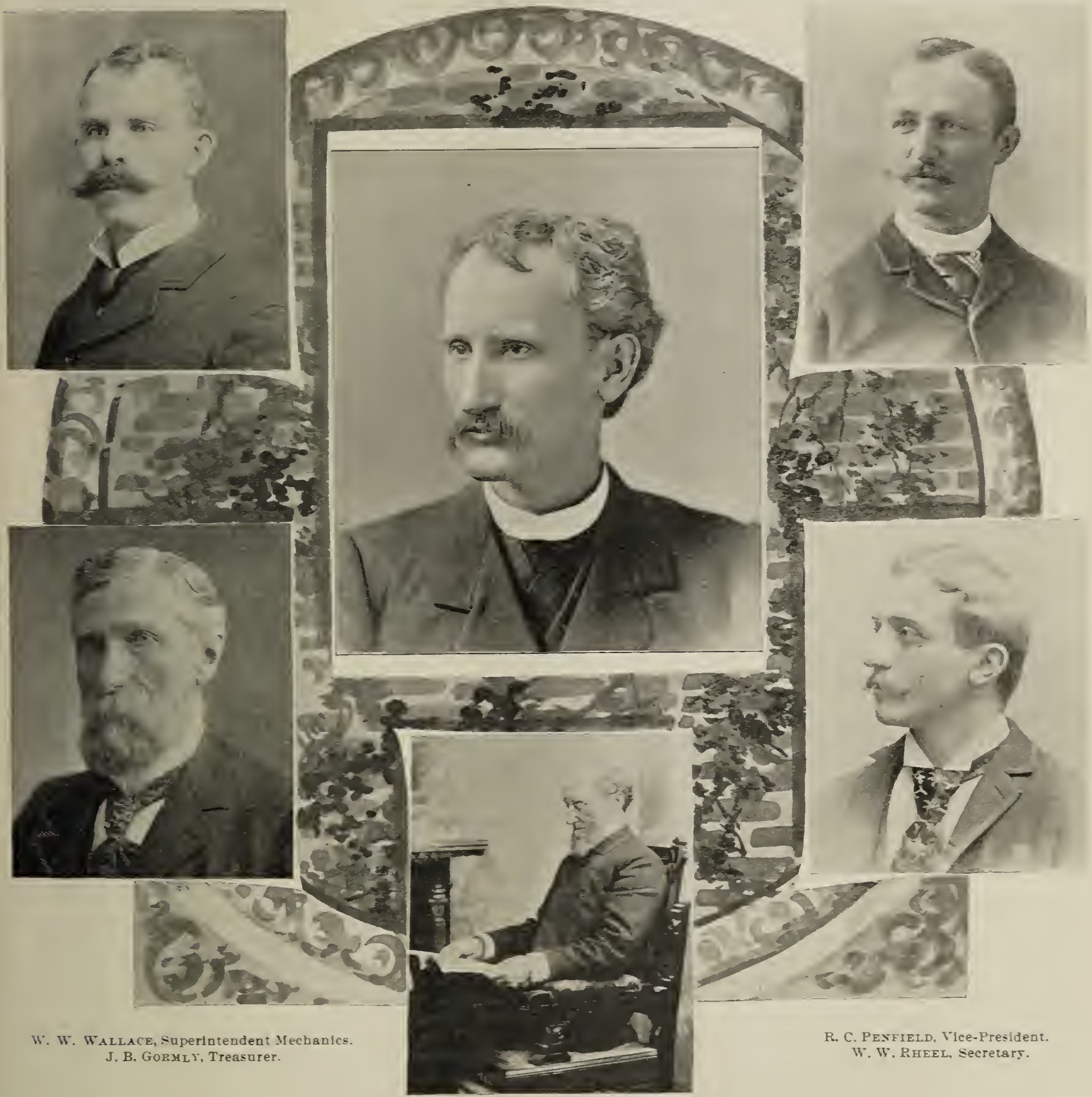
A very pleasant chat with Col. W. C. Lemert, who has directed the affairs of the Frey-Sheckler Company for some years past, and who is the head of the new company, confirmed the opinion previously formed—that the consolidation was a move in the direction of economy in the conduct of the business, made necessary by the keen competition and trade conditions that have reduced the profit in the manufacture and sale of clayworking machinery to the minimum, or lowest possible notch. Indeed, for the past few seasons the strife for what little trade there was has been so sharp that in a number of cases sales have been made on terms that, on a close accounting, left the balance on the wrong side of the ledger.

Colonel Lemert is too wise and far-sighted not to see the folly of such conditions and too energetic not to seek a remedy.

This, he thinks, lies in more economical and business-like methods of making and marketing their machinery, made possible by the operation of both the old companies under one management. He admits frankly that the volume of business may not be increased materially, but expects to lower the ratio of expense.

Their business has grown to vast proportions, extending, as it does, throughout the United States and many foreign countries, and therefore must needs be thoroughly systematized to insure satisfactory returns, for in the clay machinery trade, as in other lines of manufacturing, the days of exorbitant prices have passed. Under the new regime each branch of the business is intrusted to those best qualified to look after it. For instance, the manufacturing department is conducted by Mr. W. W. Wallace, the selling of the machinery is managed by Mr. R. C. Penfield, and the correspondence is directed by Mr. W. W. Reehl, and the finances by Mr. J. B. Gormly. "Thus, you see," Colonel Lemert said, with a smile, "Mr. Penfield, Sr., and myself have little to do but advise with and indorse what the younger members do—or, in other words, take life easy."

Anticipating the revival of business which they think is sure to follow McKinley's election, they are working on, and will soon have ready, a new catalogue of all the clay machinery made at both factories. The list is so large that it will make a book of several hundred pages.



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W. W. RHEEL, Secretary.

W. C. LEMERT, General Manager.
J. W. PENFIELD, President.

EXECUTIVE FORCE OF THE AMERICAN CLAYWORKING MACHINERY CO., BUCYRUS AND WILLOUGHBY, OHIO.

Written for the CLAY-WORKER.

WITH THE YANKEE BRICKMAKERS.

ENTERING THE Wooden Nutmeg State from New York in search of clayworkers, one naturally stops first at New Haven. This old "City of Elms," magnificently endowed in all those features of good order, thrift, education and refinement, which constitutes the best of New England life, though the seat of a great university, is essentially a manufacturing community, the manifold variety of the business interests being a distinguishing characteristic, for it includes almost every commodity in general use.

Not the least among this great variety of industries is the manufacture of brick, which has been carried on in the vicinity for about two hundred years. The business apparently has always been well managed, and is at present unusually well organized. A few years ago the brickmakers of New Haven, Berlin and New Britain organized the Central New England Brick Exchange Company, with headquarters in New Haven and New Britain. This has been of material advantage in preventing disastrous competition and cutting of prices. All brick are sold through the Exchange, and the sales are so adjusted that each firm furnishes pro rata to its production. This precludes underselling, and fair prices are maintained. The demand for brick has hitherto so nearly equaled the supply that little trouble has been experienced. The plan of the Exchange Company, which, by the way, is a joint stock association, may be imitated very advantageously in many localities. Upwards of 120,000,000 brick are sold annually through the Exchange, the New Haven district supplying over 50,000,000, while that tributary to the New Britain office will furnish more than 60,000,000. About sixteen firms are members of both Exchanges.

To thoroughly appreciate the Connecticut brickmakers one should visit them. It is an agreeable experience in many ways, as the writer can attest. Appearances of thrift are almost always discernible. At New Haven the yards are to be found along the railroad north of the city, commencing first with Davis Bros.' two plants. Wm. E. and Jas. Davis are certainly good brickmakers, for everything indicates the active personal attention of the owners.

A short distance beyond is the large plant of Geo. Ives & Son. Though one of the oldest yards now operated, it is right up to date in equipment. If Mr. Ives or his son Al are found at home a cordial welcome is assured, and you will find difficulty in deciding whether the handsome stepper, Trixy, or their last "New Haven" machine is their greatest favorite.

A few steps further up the road is the extensive yard owned by Horace P. Shares, and managed by his son, John Shares, who read one of the brightest papers at the Cleveland Convention.

Perhaps a mile further north is a smaller plant belonging to E. W. Potter, and a larger one having the distinction of being owned and operated by our ever youthful and effervescing friend, Capt. S. P. Crafts, and being the only yard in Connecticut which uses coal for fuel exclusively.

Two miles further on are the two largest plants in this vicinity, owned by the I. L. Stiles & Son Brick Company, and operated under the supervision of Mr. Frank Stiles.

CAPT. S. P. CRAFTS' BRICK WORKS, Quinnipiac Station, Hamden, Conn.

On the opposite side of the Quinipiac river, approaching the city, are Brockett & Todd and Thomas Cody, which complete the list. All these are successful and fine examples of the rack and pallet system for drying brick. Great care is taken in making and burning the brick, consequently they are smooth, square and a good red color, though not as dark as may be obtained in northern New England.

A visit to Berlin is in order next. This important railroad junction, twenty-six miles north of New Haven, has become the largest brick producing point in the State, the brick made here being sold through the Exchange at New Britain. The C. P. Merwin estate owns the largest yard, and, indeed, one of the largest in New England. Mr. E. S. Morse, administrator of the estate, is a proficient brickmaker, and a most agreeable gentleman. It is to be hoped he will take a somewhat deeper interest in the N. B. M. A.

Among other yards to be visited is the Donnelly Brick Company, which has been so successful under friend Donnelly's energetic management that they have added a terra cotta plant.

Marcus E. Jacobs, owner of the Berlin Brick Company, regularly attends N. B. M. A. Conventions, and is somewhat of a record breaker. With one machine he has managed to make about 7,000,000 pallet brick each year in the six months' summer season, and has done this for seven successive years. The regular day's work for the machine gang on Berlin yards is 45,000 brick.

Mr. Jacobs's nearest neighbor is Richard Murray, an old-time Hudson river brickmaker, who has found Berlin a more agreeable and profitable field for operation.

Two other pallet yards near the junction are the plant operated by Joseph Towers and the one recently built by the Standard Brick Company, under the supervision of F. C. Whitney. All are excellent examples of pallet yards.

Other members of the New Britain Exchange are Tuttle Bros. and Caleb Johnson, near Middletown, also Dennis & Co., whose yards are at Clayton Station.

The finely equipped dry press plant erected a few years ago near the station has not been operated for some time, the buildings being at present leased to the New Britain Terra Cotta Company, whose plant was burned some months ago.

Hartford is the capital of the State, but its principal glory is its insurance business. The great insurance companies have erected some magnificent structures and made the city one of the richest per capita in this country. Unfortunately, the half dozen or more brickmakers located here are, for some reason, unable to insure themselves against low prices on the exchange plan, consequently prices have not been so well maintained. The demand has generally been good; at least an interview with Mr. Loveland, Superintendent of the Hartford Brick Company, will lead one to think so. They are probably the largest producers, with Brother S. H. Wilson and Donahue & Curtiss close followers. Other operators are Elijah Mills, Cephas Dorr, Alderman Michael Kane, Joseph Vieghn, Fred Baker and one or two more.

The new Charter Oak Brick Company, which is erecting a plant near Elmwood, has an abundance of capital, and is building substantially. Like nearly all the Connecticut yards, they will use New Haven machinery.

In Windsor, a few miles north of Hartford, brick have been made for more than a century. A few are made there now, but mostly by hand or with horse power, in the primitive methods of their ancestors. On the opposite side of the Connecticut river are several yards, the most extensive being the Weyant Brick Works, at South Windsor; Potter & Potter, at East Windsor Hill, and Henry Alden, at Thompsonville. Their market includes the whole eastern portion of the State, Rhode Island and part of Massachusetts.

Having passed up through the central portion of the State, nearly all the Nutmeg brickmakers have been visited. The list must not be completed, however, without mentioning F. P. Rice, builder and brickmaker, in the growing city of Danbury, nor should the Quinnebang Brick Company, of Danielson, be forgotten.

Connecticut is a very small State, geographically considered, but the annual production of brick is about 150,000,000, nearly all of which are used within her own borders. The entire product is first-class sand-faced building and sewer brick. So good, in fact, that until buff brick became fashionable few repressed brick were made or used. The brick are sorted carefully, according to color and quality, the best being packed in hay or straw for delivery. Some very fine buildings are the result.

The cost of manufacture is surely low, because the best modern appliances and methods are generally employed, though it would doubtless be lower if less care was taken to have the brick perfect. Almost all are burned in temporary clamp kilns, and wood is the principal fuel.

No vitrified street pavers have yet been produced, the clay being considered unsuitable for the purpose. North Haven and Berlin clays are red alluvial deposits, while the Hartford clay is more blue and usually tougher. In other sections it is generally blue and sandy. A large deposit of red shale has been recently opened near Berlin, which has every appearance of being good paving material, and the few tests that have been made would seem to prove it. Brick pavements have been laid in several of the larger cities of New England, but, pending approval, their use will be limited. However, as the advantages of brick paving become more apparent, local manufacturers will doubtless find a way to supply the demand.

Thus it would seem that Connecticut brickmakers as a whole have little to complain of, certainly no more than the average of mankind in these times. The best of it all is, they don't. A few hours' association with such enterprising, genial and hospitable men is a tonic of more than ordinary effect.

PETROS.

H. P. SHARES BRICK WORKS, New Haven, Conn.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 49.

AFTER CONSIDERABLE deliberation on the subject, I have decided that gaseous fuel, as set forth in this journal by myself and others, will be better understood, more appreciated and more interesting to the general reader if better illustrated. I have therefore had tracings and drawings made of the Siemens and other modern gas producers, also furnaces and regenerators, in plan, elevation and sections. These, if clearly comprehended, will enable the reader to approximately estimate the value of such a system to the clayworking industries.

I repeat, and my readers must bear in mind, that regenerative chambers are not necessary where the heat is nearly all absorbed from the products of combustion before being allowed to escape into the atmosphere, as, for instance, in a steam boiler of the modern type and setting. In this and all similar cases, gas producers, with proper connections and valves, are all that is necessary to supplant solid fuel stoking.

It may at first sight be difficult to see where the advantage of gas firing for boilers comes in, for I readily admit that every unit of heat contained in the coal may be generated on the grate under the boiler, but the question arises, Is it? The following are some of the advantages of gas firing: No opening of doors for firing or cleaning grates, which all must admit is a decided advantage, as there is no cooling down by large drafts of cold air nor any cooling of the fire by charges of fresh coal; little or no dust or ashes is carried into the flues to clog them up, and last, but not least, it is easy to maintain the gas and air supply in the proportions to insure complete combustion, and, consequently, the maximum of heat.

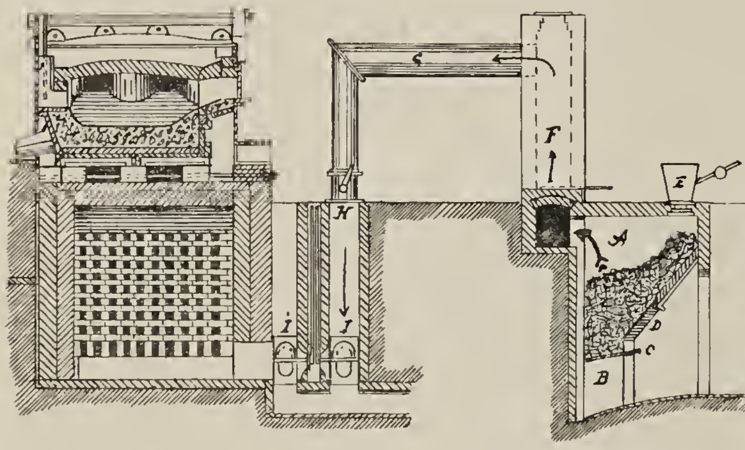


FIGURE 1. Siemens Gas Producer and Furnace in Section.

When speaking or writing of the bad effects of large drafts of cold air entering the furnace through open doors, I scarcely ever see or hear one great evil mentioned—that is, the serious injury the boiler itself sustains by the alternate expansion and contraction caused by opening and closing doors. Every one familiar with the cleaning of a clinkered grate under a boiler is also familiar with the click and snapping sounds proceeding from the boiler all the time the doors are open, but few can estimate the strain on the rivets and plates during such cooling off. If you would avoid leaky joints and rivets and prolong the life of your boiler, do not subject it to excessive variations of temperature—I mean sudden variations.

The functions of the gas producer have already been set forth. We will therefore proceed to describe the Siemens and other forms of producers, illustrated by cuts made by tracings from Cassier's Magazine, Bauerman's and Greenwood's works and from original drawings.

Fig. 1 represents a vertical section of a Siemens gas producer coupled to a melting furnace, also shown in vertical section. The close connection shown in the drawing is for compactness sake in the illustration; in practice, the producer is from 150 to 300 feet distant from the furnace, and the connection made with an underground flue. This I must ask you to supply by imagination.

The chamber, A, is built of fire brick, rectangular in horizontal section; B is the ash pit, with paved floor, sloping to the back wall, making a reservoir for water. C is the ordinary grate, with flat-iron grate bars; this grate is usually about 4 feet by 6 feet, the length of grate bar being about 4 feet 8 inches. D is what is known as a step grate, running up about two feet and being six feet from side to side; the front wall is sloping and supported by cast-iron plates. E is the coal hopper for feeding the producer, and holding about a bushel of coal. F is a brick chimney, or "up-take," for the gas, delivering it into the cooling tube, G, thence to the down-take, H, and the reversing valve, I; the course is indicated by the arrows.

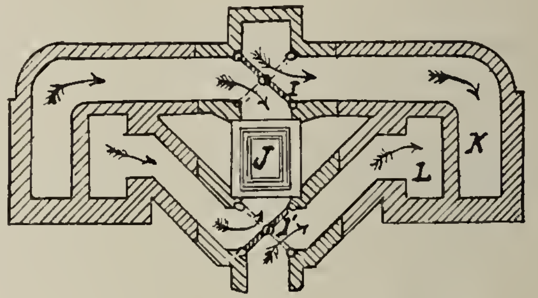
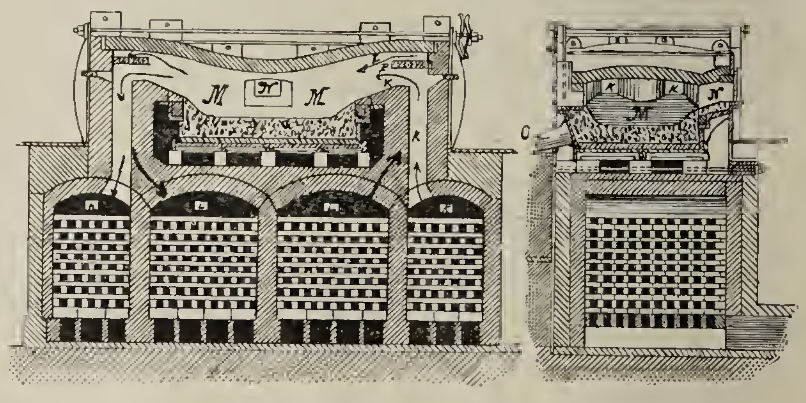


FIGURE 2. Plan of Gas and Air Flues.

In Fig. 2, which is a plan of the gas and air flues leading to the furnace, or, rather, to the regenerators under the furnace, I is the gas valve, i is the air valve; these are simply doors swung on central pivots, and their function is to reverse the currents of gas and air, respectively, hence they are called "reversing valves." Reversing is effected by swinging the valves a quarter of a turn or into the positions indicated by the dotted lines. The arrows show the direction of the gas entering at I and proceeding to K. This is the flue leading to the gas regenerative chamber. Similarly the air enters at i and proceeds to L, the flue leading to the air regenerative chamber. The other end of Fig. 2 has arrows that represent the products of combustion after leaving the two regenerative chambers at the outgoing end of the furnace and proceeding to J, which is a flue leading to the chimney. This plan of flues and valves may appear a little complicated at first, but look it well over and exercise a little patience, and it will soon lose all its apparent complexity, and take on, instead, a look of beautiful but ingenious simplicity.

In Fig. 3 we have a longitudinal vertical section of a steel melting furnace, with its inverted arched roof above the lettering and its sand bottom underneath, supported by cast-iron plates and crossbeams; beneath this, and a little below the floor level, are four arched regenerative chambers, filled nearly to the top with checker work, consisting of square fire bricks, about 3x3x9 inches, laid loosely in rows, three inches apart, then crossed by similar rows, laid same distance apart, leaving openings three inches square. By laying the rows zigzag the



FIGURES 3 and 4. Siemens Furnace and Regenerators in Section.

openings are left zigzag, and in this way the current is made to impinge on more surface, and to that extent made more effective in absorbing heat from the gases leaving the furnace, and subsequently imparting more heat to the incoming gases and air when the current is reversed. The two chambers marked K, one at each end of the furnace and underneath it, are the gas regenerative chambers, and the two similar, but larger, ones between are air regenerative chambers. The space marked M in the furnace is the melting chamber. N is the charging door. The space marked K, leading from the gas chamber into the melting chamber, is a gas flue. There are two of these flues at each end of the furnace. Their position is shown by K, in Fig. 4. This is a vertical cross section of the melting furnace, etc., where M is the melting chamber, N the charging door and O the tapping spout. There are air flues running up from the air chambers, L, into the melting chamber. These are shown only in Fig. 5, which is a horizontal section, or plan, above the regenerative chambers. Here you will see five openings at each end, at one end marked L and K, alternately, K for gas and L for air—that is, three air flues and two gas flues, side by side, and all leading into the melting chamber. I may here explain that Fig. 5 is a plan of a gas puddling furnace, three feet above floor level, and while it fails to meet the requirements of a plan for a melting furnace at that level, it will be sufficient to illustrate this subject. The gases and air are not allowed to mingle until they enter the melting chamber; otherwise an explosive mixture would be formed. To prevent this it is necessary that the flues for both air aud gas be tight; in short, no slipshod bricklaying can be tolerated in gas furnaces or their regenerators.

The gases enter the melting chamber at a lower level than the air, and are deflected down on the metal by a "feather," or thin arch, shown as a projection, P, in Fig. 3. The air is deflected by the roof and spread into a broad, thin sheet by the feather, P. The waste gases escape by both gas and air flues, as shown by the arrows at the other end of the furnace. By this division of the waste gases both regenerative chambers are heated, after which the gases join again after passing the reversing valves on their way to the chimney.

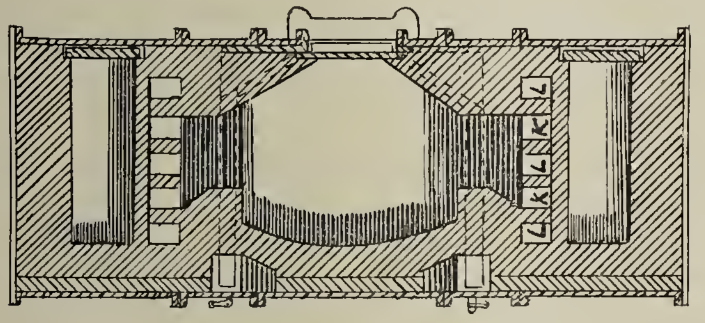


FIGURE 5. Plan of Siemens Furnace.

It requires but little pondering on the part of the practical melter to find a reason for the air being admitted into the furnace above the gas, for he knows how rapidly the molten metal is oxidized when in contact with air, and that a stratum of gas will prevent such coutact, but many a good melter has to be taught the advantages of an intimate mixture of air and the gases to secure complete combustion, or, in his own language, "to make the quickest and hottest flame." This principle or method is not new, nor is it something in the experimental stage; it has been ably expounded by other writers in this journal, and has been public property over forty years. The discoverer was, so far as I can find, Mr. C. W. Williams, of Liverpool, England. At any rate, he obtained a patent for it in 1839, and for years devoted a considerable portion of his time demonstrating in a practical way the truth and utility of his theory. How many times has the Clay-Worker told its readers the exact weight or quantity of air required to burn a pound of carbon, and then it went on to say, "but in practice about double that quantity is required." Now, why should it require double that amount in practice? Why, simply because the practice is bad, inefficient, and, of course, unscientific and wasteful.

Having now become thoroughly posted on the theoretical and practical amount of air required for a certain amount of fuel, direct your energies to reducing the difference by dividing your air supply into thin streams or small jets, so as to mix more intimately with the gases in the furnace. The better this is accomplished the less air will be needed. This applies to the ordinary grate furnace, burning solid fuel, as well as to furnaces burning gas or oil.

If you look into the matter a little you will find that every grate on which coal or other solid matter is burned is a gas producer, no matter where it is; under your boiler, in the arch of your kiln or in your kitchen stove, all are gas producers, just as much as the Siemens or any of those illustrated in this article. From these considerations, then, and a practical knowledge of solid fuel furnaces for various purposes, I must dissent from those who advocate that all the air entering the furnace should enter through the grates. WM. WAPLINGTON.

Written for the CLAY-WORKER.

CANTON PAVERS.

IT IS WELL KNOWN to all the clayworking people that in making the many different kinds of paving material manufactured throughout the world almost every one turns out a different grade, either better or worse, than their neighbors, but such is not the case in Canton, although the brickyards are from one to two miles apart; their brick are all very much alike in quality.

Canton brick, within the last seven years, have gained a reputation for themselves, having been sent all over the Eastern and central part of the United States and Canada. They are made from the famous blue shale which overlies the Putnam Hill limestone. This blue shale is mixed with red shale and surface clay, using about one-third of each. All the elements that go to make a good paving mixture are found present. After having the clay analyzed it was found to be identically the same as that of the renowned clay of Holland, where they make pavers that last a century or more.

After the clay is ground it is made into bricks, as they are made at hundreds of other yards. The shale is a very tough one, and can be dried in a very high temperature without cracking. They are set twenty-eight high in the kilns and have a shrinkage of eighteen inches, and are burnt at the temperature of about 2,200 degrees Fahr., taking from six to seven days.

In burning these brick care must be taken to burn what we call the dead ribbon off before the brick are thoroughly vitrified. I never heard anybody express their knowledge of what it is, but it is of a deep blue color, and seems to burn from the middle out, and looks as if it were highly inflated with gases. These brick have been tested time after time, and also by the United States government, where they were adopted as the standard.

At the works of the Keystone Bridge Company, Pittsburg, under hydraulic pressure, they stood 30,100 pounds crushing strength, or more than 14,000 pounds to the square inch. In absorption test they fluctuated around 1 per cent. of H_2O, which all good brick should absorb, as it is a good sign that they are not overburnt.

The yards located in Canton are the Royal Brick Company, the Canton Brick Company and the Imperial. In the works of the Royal and Canton brick can be found in correct geological formation. First, they have surface clay; second, blue shale; third, limestone; fourth, red shale; fifth, coal, and sixth, fire clay.

On the Royal Brick Company's plant they use a Bonnot stiff-mud machine, automatic cut-off table, and dry their brick by the waste heat of kiln. They use the square down-draft Eudaly kilns, and turn out 50,000 brick per day. They make their own square and floor fire brick, using their own plastic fire clay and grog, which is waste silica brick obtained from the steel works. Their chief brands are Royal, Brown Rock and Metropolitan.

The Canton Brick Company uses a Bucyrus stiff-mud machine, table and drier, and the square and round down-draft kilns. Their output is 50,000 a day. The Canton Red Granite and Metropolitan are their specialties. An interesting feature at their works is that the county workhouse convicts are employed by the county in crushing limestone for macadamizing the country roads.

The Imperial Brick Company uses a Freese stiff-mud machine, automatic cut-off table, Bonnot drier and Gouder down-draft kilns. Their capacity is 50,000 a day. Their chief brands are Imperial and Metropolitan Block.

But the best brick and the most interesting figure in Canton at present is the newly elected President, Major McKinley, of whom we are all very proud. CARL GIESSEN.

Written for the CLAY-WORKER.

THE BRICK MARKET—CUTTING PRICES DON'T INCREASE SALES.

BY R. B. MORRISON.

—"In Adversity Prepare for Prosperity."—

THE GREAT POLITICAL questions that have agitated our people for many months have been settled, so far as elections are concerned, to the satisfaction of a majority of the voters, and the financial and revenue policy of the country will no longer be an uncertain, vacillating one. The business men will know what to count on in their forecast of the future. Our business interests, especially the manufacturing ones, have been crippled for the past three years and our workingmen have been living a large part of the time in enforced idleness, all of which has been caused by a general lack of confidence in business circles; in other words, capital has been timid.

The cause for all this has been extensively discussed in the columns of the Clay-Worker. Some ascribe it to the demonetization of silver, some to change in the tariff laws, others to overproduction. The last reason, it seems to me, is not a good one. So long as the consumers are in need of the products of the country, just that long will there be no overproduction. It is not the intention of the writer, however, to enter into a discussion of these questions. That must be left in more competent hands.

It would seem that we have good cause to expect a general and speedy revival of business. Idle capital seeks profitable investment, and has been awaiting safe and favorable conditions, and those conditions are now here. The brickmaker who has now, or will have in early spring, a good stock of brick on hand, will reap the reward that courage deserves and foresight brings.

Improvements in the building line have been at a standstill, or almost, at best, for three years, and should business revive, as it surely will, the demand for building material during next year will be very heavy, and, as a natural result, prices will be better. One fact has been demonstrated during the dull times, and that is that low prices do not increase the demand for building material. This year buildings could be constructed cheaper than for thirty years past, and yet there was comparatively little building done.

During these dull times the nervy, foresighted brickmaker has improved his plant, repaired his machinery, put his kilns and driers in good working order, and is ready for the rush when it comes, and will reap the harvest in the near future. But most of us, no doubt, have been timid and short-sighted, and have allowed our stock and our plant to run down, and, when the time comes, will be found without oil in our lamps. We should at once prepare for any demand that may come by putting our machinery and works in good running order. If any new machinery is needed, it should at once be procured. It will cost more to do this next summer than it will at this time.

To succeed in the manufacture of brick and compete successfully with others, a brick manufacturer must have the best appliances and be able to turn out a good quality of brick, and as cheaply as it is possible to do it. The plant must be skillfully and economically managed. Finances must be properly taken care of. In fact, there must be good management in every department. The day of slipshod, careless management has passed by. There must be method and system in our business affairs, or failure is inevitable.

Our experience during the past few years admonishes us that only strict economy in good times can enable us to weather the financial storms that are sure to come upon us. If we have accumulated no reserve in prosperous times we cannot hope to weather the storm in hard times.

We must make a good brick at lowest possible cost. We must, as near as practicable, get every brick into the market, then get pay for them, and success is assured.

In addition to attending closely to every detail of our private business connected with the manufacture, we should also co-operate with our fellow-craftsmen to promote the general welfare of our business, to push our products into new fields and have them used for every purpose to which they are adapted. The general interest of our business can only be advanced by organized effort on the part of manufacturers. Every brickmaker should identify himself with some local organization or the National Association, or both, if he wants to be an up-to-date brickmaker. In these organizations we can discuss every question that relates to our business, whether it be the best method of making brick or how best to bring an increase in the consumption of our product. Efforts in this direction are fast crystallizing into practical shape. Great good has already resulted and much more will come from it in the near future.

The American home builders should be educated on the line of durable and safe homes. This can only be had by using fire-proof material, and burned clay combines this quality with durability, and is really the best building material in use in this country. Much can be accomplished in this direction by combined efforts through these organizations.

Every enterprising brick manufacturer should be a member of our National Association if he wishes to help himself and promote the general welfare of our business.

THE CURIOSITY SEEKER.

Mail-order advertisers are bothered by a species of humanity that causes expense and brings little profit. I refer to the curiosity seeker, who haunts the columns of newspapers and magazines, and sends for everything that may be secured free of expense. Certain classes of cheap publications seem to have a great attraction for him; hence advertisers in these publications often get a superabundance of "answers," but do little business as the result of the letters that come in reply.

The curiosity seeker is usually a young man or a young woman, blessed with but little of the world's goods, but possessing an insatiable curiosity to know as much as possible of the world that lies without his or her circle. He (or she) usually subscribes to a cheap publication which contains more advertisements than reading matter. All else now necessary is a batch of postal cards, a cheap pencil or a bottle of ink, and the campaign is begun. Every advertiser who offers anything free, whether it be a circular or sample, is solicited.

The curiosity seeker is found chiefly in the country. There life is rather dull for the younger element, and the waiting for replies to the requests supplies a mild sort of stimulus that is not without its attractions. The circulars and pamphlets that arrive are eagerly read, and the only obstacle that hinders the purchase of the articles is the lack of funds.

"There is no way of distinguishing," said an advertiser to me recently, "between the request of the curiosity seeker and the man or woman who really seeks information. The only plan is to honor all requests. Many of the curiosity seekers are intelligent people, who write their requests in excellent diction and penmanship; hence the impossibility of laying down any arbitrary rules. I do not think," he continued, "that the curiosity seeker is as unmixed an evil as some people imagine. He often remembers the articles of which he has read, and, as he rises in the world, buys them. As there is no way of getting rid of him, we must grin and bear it."—O. H., in Fame.

OFFICIAL ANNOUNCEMENT.

Eleventh Annual Convention of the National Brick Manufacturers' Association to be Held in Buffalo, N. Y., February 2, 3, 4 and 5, 1897.

To Members of the N. B. M. A.:

WHEN WE ADJOURNED at Atlanta last winter it was generally understood that we would next meet in Boston. Since then a change has come over the spirit of our dreams. The continued business depression which has prevailed throughout the land has materially depleted the "gold reserve" of a large majority of our members, especially those of the Central and Western States. This, it is feared, will cause a marked decrease in the attendance at our coming Convention, if held so far East. Appreciating this fact, the Boston brethren have very kindly consented to give way for a season and so permit us to meet at a more central point in order that those who feel the pinch of dull times may more easily and surely make the annual pilgrimage.

As will be seen by the following letter, the brickmakers of Buffalo invite us to hold our next Convention there. Buffalo's central location, unexcelled railroad facilities and excellent hotels make it pre-eminent among our great convention cities. This, coupled with the fact that it is but an hour's ride from Buffalo to Niagara Falls, the greatest of America's natural wonders, which presents a more beautiful and impressive appearance in midwinter than at any other season, will make the Electric City, as newly christened, a most desirable place of meeting for our entire membership.

We are confident that no more satisfactory point could be selected, and have therefore determined to hold our next Convention in Buffalo, Tuesday, Wednesday and Thursday, Feb. 2, 3 and 4, with a side trip Friday, the 5th, to Niagara Falls. The meetings will be held in the main hall of the Builders' Exchange, which is but a square from the new Tifft House. The latter will be headquarters, where delegates and those accompanying them will be accommodated at the following special rates, on the American plan only: $2.50 and $3 a day for rooms without bath, and, with bath, $3.50 to $4 per person, according to location of room, two or more to a room.

Reduced railroad rates will be obtained, as heretofore. Further particulars in regard to same, and the programme, which is being prepared, will be announced subsequently.

Brickmakers of the United States and Canada are all cordially invited to attend the Convention and participate in the good work. Those desiring information relative to requisite of membership, etc., are requested to address the Secretary at Indianapolis.

THE EXECUTIVE COMMITTEE.

T. A. RANDALL, Sec'y. R. B. MORRISON, Pres.

A CHARACTERISTICALLY CORDIAL INVITATION.

T. A. Randall, Secretary N. B. M. A., Indianapolis:

Friend Randall—Observing the suggestions in recent issues of the Clay-Worker that a central point like Buffalo would likely be more acceptable as a place of meeting this year to a large number of our brethren than a far-away town, even though so noted and attractive a place as the Hub, and consequently enable us to gather a larger number of the ancient fraternity of brickmakers to our Annual Convention—I am tempted to say reunion—this winter than we can otherwise reasonably hope for these "16 to 1" times—sixteen brickmakers to one job—and desiring to emulate the generous and self-sacrificing spirit of New England forefathers, which prompts our Boston friends to step aside for the present, the brickmakers of Buffalo have communed together, and desire and instruct me to extend to the members of the N. B. M. A. a most cordial invitation to hold the next meeting here in the Queen City.

CLAY-WORKER.

WM. H. BRUSH, Buffalo, N. Y.

From our point of view this is generous and self-sacrificing, in that we realize that we are foregoing a rare treat by not going to Boston, where we know we would all be made happy, for our brethren there, headed by our gifted Vice President, know far better than any one else how best to welcome and entertain those who are bidden within their gates. We of Buffalo have been looking forward with a great deal of pleasure to our meeting in Boston, and would not now consent to a meeting anywhere else but for the assurance that the postponement is only for a season, and is made for the benefit of the poor brickmakers, like Morrison, Ittner, Eudaly, Purington and Alsip, who say they can't raise money enough this year to carry them to far-away Boston, but can reach Buffalo. A Convention without these old stand-bys would be a disappointment, so we must change the programme.

From what you have said to us, we take it that it is not necessary for us to send with this formal invitations from our Mayor and other city officials. Will say, though, that we Buffalo brickmakers stand in with his Honor and the Chief of Police, and they assure us that they will afford free lodging to any of our visiting friends who "go broke" during the week of the Convention.

With this assurance of our good intentions, I hope, Mr. Secretary, you will be able to induce the Executive Committee to accept our hospitality this winter, and that every progressive brickmaker in the land will come to Buffalo at the appointed time. We will do all in our power to make the Convention a success, and think our visitors will have a good time to boot.

Yours very truly, WM. H. BRUSH.

Written for the CLAY-WORKER.

A CHAMPION IN HIS WAY.

What the Procrastination Habit Leads to if Persisted in for Years—Lederer Tries to Square Himself—A Wide-Open Confession From the Caricaturist.

Procrastination is the Thief of Time
INK

I AM NOT AT ALL DESIROUS of adding to my reputation as an egotist, but I am really able to set up a claim for something in the championship line. And do you know what it is? Simply that I believe myself to be the Champion Procrastinationist of the World. It is in my power to put off doing things longer than any person of my acquaintance, at least. It is a gift that I have been assiduously cultivating since earliest boyhood. Take as an example: For years and years I have been calmly promising the patient editor of the Clay-Worker and his friends that I would visit a first-class brickmaking establishment—and the nearest thing to doing it has been to prowl around some one-horse brick foundry at a country crossroads.

"It doesn't seem right," sadly remarked the editor, who had corralled me down in St. Louis, one hot day last summer, "for a member of my correspondence staff to know no more about clayworking than a zebra does about the history of Yucatan architecture. Really, it doesn't." And then I promised for the dozenth time to make a thorough inspection of some bang-up brick producing atelier.

"You'll put things off, will you?"

The first appearance of the afterrmath of Procrastination.

But I haven't accomplished my laudable purpose yet, wherefore my conscience smiteth me with gruesome frequency. And remorse, in the dead hours of the night, gnaws at my mental vitals, whereat I awake with great suddenness.

Do you, my reader, ever wake up abruptly after midnight, struck with the thought that you haven't done the thing you have faithfully promised to do, but just put it off from day to day, wondering what skillful, plausible excuse you'll make next? But there! Being a methodical man of business, instead of a putterer with pen and pencil, of course you have never done anything of the sort.

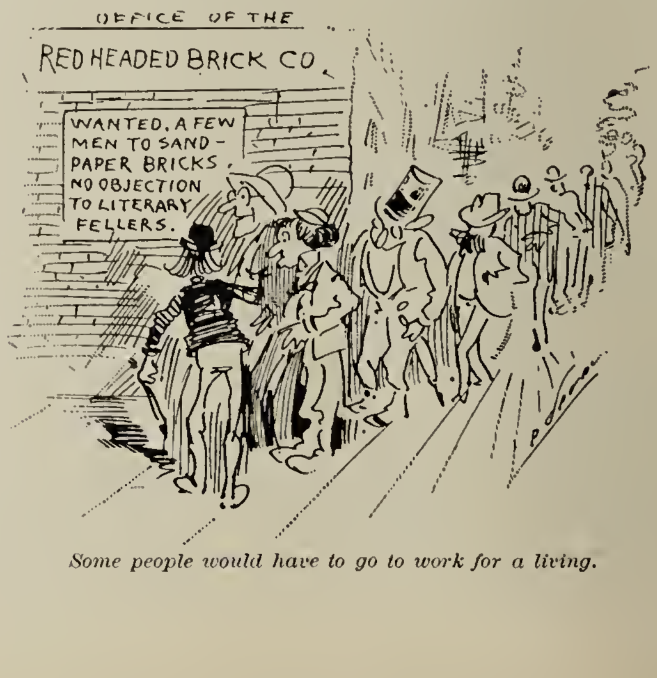
Yet truly it is mental agony for me, this fateful gift of procrastination. What gigantic proportions it assumes, regarded from a horizontal position about 12:30 a. m., say, when the candle is out (I am writing in the backwoods now) and the itinerant feline vocalist pervades the night!

EVEN TIME THOU SHALT NOT STEAL

At first the fiend is not even open to argument.

Put yourself in my place for a few instants. In vain you change your position; in vain you endeavor to regard the peccadillo procrastination from a charitable, free-and-easy, third-person point of view. It persists in growing, swelling to a size perfectly abnormal. You try to think of something else—futile attempt! However, towards the small hours it begins to shrink. Its attitude becomes less overwhelming; it condescends to parley with you, and acknowledges itself not to be quite so vainglorious as it represented itself at first. You remind it of the years you have passed in cultivating its acquaintance, and that you have always been constitutionally inclined towards procrastination; that you have always agreed with it, and that, in turn, it is morally bound to agree with you; you suggest that as you happen to be a human being, and all beings are fallible, you were only carrying out the universal law of humanity in giving way to its subtle influence. You even suggest, by way of faint extenuation, that other men might even have put it off much longer.

The Sun's rays drive the Fiend away.


OFFICE OF THE
RED HEADED BRICK CO.
WANTED, A FEW MEN TO SAND-PAPER BRICKS, NO OBJECTION TO LITERARY FELLERS.

Some people would have to go to work for a living.

Then you gradually assume a bullying tone. Perhaps by this time it is broad day, and you have reduced the aftermath of procrastination to a pitiable state of subserviency. Then, arising, you dismiss it from your mind with an indifferent yawn, and say "Pooh!" much as you'd have said "scat" to the feline melodist of the preceding hours.

The moral of this would appear to be that it is, on the whole, more injurious to have a conscience than to develop the procrastination habit, or, at least, a sad thing to combine the two. But morals of any kind are not fashionable nowadays. To write a screed that has neither discernible head nor apparent tail, and to leave your readers to fill in the plot for themselves, is considered the thing. If this mode should become unpopular a good many writers will be thrown out in the cold and be compelled to work for a living.

THIS IS MY BOOZY DAY.
INK
INK
INK
INK.

Remorse followed by Cyclonic industry.

CHAS. LEDERER.

BRICK PAVEMENTS—METHODS OF TESTING ETC.—EXTRACTS FROM PAPERS AND DISCUSSIONS.

THE AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS had a successful meeting at Chicago Oct. 14 to 17. Mr. A. D. Thompson, Chairman of the Committee on Street Paving, presented a report outlining a programme for discussions on that subject, as follows:

"Advantages of an Asphalt Testing Laboratory." N. P. Lewis, Engineer of Street Construction, Buffalo, N. Y.

"Specification Requirements for Asphalt; Asphalt Mixtures and Tests of Asphalt." A. W. Dow, Inspector of Asphalts and Cements, Washington, D. C.

"Paving Streets with Brick." S. J. Hathaway, Chairman Street Commissioners, Marietta, O.

"Paving in Nashville." J. L. Kennedy, of the Board of Public Works, of Nashville, Tenn.

"Modern Street Railway Track Construction on Asphalt Pavements in Minneapolis." F. W. Chappelen, City Engineer of Minneapolis.

"Testing Paving Brick." A. D. Thompson, City Engineer of Peoria, Ill.

"Regulations Concerning the Opening of Pavements by Corporations or Plumbers in the District of Columbia." Capt. Lansing H. Beach, Captain of the Corps of Engineers, of Washington, D. C.

"Regulations for Opening Paved Streets." G. D. Snyder City Engineer, Williamsport, Pa.

"Rumbling of Brick Pavements." E. Adam, Engineer, Newark, N. J.

"The First Cost and Maintenance of Pavements." W. F. Williams, City Engineer, New Bedford, Mass.

"Improved Streets and Care of Same." M. A. Downing, Chairman of Board of Public Works, Indianapolis.

"Cost of Repairing Asphalt Pavements." E. B. Guthrie, Engineer, Buffalo.

—Testing Paving Brick.—

Mr. Thompson's paper on "The Testing of Paving Brick" was quite exhaustive. He summarized the three essential qualities to be possessed by paving brick as follows:

First—It should be tough to prevent rapid wear, thus prohibiting brittleness or undue softness.

Second—It should be non-absorbative to prevent disintegration by weather and the absorption and retention of street fluids, which present an unsanitary pavement.

Third—It should have sufficient strength to resist, without crushing or breaking, the heaviest loads passing over the street.

In a general way, he said, the old plan universally employed was to judge paving brick by inspection, and fully one-half the cities using brick pavements require brick satisfactory to the Engineer or Board of Public Works, without naming definite qualities. This is unfair to the manufacturers, as well as to the citizens. * * *

Color is used by inspectors as the main guide to judge of the quality, and it is a good basis to compare brick from a single factory, after determining by tests the color indicating the best quality. It is not a good test for bricks manufactured from varying materials under varying conditions.

The points mentioned which appear to establish the necessity of testing paving brick are: First, there is no other method of determining the quality; second, it is the only method by which the qualities demanded can be definitely and specifically stated; third, it is the only method of judging quality which is fair to both manufacturers and citizens; fourth, the quality of material is constantly improved. * * *

Even among men who admit the necessity and appreciate the value of tests there is a wide difference of opinion as to those necessary and the method of conducting the same.

The amount of absorption is used by some cities as a single criterion of the quality of the brick, while among the tests required by other municipalities are those for abrasion, impact grinding, penetration by oil, transverse strength, crushing strength and chemical analysis. There are but three qualities to be determined: toughness, non-absorbativeness and strength.

* * *

The quantity of water absorbed in a given time indicates the probable disintegration by freezing and is also an indication of completeness of vitrification. * * *

The amount of absorption allowable depends largely upon the material of which the brick is manufactured. * * * Experiments with shale brick show that an absorption of from 5 to 6 per cent. in forty-eight hours could be allowed. * * *

That the absorbative test is more valuable because of the indication of vitrification. This quality is shown by no other tests thus far devised, and a brick which absorbs more than 2 or 2½ per cent. of water in forty-eight hours lacks this element to such an extent that it will not produce the best results in pavements. * * *

The transverse test gives the strength of the brick when used as a beam. With the load applied at the middle, it is valuable in determining the brittleness and in showing the lamination. This test is made by supporting bricks at the ends upon knife edges and breaking them by pressure applied by knife edge at the middle. With bricks laid flat the strength per square inch of section is then figured out by the beam formula: R—(31x2 b d) 2w, wherein R—modulus of rupture of square inch, I—length in inches between supports, b—breadth in inches, d—depth in inches, and w—load in pounds. The highest modulus required three years since was 1,600 pounds, but this requirement has increased steadily, until the past season the writer has required a modulus of 2,200 pounds.

Toughness is generally determined by the abrasion test, which consists of tumbling a number of bricks in a foundry rattler for a certain length of time together with given quantities of scrap iron. The size of rattler recommended is from twenty-four to thirty inches in diameter, eighteen to forty inches in length, and revolutions between thirty and forty per minute.

Scrap iron is generally used for the abraiding material. Many engineers used foundry shot or stars.

Brittleness is the most serious fault in paving brick to-day, and must be overcome before brick can compete with other material on streets with heavy traffic.

With a rattler two feet in diameter and three feet long, with three hundred pounds of scrap iron, say from one-quarter of a pound to five pounds in each piece, the writer has found twelve bricks a good number. The test should be conducted a sufficient time to cause an appreciable loss and develop the faults of the brick.

In an experiment in 1894 the following results were obtained:

	Per Cent. Loss.				
Lot.	1st Hour.	2d Hour.	3d Hour.	4th Hour.	Total.
1............	8.35	6.79	5.47	3.99	21.4
2............	11.44	6.81	3.55	5.04	22.3
3............	11.07	5.09	4.40	3.43	22.5
4............	9.28	5.09	3.31	2.11	18.2
5............	12.59	6.67	6.21	4.12	26.4
6............	9.40	4.00	4.08	3.61	19.7
7............	9.45	4.52	4.59	3.14	20.0
8............	7.92	4.74	3.59	2.24	17.4
9............	6.59	2.32	2.54	2.00	12.9
10............	11.16	5.55	4.00	2.97	21.8
11............	7.11	4.07	3.79	2.58	16.75
12............	7.99	4.81	3.17	2.64	17.62
13............	6.52	4.07	4.66	4.33	18.29

This paper developed quite an amount of detailed information.

—Paving Streets with Brick.—

Mr. S. J. Hathaway, Chairman Street Committee, Marietta, O., said, in part, on this subject:

Our main streets we pave fifty feet in width; other streets forty feet. One street has been paved twenty-four feet in width, but there has been complaint that it is too narrow. The contractor excavated one foot in depth the full width. The subgrade is then rolled with a heavy road roller. Our specifications call for a seven-ton road roller, but on Third street we used a thirteen-ton roller, thereby securing a much better foundation. After the subgrade is rolled, six inches of gravel is put on, then rolled with a seven-ton roller, the steam roller being too heavy for rolling gravel. Then two inches of sharp sand is put on in which to lay the brick, this six inches of gravel, two inches of sand and four inches of brick making, in all, twelve inches. This fills the excavation back to the established grade. Then one inch of sand is spread on the top and broomed in, and the brick are rolled with a seven-ton roller. After that one inch of sand is spread over the brick and the pavement is finished. The top of the pavement is usually even with the top of curb, with six inches gutter. * * *

Many different kinds of brick are offered. Two kinds, however, present marked differences—shale and fire clay. Both these kinds are known to the trade in two general divisions—standard brick or repressed brick or blocks. A repressed paving brick is generally larger than a standard paving brick, and is called a block. It makes little difference, in our estimation, which we use. One-third fire clay and two-thirds shale make a fine, hard brick. We also have several streets paved with Hallwood block, which is giving excellent satisfaction.

On the whole, I am in favor of repressed shale block, and believe if it had one-third fire clay it would be an advantage. If they are burned hard enough and then cooled properly, or, to use a more scientific term, properly annealed, a brick can be produced which will last as long as a granite block. The common paving brick have sharp edges, which will be broken off. The repressed block present smooth, beveled edges, while the raw edges of the ordinary block are liable to absorb water. The question of the absorption of water does not cut much figure if the material has been properly burned. * * *

The question of desirability is largely one of skill in burning brick properly. A perfectly annealed brick, like a perfectly tempered piece of steel, will outlast the man who made it. I would place the life of a well-made brick on a residence street in any ordinary sized city at a hundred years. * * *

We have never used tar to fill in between brick, deeming it unnecessary. Six months' use of a pavement will fill the interstices, if any should be unfilled with sand. We can take up our pavements at any point and find the sand underneath dry, showing that it is impervious to water.

The thorough manner in which a street sweeper will clean a brick pavement recommends it over all others, unless it be asphalt. But it must be remembered that asphalt costs nearly twice as much as brick. * * *

For heavy traffic I recommend broken stone and concrete foundation, but for residence streets sand and gravel is good enough.

Our first improvement began in 1891. It was of standard brick, and cost $1.08 per square yard finished pavement. The next year we tried repressed blocks at a cost of $1.14 a yard. Our last letting this summer was 65 cents for standard brick.

—Rumbling of Brick Pavement, by Ernest Adam, Engineer, Newark, N. J.—

In introducing his paper, Mr. Adam spoke of the construction of brick pavements in Newark on which there has been unusual rumbling noise.

I began to investigate the cause of this noise, and attempted to find remedies for it in the pavements already laid. From the information received, I came to the conclusion that in order to avoid this objectionable noise it was necessary to abandon the exclusive use of cement grout. Mr. N. P. Lewis, Engineer of Street Construction and Maintenance, in Brooklyn, according to a recently published article entitled "Trouble with Noisy Brick Pavements in Brooklyn," attributes the cause of the noise to the fact that the paving was done in cold weather, during which the sand cushion and probably the surface of the concrete was frozen at about the time the bricks were rolled. As the frost worked out it caused the sand concrete to shrink, producing a void under the bricks, and consequently a noise.

My experience with the brick pavement in South Tenth street and Congress street, where I am positive the frost had not affected any material, contradicts the theory of Mr. Lewis.

The theory of expansion in brick pavements was clearly proved by an ocular demonstration in Johnston avenue, which is paved with fire-clay blocks. Upon May 10, this year, when the temperature was 94 degrees in the shade, the pavement was heaved to a point where the avenue forms a summit. It is said that a loud noise accompanied the rupture. The break formed an arch with a nine-foot span and eight-inch rise, and extended from curb to curb, forty-two feet. No rupture like this had occurred in any other streets, although there are bulgings, but more so in the fire clay than in the shale brick pavements.

The experience had with cement grouting should have caused us to abandon its use in Roseville avenue, but the specifications in the contract, which had been awarded last year, called for such a filler.

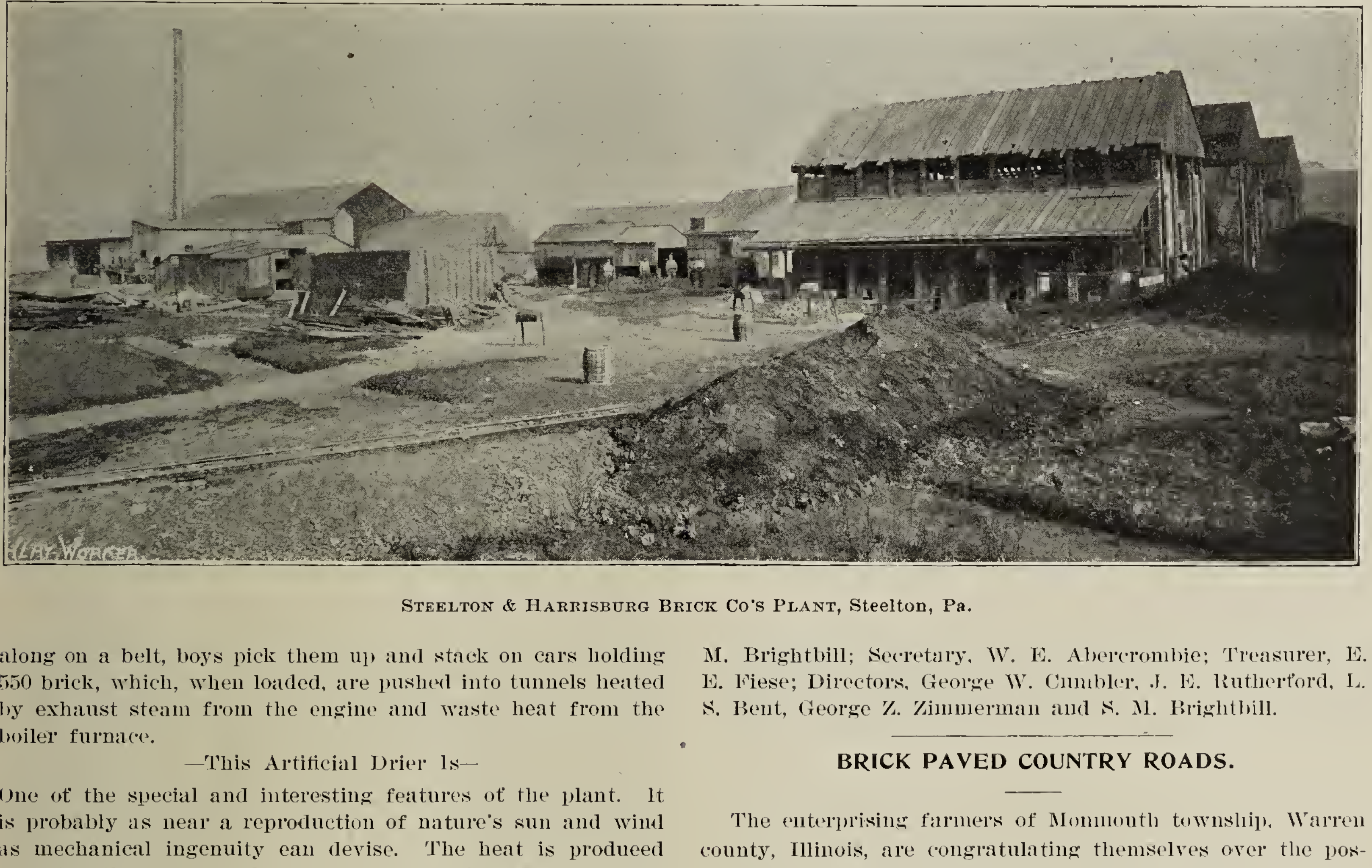
—Providing for Expansion and Contraction.—

When three blocks of the avenue had been paved in the ordinary way a different method was adopted in finishing the remaining block. A thin board, one inch thick and five inches wide, was placed against the curbstone before the bricks were laid, with small wedges set between the curb and the board, so that it could be removed after the bricks were rolled with the five-ton steam roller. It was necessary to fill the ends of the joints next the curb with cement mortar in order that paving mastic, which was afterwards filled in the space left by the board, could not spread. At both ends and at the middle of the block a strip of pavement across the street, full width and fifteen feet in length, was also poured with the composition. The block is about eight hundred feet long. This device was that ordinarily used in stone block pavements, and was adopted in order to provide for lateral and transverse expansion during hot weather.

The pavement treated in this manner so far does not cause any uncommon noise, whereas in the first three blocks it was very soon experienced. I certainly agree that it is far better to lay brick pavements during the summer months than when cold weather is liable to affect the material.

A NEW BRICK PLANT.

ONE OF THE most successful of the few new brick plants started the past season is said to be that of the Steelton and Harrisburg Brick Company, near Steelton, Pa. The company was organized early in the year, and started out with the laudable ambition to build a thoroughly up-to-date brick manufactory. They have a large tract of clay land that will supply an abundance of the raw material for many years to come, and they think their equipment will be hard to beat for some time to come. It consists of 125-horse-power boiler and engine, steam cable hoist, which hauls the clay from bank to machine in dumping cars, a Chambers pug mill and brick machine, with automatic cutting table, having a daily capacity of 40,000 brick or more. As the brick are cut off and carried along on a belt, boys pick them up and stack on cars holding 550 brick, which, when loaded, are pushed into tunnels heated by exhaust steam from the engine and waste heat from the boiler furnace.



STEELTON & HARRISBURG BRICK CO'S PLANT, Steelton, Pa.

—This Artificial Drier Is—

One of the special and interesting features of the plant. It is probably as near a reproduction of nature's sun and wind as mechanical ingenuity can devise. The heat is produced by using the smoke and gases from the boiler, which heretofore has been wasted by allowing it to pass out through the smokestacks. It is now taken out through sheet steel flues, which permit the heat to radiate up through the brick on cars in the tunnels and carry off the smoke and gases. The interior of the drier is perfectly clean and free from smoke or odor of any kind. The exhaust steam is passed into heater coils, and fresh or pure air is drawn through them by a system of fans, which are so arranged inside of the drier building as to give each of the tunnels an equal or perfect distribution of air, and are so placed as to give the brick the full benefit of the heat and wind. The moisture being taken out by fans makes the drying positive and rapid. During the past week brick have been made, dried and set in kiln ready to burn, all in the short space of ten hours. The bricks are dried and perfectly free from checks.

The entire drier is at all times under complete control, and can be regulated to suit the material to be dried. The drier was invented and constructed by J. F. Stengel, office at No. 928 Elicott square, Buffalo, N. Y.

The Steelton and Harrisburg Brick Company speak very highly of it, and consider themselves fortunate in securing so economical a system, and have every reason to be proud of their new plant.

It takes about one and a half tons of coal per day to run the entire plant.

The fans used were furnished by the American Blower Company, Detroit, a firm having many years' experience in drying brick, so their commendation of this drier is very gratifying to the brick company.

The brick are burned in square kilns, each holding 250,000, and are pronounced as good as the best by all who have tested them.

The company is also operating works at Harrisburg and White House, near Highspire, and are prepared to ship brick to any point at very short notice, at the very lowest prices. With their entire plants the company have a capacity of 100,000 per day.

The following are the officers and directors: President, S. M. Brightbill; Secretary, W. E. Abercrombie; Treasurer, E. E. Fiese; Directors, George W. Cumbler, J. E. Rutherford, L. S. Bent, George Z. Zimmerman and S. M. Brightbill.

BRICK PAVED COUNTRY ROADS.

The enterprising farmers of Monmouth township, Warren county, Illinois, are congratulating themselves over the possession of a brick paved country road. The pavement is made of a single course of brick laid on six inches of sand and supported on each side by two and a half feet of crushed stone. They claim it to be the first brick paved country road in the United States. In this we think they are mistaken, as Cuyahoga county, Ohio, began paving her roads with brick two years ago or more. We commend the enterprise of both these communities. Farmers cannot invest money to better advantage than in making good brick roads over which they can haul good big loads of produce to market at any and every season of the year.

Written for the CLAY-WORKER.

A RESUME OF A FEASIBLE PLAN FOR A COLLEGE FOR BRICKMAKERS.

BY J. W. CRARY, SR.

IN SEVERAL ARTICLES in the Clay-Worker I have spoken of schools for brickmakers. In my article for last August Clay-Worker I gave a plan in detail for a school on the industrial plan. In the October Clay-Worker I notice quite an extensive comment, or rather criticism, on my plan. The criticism is more erudite than argumentative. It was written, I think, by a very nice, good young man, and with good motives. In fact, he pays me a very high, and, perhaps, an undeserved, compliment, for which I thank him, and, in return, will say that the school to which he is attached has my hearty good wishes and commendation. My young friend and critic seems to be a little jealous of my industrial school for brickmakers, but as he signs himself "Student," I cannot see that my school could in any way interfere with or come in competition with Professor Orton's school for teaching the science of ceramics.

My school is a school of technology and practice in brickmaking, setting and burning in variety of clays. I do not propose to go into the whole science of clay work. After my pupils have graduated and received their diplomas as expert brickmakers they can visit Professor Orton's school and go through his "curriculum" with much advantage. Indeed, I would advise them to do so, for I would not want to mix all kinds of clay work with a brickyard that is to graduate expert brickmakers only. Professor Orton begins right where I would stop. If I understand the object of his school, it is to teach the science of ceramics, including all kinds of clay work, theoretically treated.

My industrial school for brickmakers would have nothing to do with any kind of clay work but brick. I propose to make a business affair of it, so that it will pay its own way and be a profit to the stockholders as a brick plant exclusively. It would neither be wise nor practicable to start a school that would embrace all kinds of clay work and expect to turn out first-rate experts in all the different branches. In the first place, it would take a very large capital to start it, and then it would be very difficult to carry on all the different branches so that a student would become an expert in all, or even in any one branch. He would be "jack of all trades and master of none." No young man would care to enter such a college, only as a matter of superficial knowledge in clay work; besides, such a college would charge more for matriculation than young men who desire to be clayworkers could afford, and there would not be sufficient patronage by the wealthy class of young men to sustain such a college. Professor Orton, I think, has the right thing for a beginning.

If I should succeed in inducing the brickmakers to start an industrial college, or brick plant, on my plan, then the students of Professor Orton's school can come to the industrial school and finish as brickmakers. They need not travel all over the United States and work in the various kinds of clay in order to know what to do with it. They will find all this concentrated in the self-sustaining brick college that I propose. The plant would be located in some central city where a variety of clay could be obtained, and if it could not be all found at such a place a supply could be brought from other places sufficient for all experimental purposes. Many brickmakers and clay land owners would be glad to send specimens of their clay, free of cost, or at low prices, in order to have it fairly and reliably tested. For instance, a man has a good and inexhaustible bed of clay which he desires to sell. He would not want to start a brickyard in order to test the clay, nor would he send it to some private brickmaker to have it tested, but, as a business matter, he would send a carload of his clay to the well-known public brick college, which would make a full and reliable test of it and give an official certificate of the result. If the clay proved to be good, the owner would advertise it for sale, with the certificate of the college, which would be a sufficient guarantee to any party wanting to purchase clay land. Since my article in the August Clay-Worker on this subject many have indicated their approval of my plan for a brickmakers' college, and I doubt not that the N. B. M. A., at their next meeting, will discuss the subject with much interest and favor. Of course, there will be objectors; they are necessary in all human affairs. The affirmative side of any question cannot be fully understood or appreciated without the negative side is shown. There is sound philosophy in this idea, applied to all things in God's universe. The pessimist is just as necessary as the optimist. I do not undertake to say just how the pessimist gets his pay or pleasure; perhaps he sees it in the first sentence of the Sermon on the Mount: "Blessed are the poor in spirit, for theirs is the kingdom of heaven."

My good friend, "Student," in the October Clay-Worker, thinks that my scheme for an industrial college for brickmakers is not practicable, and his main objection seems to be that the students could not work six hours in the morning and then study books and hear lectures four or five hours in the afternoon. He thinks a man don't feel like studying after he has done a day's work. I did not discuss the hygienic side of the question, for my teaching at school and my experience at manual labor demonstrated the fact that the brain not only needs recreation by physical exertion, but, in order to have it, will cause the body to do a good half day's work. But perhaps my friend, "Student," thinks that "brain work" is harder than "body work," and that my plan is at fault because my students would have to do their manual labor before doing their mental labor. If this should prove to be true, I would not object to four hours' study in the morning and five or six hours' manual labor in the afternoon. I would leave this to a majority of the students. I only give an outline of my scheme for making expert brickmakers. The proper details would suggest themselves in a proper way and time.

I would do nothing in any way to interfere with Professor Orton's school. In fact, a practical brickmakers' college, run on business principles, would be a great help to a school of merely science and technology in clay work. As I have said, students could get a thorough education in brickmaking by attending both schools. "Student" does not believe that brickmaking and burning needs a high order of brain to master it. Let him graduate at his school, and then start out to take charge of a plant where the clay is different from that which he has been used to, and he would find that he was yet a student. Suppose him to be a good setter and burner where the clay will shrink and fuse in burning, as most of the clays do; then he gets where the clay will neither shrink nor fuse. Here he would be little better than a "greenhorn;" he would "watersmoke" and get his kiln hot all right, but he would not "settle" it, and if he had learned that such clay must be got to a high heat, he would not know when to stop his fires, and the only thing he could do to be on the safe side would be to get his kiln as hot as possible, which he would not likely do, and if he did it would be by the waste of labor and fuel. Of course, if he had carefully read my writings, he could form a pretty correct idea of what to do, but book learning is only half learning. "Practice only makes perfect." Chemical analysis or pyrometers will not unerringly determine the proper and necessary practice in burning clays. We may reach an approximate truth by such means, but the reliable fact must come by repeated practical tests.

—A College for Brickmakers Is a Public and Private Necessity.—

Uniform good brick, according to the class of clay to be used, is a great advantage to the public. There are many instances where public buildings have been erected of very imperfect brick, because it was very difficult to get good brick at any price. The fault did not lie in the want of raw material, but in the want of intelligent skill. I could mention several instances where public buildings, both State and national, were built of second and third-class brick for the reason that it was quite impossible to get first-rate brick. It is fair to say that one-third of the public buildings are built of inferior brick. Now, if we had a college that could turn out well-skilled, intelligent, expert brickmakers in a short time, all manufacturers of brick, skilled or unskilled, could avail themseves of the services of a brick college graduate, who would insure success.

—Where Should a College for Brickmakers Be Located?—

Several places have been suggested. One writer urges the choice of Kansas City, Mo. His reasons are that Kansas City is the most central for the whole body of brickmakers, and that an inexhaustible supply and great variety of the best clays are to be found there, and that the facilities for transportation are equal, if not superior, to any other place, and that he and many others would take stock liberally in the enterprise. I have no doubt but that many brickmakers in all parts of the United States would take stock in the enterprise. I would give preference to all such, but if there was a lack of capital, I would invite outside capital, which would be glad to invest in the plant, because there can be no doubt that its net profits would pay a large dividend. But there are enough brickmakers in the United States to establish this college and successfully operate it without any outside assistance. If the craft of brickmakers can hold a National Convention every year and sustain a publication of respectable journals and other literature, it should certainly be able to start and run a college for brickmakers, which can and would be as profitable as the business of any one brick plant run on private account.

It may be asked, Why start a brick college and not for all industries? The answer is plain and obvious. There is no other one industry which takes in such a variety of raw material and requires such a variety of treatment and manipulation. The raw materials in metal, wood and textile fabrics are nearly the same of each kind. If a man learns to work one of these in one place he can work it in any other place, but if he learns to work clay only in one place he cannot successfully work a different kind of clay in another place. For instance, a first-rate brick burner in Philadelphia, or place of similar clay, could not burn a kiln here, or anywhere, where the clay is infusible and requires an intense heat. This is why it is not necessary to have a college for every kind of industry.

The expert brickmaker should be able to take charge of the business anywhere in clay that will make brick, and the college I propose would teach him how to do that, as all kinds of clay would be used sufficient to show the different treatment required to make good brick. I have heretofore explained all these facts in the Clay-Worker, but it is pertinent to repeat them in substance here.

—How to Properly Initiate a College for Brickmakers.—

Let the next meeting of the N. B. M. A. fully discuss the subject and appoint a committee to formulate suitable articles for incorporation. Let it be called the "N. B. M. A. Brick Works College." Let the capital stock be fixed at $50,000, with the right to increase it to $100,000. As it is more national than local in character, let the stockholders apply to Congress for a charter, unless a State charter could be more readily obtained. Let the by-laws and regulations be to this effect, viz.: that there shall be two kinds of students, "stipendary" and "volunteer." The stipendary students would receive their pay in tuition for five or six hours' labor each day, and get their board free of cost. The volunteer students would pay a matriculation fee and all of their personal expenses themselves. Then there would be a third class of workers, which would labor for pay, as at common brick works. In order to supply the college with labor needed to operate the works steadily and systematically it would be necessary to employ, perhaps, one-fourth of the labor. These laborers would not be entitled to any of the privileges of students, but they would learn much to their advantage by contact with students and the regular exercises, and for these advantages they would engage to work at reduced wages.

All "stipendary" students would be required to work at least six months before receiving a diploma, and the "volunteer" students would have to remain at the college at least four months before receiving a diploma. But in no case would a student receive a diploma until he could satisfy the board of examiners that he was a thoroughly qualified, expert brickmaker, as it would be fatal to the character and best interest of the college to graduate inferior students.

—The Officers of the College and Their Qualifications.—

The plant should be governed by a President and Board of Directors, all expert brickmakers, chosen by a majority of the stockholders annually. The Board of Directors should employ all suitable officers to superintend the practical work of the college. A thorough, expert brickmaker, who had been used to all kinds of clay, all kinds of brick kilns, and knew enough of chemistry to analyze clays and teach the principle of combustion of fuels, should be employed, with an assistant, if necessary. The three general kinds of brick kilns, the "up-draft," the "down-draft" and the "continuous," should be used. Then three kinds of brick machines should be used—the "soft-mud process," the "stiff-mud" and the "dry-press." They could be worked alternately, or as often as would be deemed necessary to instruct the students. The kilns would all be small, so that burning would go on constantly. Students would do all the setting and burning, and would take it "turn for turn," so that each one would become expert and perfect in the art, provided that he had a natural desire to master it and the necessary physical and mental qualifications.

—Money in the Enterprise, if Wisely Located and Managed.—

It cannot reasonably be doubted that there would always be a sufficient number of students to do all the work that might require skilled labor. The digging and hauling of clay and the handling of fuel, etc., does not need more skill than a common laborer can perform, but attending and running the machines, the proper "hacking" and setting of brick, and, most of all, the burning, are of primary importance. About two-thirds of the labor and skill needed are in these things, and this labor and skill would only cost the college the boarding of the students doing the work.

If it should be desirable to run the machines, say, ten hours a day, the students could be divided into two classes, the morning class and the evening class. Those that worked at manual labor in the morning hours could study and hear lectures, say three hours, in the afternoon. Those that did manual labor in the afternoon could study, etc., in the morning hours. This would enable the works to run at full time, which would be advisable when all other conditions were favorable.

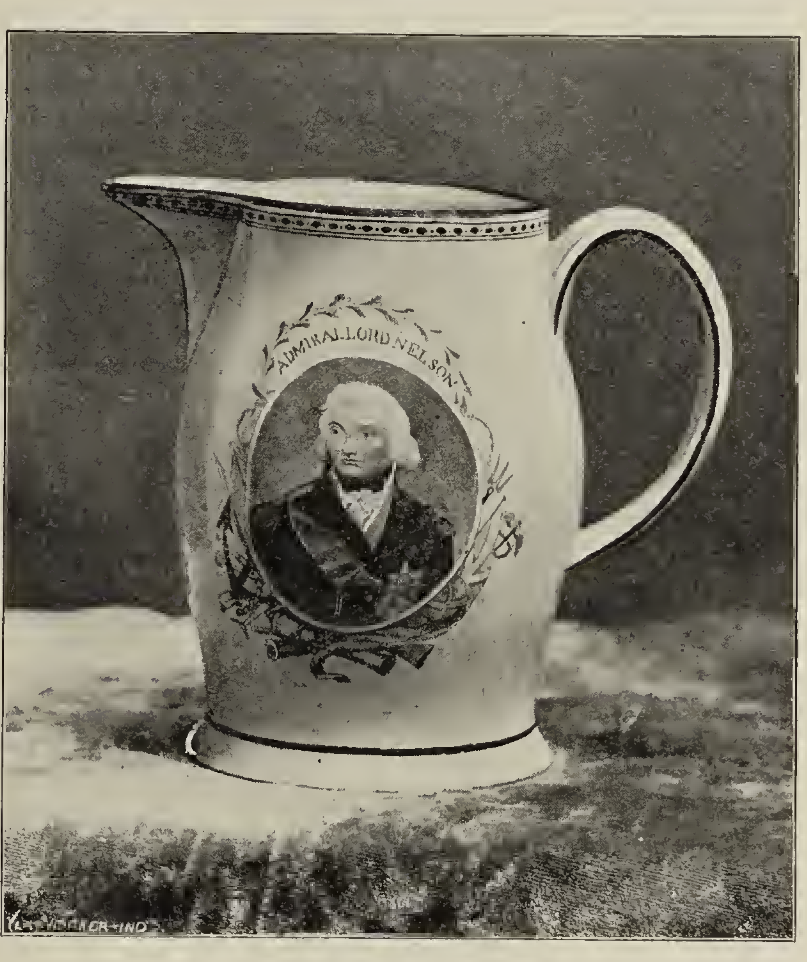
I hope and trust that brickmakers will seriously consider my scheme for a college for brickmakers, and that the members of the N. B. M. A. will formulate the plan and provide for its actual operation at their next meeting.

HISTORICAL PITCHERS.

BY MRS. MARY E. NEALY.

—Admiral Lord Nelson.—

THIS PITCHER, of the famous Liverpool ware, shows an excellent portrait of Admiral Lord Nelson, Duke of Bronte, one of the most remarkable men of his age. With a form so delicate as to suggest frailty and weakness was combined a mind and soul so strong and brave as to rise above all feelings of fear or doubt, even in the most perilous condition of things. His faith in his own ability to succeed and conquer was almost miraculous, and proved a source of strength quite out of and above the ordinary attributes of manly bravery. With a full sense of his lack of physical power, and with the loss of an eye and an arm, he still believed utterly in the success that awaited him. He had good blood, being related to Suckling, the early poet, and to Sir Robert Walpole. And probably from his thirteenth year, when he entered the navy, until his glorious death at Trafalgar he had never known for a moment the sensation of fear. Indeed, when the only blot which ever marred his character spread its shadow over his name, he faced it boldly, as he had done the guns of his enemy, and was faithful to the last to the brilliant



Admiral Lord Nelson, Naval Engagement on other side. Liverpool Ware.

and beautiful, but unscrupulous, woman who had captured his heart.

His record in battle is unmatched in the history of the world. It equals even that of Napoleon, as death alone could conquer him. So it is well that his name should be honored in the households of our land, as well as in those of England. Let the young man who becomes morbid on account of physical defects or delicate health brace himself up with the story of Nelson, where he will learn that the battle is not always given to the strong, but to him who has the bravest heart. Let the siege of St. Vincent, the struggle of Teneriffe, and the victories of the Nile and Copenhagen and Trafalgar stir the sluggish blood within him and make him clench his hands in the battle of life and determine that he must win.

It is said that the number of designs upon English pottery in honor of Nelson is only equaled by those upon Liverpool in honor of our own Washington. These prints are always in black upon the cream ground. This pitcher belongs to the collection of Mrs. Emily B. Livingston, of New York. On the opposite side of the pitcher is given a naval engagement, one of Nelson's. But naval battles all look the same.

Written for the CLAY-WORKER.

SEDIMENTARY AND ROCK FIRE CLAYS.

THE REAL VIRTUE of any fire brick, as applied to the roof of a reheating or puddling furnace, is determined by the life it gives in practical service. Theoretical tests are of little significance in the comparison of two varieties of fire brick unless the conditions are identical and such as will measure the duration of time, which each will serve its purpose adequately. There are many different grades of fire brick used for this purpose, the physical and chemical natures of which are quite as unlike as their behavior during the period while they remain in the furnace roof.

The general rules for the production of fire brick from any fire clays are similar, and to discover the real source of an error in the burned ware, as being the cause of inefficient results, may be found in the character of the materials used and in the methods of factory manipulation. Usually the fire-brick manufacturer is limited in regard to the available refractory constituents which can be employed for compounding his brick mixtures. In developing a formula for a fire-brick mixture there are two essential points to be observed. First, that the ware it yields should be perfect in physical condition, and, in appearance, satisfactory to the consumer. Second, to be composed of substances which will produce the most refractory brick, applicable to a given purpose.

The first problem is usually solved after a careful study of the shrinkage of the clays which are to enter into the composition of the brick, and unless this list embraces several clays, extremely dissimilar with respect to their principal chemical constituents, this question resolves itself into only a few possible combinations.

If one variety of clay is used to obtain a single standard shrinkage, there would be only one proportion of calcined clay (biscuit) and raw clay. But for different varieties of clay this ratio does not remain constant.

There are the denser (rock or flint) clays and the sedimentary (plastic) fire clays, practically the same in chemical composition with respect to silica and alumina, but the shrinkage law which is applicable to one cannot be used for the other. In either case, however, the clays carry high percentage of combined water, which, if not largely disposed of, may lead to practical difficulties. Some of these very hard raw clays are immediately disintegrated if calcined at a red heat, and must be reduced to a pulverized state to permit the water of constitution to pass off freely. The sedimentary clays, on the contrary, are able to evolve their combined water without disturbing their molecular structure. The result of such treatment destroys their plasticity and hardens the whole mass into a rock-like state. If we compare the two forms of calcined clay we will find that the fragments of rock or flint clays are extremely hard and so very dense that they are almost non-absorbent, while the calcined sedimentary or plastic clays are rather hard and quite porous. Similar methods are used in factories for manufacturing fire brick from the resources of these two distinct clay regions, but their wares are not able to give the same results in the reheater or puddling furnace roof.

I will outline the tests which were made of two batches of fire brick made from these clays to illustrate their one significant physical inequality and dissimilarity. About one thousand of each were placed in the roofs of two reheat furnaces which were run under the same conditions. Special provisions were made for the same coal to be used in both, and for the time and manner of shutting the furnaces down each week should be conducted uniformly alike.

At the end of the first week the plastic clay fire brick was found to be slightly glazed over and quite similar in appearance to that of the Pennsylvania fire brick. During Sunday of each week these two furnaces were idle and the linings cooled down. After the third or fourth week it was easy to distinguish a peculiar feature with respect to the Pennsylvania fire brick, which grew more and more noticeable each Sunday, and yet which was not in the least apparent throughout the roof of New Jersey fire brick. The brick, in either case, were laid in the roof as "headers," making a nine-inch lining, and it was observed that after the fourth Sunday fifty or more Pennsylvania fire brick had begun to crack and disintegrate. In most cases a third or more of each of these brick chipped off and fell into the bottom of the furnace, leaving the surface of the Pennsylvania brick lining jagged and uneven. After the sixth or seventh week this serious crumbling had extended throughout the whole lining and had caused it to waste away very rapidly, not so much from any tendency to fuse, but due to its inability to endure changes of temperature—expansion and contraction.

The reheater furnace roof was not removed for two months subsequent to the time when the Pennsylvania fire-brick roof became loose and unreliable, and throughout the test the New Jersey brick had shown no inclination to "chip off" from Saturday to Monday of each week, but burned down slowly and evenly, till only a crust was left, and the brick were hardly more than one inch thick when removed.

There are a number of important lessons which may be learned from such a test as this. The theories to be derived are based, to some extent, upon chemical laws, yet are by no means beyond the comprehension of all practical brickmakers. They are truths no less valuable and applicable to the manufacture of fire brick from the sedimentary clays than from the rock or flint clays, but as careful consideration of them is necessary in overcoming one of the most serious weaknesses that fire brick may possess.

The consumers and manufacturers of refractories are very liable to devote all their thought and attention to the subject of infusibility, without regard to the wasting away of their wares as a result of rapid disintegration. Take, for instance, two fire brick, or small specimens of their mixtures, and subject them to most severe metallurgical heat, and it is very easy to form a correct opinion as to their comparative value with respect to fusibility, but it is quite easy to misjudge the relative practical efficiency of the two specimens in the reheater furnace roof. The brick which is able to burn "smoothly," yet very gradually fuse upon its surface, has got much more in its favor for outlasting all competitors than one can realize at first.

Referring again to the two principal constituents of a fire-brick mixture, "biscuit" (calcined clay) and raw clay, let us consider, first, the former component part with regard to its chemical and physical properties. The method of preparing fire clay "biscuit" is quite clear to all. The raw clay is burned in the green state, either in the form of brick or in bulk.

The raw flint or rock clays possess less plasticity, even if reduced to a powder, than the sedimentary clays.

The composition of both are: Kaolinite, free silica (quartz), water of constitution (fluxing impurities), lime, magnesia, ferric or ferrous oxide, alkalies, and possibly sulphur, phosphorus, titanic acid.

Assuming that chemical analysis has proven that two specimens, one of flint or rock fire clay and the other of the sedimentary variety, are composed of the same percentage of the substances tabulated above, then they can only differ in their physical condition. As a result of the incomplete disintegration of the molecular structure of the former, it is incapable of becoming as sticky and fat as the latter. It is impossible to discover with the naked eye that the molecules of silica and kaolinite are finer in one case than the other. The theory is generally accepted, however, that the sedimentary clays possess but little crystalline structure, with the exception of a part of the silica that exists in the anhydrous condition (quartz). In the laboratory the chemist is familiar with those substances which are precipitated from solution in a gelatinous state, while there are others thrown down in a flocculent condition. When wet both are sticky, but after they have been ignited the former burns together into hard, tough lumps, while the other yields a powder, the grains of which apparently have no bond.

This merely serves to illustrate the difference between the bond which a perfectly plastic clay brick receives when fired in the kiln, as compared with that of a semi-plastic or rock clay fire brick. The binding power, in either case, is imparted only by virtue of the kaolinite or the mixture, and its strength dependent upon the physical condition of the silicate of alumina. This leads us up to the two general methods of combining the substances in a fire brick into a hard mass, thoroughly cemented together. The result may be obtained by the presence of a sufficient quantity of (1) fluxing agents and (2) plastic kaolinite.

Fire brick made from the rock or semi-plastic clays are usually dense and extremely hard, so much so that the mason finds it difficult to cut them with a trowel. As compared with the sedimentary New Jersey fire clay, their fluxing impurities, especially with regard to the alkalies, run considerably higher. The effect of this is to produce a hardness in addition to the imperfect bond given by the semi-plastic kaolinite, which is characteristic of fusible silicates, viz.: a hardness which is inclined to appear brittle when subjected to sudden and extreme changes of temperature.

Again, if we examine the "biscuit" made from rock or flint fire clay, as compared with the calcined plastic clay, we will observe another important point bearing upon this subject.

As I have said before, the rock or flint clay "biscuit" is very hard, and so dense that it could almost be called vitrified.

The plastic fire clay "biscuit," on the contrary, while hard and firm, is slightly porous.

The tendency of the latter form of "biscuit" clay, when in contact with the soft, plastic clay of the brick mixture, is to absorb, and, by virtue of the little porosity it has, to adhere to the raw clay. In other ways, as the brick mixture is burned in the kiln, there is formed that affinity, or, better, a means of the biscuit "gripping" and "holding" the clay, that is not possible if the biscuit is as hard and non-absorbent as rock or flint clay in the calcined state.

There is advantage, too, derived by using raw fire clay in the brick mixture which has the maximum amount of plasticity.

It is an old law, but a good one, and has been observed for many years: a fire brick will expand and contract suddenly with the least chance of serious disintegration if thoroughly bound together with plastic kaolinite, and, therefore, it is wise to use the stickiest pure fire clay available in conjunction with the biscuit.

It is easy to imagine, and laboratory experience teaches, that the rapidity with which a dry, difficultly soluble substance goes into solution in an acid depends, in a great measure, upon the fineness to which it is pulverized before the application of said acid is made.

In all probability the same law holds good in the case of raw fire clays. I do not say that any of the kaolinite of the raw clay will go into solution when water is applied to the mixture, but I do mean that the most plastic, and, therefore, the finest, clays are, with the same amount of pugging, more capable of being absorbed by the slightly porous biscuit than the coarser semi-plastic clays, and it is by this effect which the kaolinite is able to produce a tough, thoroughly combined fire brick.

You have often heard a mason ask if a certain hard, vitrified brick would "take" cement. He has learned from experience that there are certain dense and non-absorbent masses to which cement is unable to cling sufficiently to insure a reliable job. It is just as true when applied to the relation between the raw clay and biscuit of a fire-brick mixture.

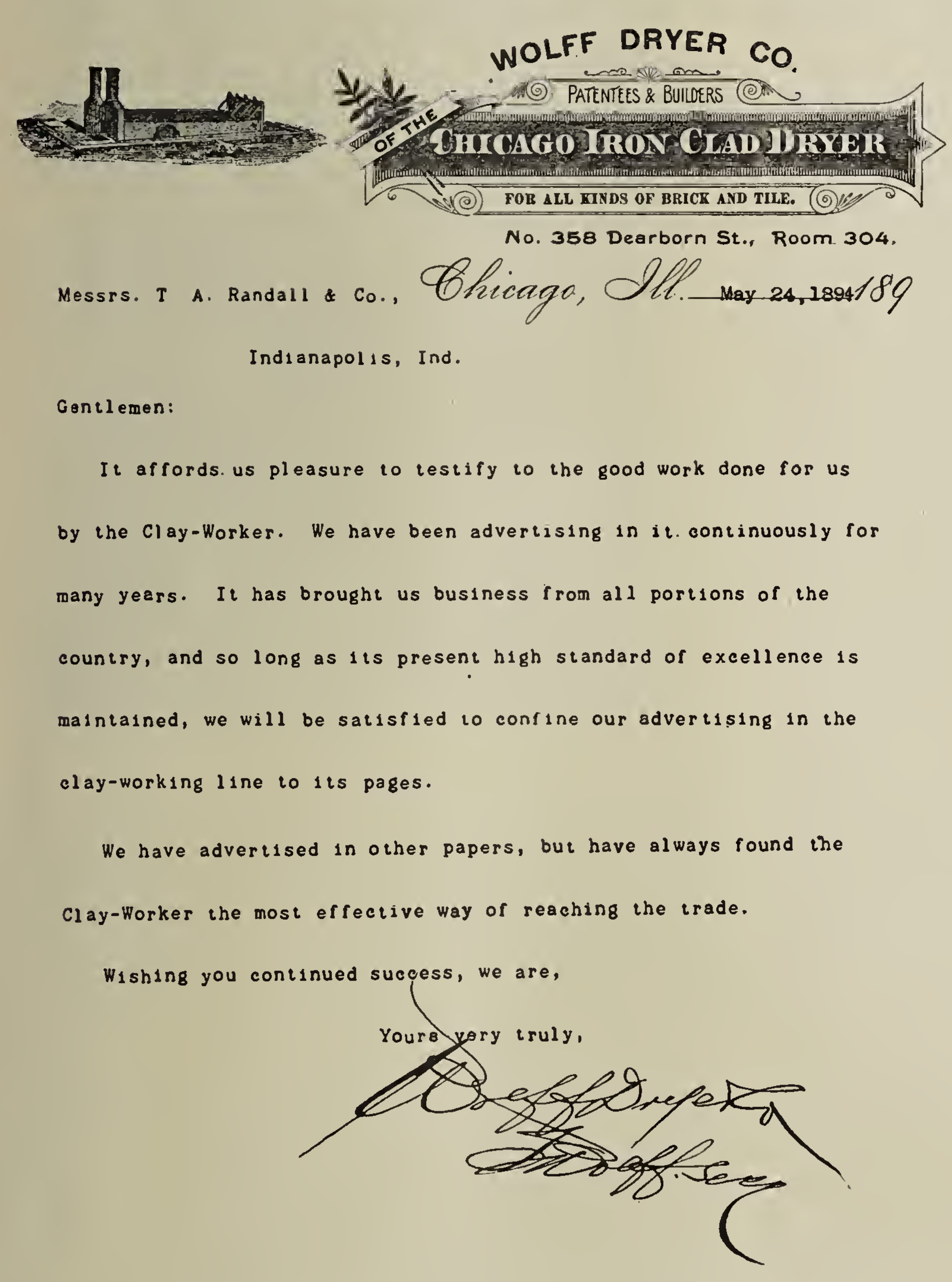
First, it is necessary that the clay should have the right kind of means to cling with, and plenty of it. Secondly, it must have something to which it may fasten itself. CHARLES FERRY.

TALL CHIMNEYS OF GREAT BRITAIN.

The highest chimney in England is supposed to be that at Barlow & Dobson's mill, at Bolton. It is 368 feet high, and is built of 800,000 brick and 122 tons of stone. It is excelled by at least two in Scotland—the St. Rollox chimney, in Glasgow, is 445 feet, and the Townsend chimney, in the same city, is said to be 468 feet high. But the steeplejacks make no more of climbing such chimneys than one a third of their height, though the vibration is more serious at times. All chimneys vibrate, especially in a gale—it is a condition of their safety—but the oscillation at the top is a serious matter for any one at work there during a high wind, and in such conditions the job is postponed to a calmer season. Lancashire also boasts one of the crookedest chimneys in the country—a shaft at Brook Mill, Heywood—which is nearly 200 feet high, but is more than six feet out of plumb. It has been belted with iron bands and is considered secure.—Chambers's Journal.

A brick chimney is being moved about one thousand feet at Bridgehampton, L. I. This chimney is seventy-five feet high and weighs about one hundred tons. It belonged to a hotel destroyed by fire, and is to form part of a newly-built structure. The contractors for the work are William and Charles P. Topping, of that place.

BRINGS BUSINESS FROM ALL OVER THE COUNTRY.



WOLFF DRYER CO.
PATENTEES & BUILDERS
OF THE
CHICAGO IRON CLAD DRYER
FOR ALL KINDS OF BRICK AND TILE.

No. 358 Dearborn St., Room 304.

Messrs. T A. Randall & Co., Chicago, Ill. May 24, 1894 189

Indianapolis, Ind.

Gentlemen:

It affords us pleasure to testify to the good work done for us by the Clay-Worker. We have been advertising in it continuously for many years. It has brought us business from all portions of the country, and so long as its present high standard of excellence is maintained, we will be satisfied to confine our advertising in the clay-working line to its pages.

We have advertised in other papers, but have always found the Clay-Worker the most effective way of reaching the trade.

Wishing you continued success, we are,

Yours very truly,

Wolff Dryer Co.
F. Wolff. Sec.

P. S.--THE CLAY-WORKER IS STILL WITHOUT AN EQUAL. IT IS A MODEL TRADE MAGAZINE AND WE PRIZE IT HIGHLY.—W. D. CO., AUGUST 26, 1896.

CORRESPONDENCE.

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

BRICK BUILDING.

Editor Clay-Worker:

A few days ago I saw in the October Clay-Worker an article called "A Plea for Brick Houses." There are some things in that article that I want to express myself about. The party that wrote that article gives very good reasons for building of brick instead of wood, but he shows that he doesn't know much about building brick houses. He talks about building hollow walls. Now, if there ever was a nonsensical thing, it is a hollow wall built of common brick. In the first place, such a hollow wall isn't hollow. A good part of the space between the brick gets filled in with mortar, and then where it is tied together in the way that is advised in that article all the good that would come from the wall being hollow is lost. A hollow wall isn't needed where people use the right kind of brick. A wall made of hard burned brick, as they are now burned in the right kind of a kiln, is never damp. I do not believe that there is a damp brick house in this county, and there are lots of them that are largely made up of soft brick. But if the brick are hard and the walls thick enough, no one need fear its being wet at any time. The way that the party that wrote the article in your paper advises building a wall is a mighty bad way. He speaks about laying the inside course on edge, three courses high, and then a band course on that. That he does to make a hollow wall out of a nine-inch wall. That is a mighty bad kind of a wall to begin with, and then it cannot be laid up with brick as ordinarily made. You can't lay up three courses on edge and then bond in with the outside courses laid up in their usual way. It looks to me like the party had been advancing a theory without doing any practicing. He is all right about plastering directly on to the brick, and all wrong about building a nine-inch wall for a two-story house. If he would undertake to build that kind of a wall here the building inspector would come along and make him pull it down, and he is right. BRICKLAYER.

He Got There, as Brickmakers Usually Do.

Dear Randall:

Yours of the 15th inst. at hand and noted. I take great pleasure in sending a photo of our plant. You may be more interested in this when I tell you that ours was the first yard in New England to be equipped under the pallet system. In fact, I believe it was the first yard east of Lancaster, Pa., as it was at that place that my father got the idea, and they only had a very small plant fitted up, and were not satisfied that it would be a success. My father saw the benefit and fitted up his plant at once, using it about two years before his neighbors dared to venture.

We still think well of the "Brick Exchange," and it is still our "salvation." We may have had a little more trouble with our collections this year, and possibly the demand has not been quite as good as in other seasons, but we are content, and almost all of us will show up at the Buffalo Convention.

We are all somewhat interested in politics just now. McKinley is all right in our State. His chances might have been better had not the Republicans in our town decided to try to send me to the Legislature. Just how great a drawback I am can only be determined on the 3d of November.

As you may see from the letterhead, I am devoting my attention to another business, but I still keep my weather eye on the brick industry. JOHN O. SHARES.

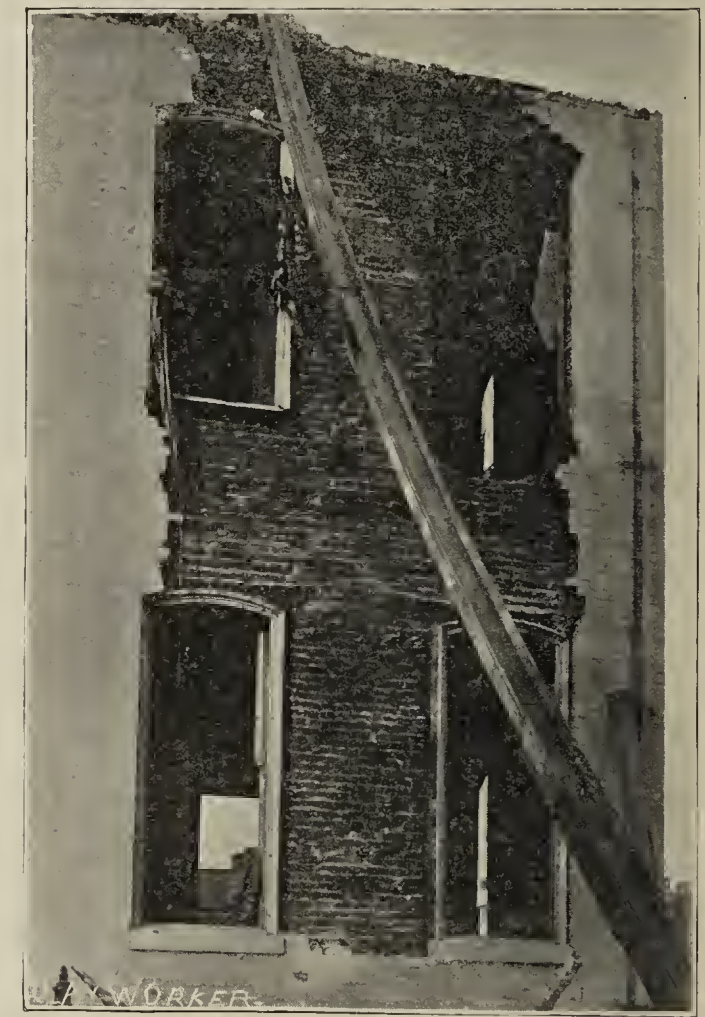
New Haven, Oct. 19.

St. Louis All Right — Bonding of Wall Facings — Resumption of Specie Payment.

Editor Clay-Worker:

Referring to the photograph herewith, showing the peculiar manner in which the face brick were stripped by the St. Louis cyclone, leaving the backing brick exposed, there is food for a large amount of reflection. The question is, How many buildings in St. Louis and elsewhere have been erected as carelessly as this one? How many owners who have been reposing peacefully under the impression that they had first-class work will awaken some morning and find that the fronts of their houses are blown out or fallen?

By close inspection of the photograph you will find that there was no attempt to bond for twenty-four courses in the first story. This should be classed as criminal negligence, or worse.



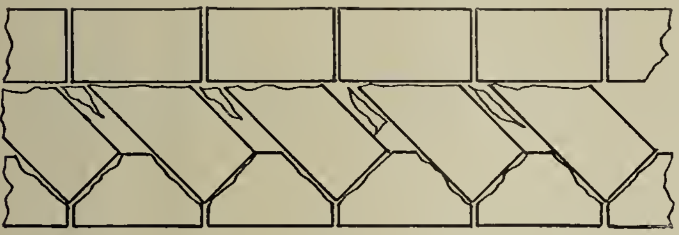
A BAD JOB OF BRICK BONDING.

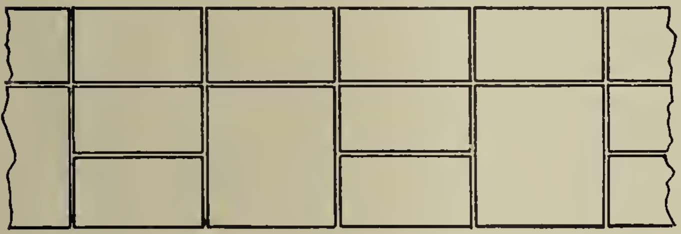
To avoid this kind of work on the part of bricklayers a brick catalogue of recent issue shows a "stretcher bond brick." If these brick are used the mason cannot help making a perfect bond.

The attached sketch shows the old method of bonding brick with clipped headers and the new style of bond with the "stretcher bond brick." It is urged by some that soap brick could be used effectively, but it would seem that the same objections could be raised against them as against the old style.

The clayworkers of St. Louis turned out one thousand strong in the sound money parade Oct. 31, and the result of the election is satisfactory to the majority of them. On Nov. 5, the regular semi-monthly pay day of the Hydraulic-Press Brick Company, they paid off all their men in gold, amounting to $12,000, which is evidence that the banks have no further use for that metal. I understand also that the Citizens' Railway Company and a shoe manufacturing establishment are using the yellow metal for payment of their hands.

The prospects are brighter than they have been for some time. Owners and real estate men are congratulating themselves on the general result, and all look forward to increased prices and increased sales. It will take 22,000,000 bricks to erect the buildings which are now being figured in the city of St. Louis, and the amount is increasing weekly. The Fullerton office building, on the corner of Seventh and Pine streets, twelve stories in height, has been let to the George A. Fuller Company, Chicago; W. Albert Swasey, of this city, architect. This building will go on at once. A manufacturing building, in the vicinity of Eighth and Spruce streets, requiring 1,000,000 bricks, will also be pushed to early completion. Another large office building, on the northeast corner of Sixth and Olive, McClure & Wheeler architects, will be built at once; also a large warehouse, with railroad connections, all of which, and many others, have been held up awaiting the result of the election.


Old Style Bond.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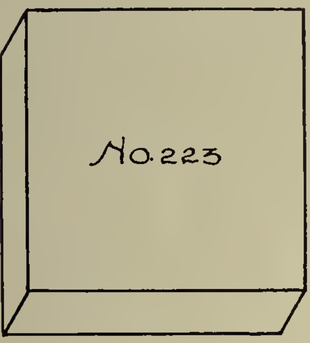

This brick saves labor and the waste of clipping, and makes a stronger wall than does the old style of bond.

STRETCHER BOND BRICK.

If we have our usual weather until Christmas there will be a good many bricks used in 1896 which were not figured on four weeks ago.
BRIC-A-BRAC.

A Graceful Submission to the Will of the Majority — Will Develop a Fine Clay Property.

Editor Clay-Worker:

Dear Sir—Inclosed please find check for $6.50 to cover subscription account to December, 1897. Please excuse the delay in not sending sooner. I was pleased with the impartial way the Clay-Worker discussed the late political issue. We of the West believe that the double standard is the correct thing, but as a majority have decided otherwise, we hope their claims may be realized.

Business in the building line is quite dull. Should it revive soon, I shall add brick and tile machinery to our plaster business, having a clay and shale formation, laying fifty feet above railroad track, with over one thousand feet frontage on same, with the different strata of clays standing perpendicular, so as to run in on any stratum which proves best for the manufacture of ware decided on. There are in the one thousand feet more than twenty different strata, with no two seemingly of the same texture or color. A. WILD.

Loveland, Col., Nov. 7.

A Fiery Lesson Well Learned—A Prediction Come True.

Editor Clay-Worker:

Your kind letter at hand. On the morning of Oct. 18 fire destroyed all that we had in the way of combustible material—dry house, machine house, belting, etc. Our engine was destroyed. Machines, pug mill, dry pan, etc., were all O. K. The actual loss will not be so heavy, about $10,000.

Like all other bright and brilliant (?) brickmakers who meet with each other once per year, vociferate loudly and to great length about the only indestructible material in the world (which we all profess to make, but never use), I have continued making this indestructible material in buildings erected with the most inflammable material I could purchase—light, cheap lumber, with pitch paper roofing, and, to top it off, I commenced to pump the waste heat from the bottom of our Eudaly kiln into this wooden building. This was all right of itself, had I stopped there, but I found that I had a good thing and I started to push it along, and got hoggish—commenced to steal the heat from the burning kiln as well as the cooling kiln, and—you know the rest. The experience is worth all it cost us.

We have closed with Chambers for one of their latest large machines and one more pan. Have bought a 250-horse-power engine, and are now erecting a building as near fire-proof as we can get it. The dry house will be absolutely fire-proof, brick and iron. The engine and boiler house the same. The machine house will likely be covered with wooden rafters, but it will be brick walls and have a fire-proof roof on the wooden rafters. Think we take no chances in putting wooden rafters on the machine house, as it will be cut off from both the drier and engine house by a brick wall on each side, each wall eighteen inches thick. Expect to put up a very nice looking brickyard. We are going to put ourselves in shape to make at least 50,000 per day, and have erected a drier to dry, if we need it, the output of the large machine—seventy or seventy-five thousand. Have an engine that will make them. We will be making brick in thirty days if every one keeps their word and gets their material on the ground for us. Expect to dry all our brick with waste heat from Eudaly kilns and exhaust steam. Will run the exhaust steam through the dryhouse half way down from the green end. Will pump the air in the other end with two high speed fans.

The "Boss" is in good health. Politics redhot. I predict that McKinley will clean Bryan up like Greeley was when he ran. I am the only one of our gang who think that way, but think that the prospects justify me in making that claim. To my mind it is like a vast army of intelligent, well-drilled soldiers charging upon a disorganized mob. The Republicans have to-day the strongest, most intelligent, best organized, best drilled organization that they have ever had in their history. To cap this, they have, outside of Washington, Lincoln and Harrison, the cleanest Christian man that ever stood for the office. The Good Man takes care of His own. He has chided His people and made them suffer for four years. They are repentant and want to get back into His good graces again. To show this, they nominated a man of good Christian character, one who will revere the Sabbath and respect his God—not fish, gun, etc., regardless of the time or day; one who will rarify and purify the atmosphere of Washington, and bring about a feeling of respect and confidence in and for our government. All these things go to show that the Giver of all good things is on our side this time, and we will clean them up clean as a whistle. FRANK B. McAVOY.

Philadelphia, Oct. 22, 1896.

Roofing Tile and Tariff.

Editor Clay-Worker:

Now that the money question is disposed of (or will be before this reaches you), we can devote some little attention to the manufacture of roofing tile.

To a man in Mexico the United States at present appears like a vessel sailing between Scylla and Carybdis—liable, in endeavoring to avoid the rock of free silver, to be drawn into the whirlpool of high tariff duties. In the writer's opinion, what is known as "the McKinley bill" is to a large extent responsible for the deplorable state of affairs in the United States. Not only has it tended to impoverish the already struggling masses for the benefit of the few, but in doing so it has helped to create monopolies, whose baneful influences are already making themselves felt.

Those who imagine that the presidential election is all that is required to bring better times are simply living in a fool's paradise. The country has so long been accustomed to a monopoly of all the good things of the world that when it comes down to the level of other nations, and has to face the hard times and close competition which are chronic in Europe, it cannot readily understand it. One thing the United States requires is more economy and better management in the governing of its affairs. No other nation in the world could have so long stood the extravagance and mismanagement which has gone on uninterruptedly, regardless of which political party was in power. It also requires new markets for its products, and here is where any attempt at high tariff duties will prove disastrous.

Clayworkers should, as a class, set their faces sternly against any rise in the duties. Except in the case of a little pottery and a few thousand fire brick, which is as a drop in the bucket, compared to the clay business of the country, they have nothing to gain and much to lose from protection.

What is needed by the country is also required by the "craft" —more economy and a new market for their product. This latter, a large proportion of it, lies at their very doors in the manufacture of roofing tiles.

The Clay-Worker, with its usual devotion to the interests of its clients, has, in recent issues, given considerable space and attention to this question.

Let us compare the roofing-tile business with that of paving brick, about which we hear so much, and which is generally considered to be second in importance only to building brick. Take, for example, any city, and it can at once be seen that the area to be roofed very considerably exceeds that to be paved. Also, every house must have a roof covering of some kind, while it is not absolutely necessary, as the residents of many American towns are aware, that a street must be paved. This is not taking into account the thousands of country residences and other buildings for which the burned clay roofing tile is in every way best.

Mr. Tiffany, in one of his recent valuable articles, says: "Good roofing tile have been made with horse-power machines for preparing the clay and hand presses for pressing the tile, and some drain-tile makers have succeeded in making a good roof tile by simply adding to their plant a hand press and pallets." It is to this class I wish to say a few words, as I feel certain that it is in this way, at least to start with, that roofing tile will become the universal roof covering it is ultimately certain to be.

The brick or tilemaker who has already the plant to prepare his clay and burn his product, and only requires the addition of a hand press and pallets, will be surprised at the very small amount of extra capital required, and the splendid return which can reasonably be expected from such.

In the next issue of the Clay-Worker the writer will endeavor to describe from experience how, with comparatively simple machinery, a first-class roofing tile can be made, with less than 5 per cent. waste from pug mill to storage shed, and 100 per cent. burned hard in an up-draft kiln, with a loss of less than 1 per cent. In the meantime it will give me pleasure to tell any one who seriously wishes to make a start in this way what special plant they require, where they can get it, and at what cost.

R. M. GREER.

A PLEA FOR GOOD TIMES.

"Hard times! Hard times! Come again no more!"

We all sing it, we all hope it, but do we know what hard times are? We sing it while we eat beefsteak at 20 cents a pound, oysters at 50 cents a dozen and three kinds of bread at the same meal; we shout it while we smoke cigars, two for a quarter; we think it while we stretch our comfortable legs on Brussels carpet, before a blazing grate, with well-groomed boys and expensively clad girls around us; we shout it to our neighbors across our smooth lawns, or through our plate-glass windows; we groan it as we read our morning and evening papers, our plentiful magazines and our costly libraries; we dream of it in our soft and springy beds, while our coal-fed furnace keeps the whole house warm; we maunder about it in our well-equipped offices, shout it through our telephones, ring the changes on it as we send telegrams and take expensive summer outings. We meet in our political, social, literary and business conventions, and ring the changes on it while we are spending fortunes with railroads, hotels, restaurants and places of amusement.

And yet, in these days we do not know what hard times are; we think we do, but we do not.

The writer knows of a time within his remembrance—and he is no patriarch—when, in one of the richest parts of one of the most favored States in the Union, the whole town of some two thousand inhabitants possessed altogether not over $300 in money; all exchange was by barter; there was no cash payment, because there was nothing to pay with. Among the best and richest families (and there were many who thought themselves well-to-do) beefsteak was a once-a-week visitor; round beef was a luxury; oysters were an unheard-of dainty; cornbread was the usual, wheat the rare food; the cheapest pipe tebacco was a dissipation; cold bedrooms, scanty wood fires, woolsey and calico were in the house; 6x8 window panes were helped out by hats, old papers and rags; a weekly paper was an extravagance and served several families. Ten books made a good, fair library; beds were slatted or corded; rag carpets were occasional, ingrain scarce, and Brussels a tradition; the sole vacation was a ride to the annual picnic in the one-horse shay; nobody had time, money or heart for conventions or amusements. We men worked from 5 a. m. to 7 p. m. (the aristocrats shortened the time by two hours), and the women worked at all hours.

And yet it is doubtful if there was in those times such a universal spirit of unrest and discontent, such a concert of growling, as to-day.

Is it fair? Are we just? Can we afford to waste time in bewailing hard times, when times are easy on us, and treat us far better than we deserve?

A manager once said, with a chuckle: "The mails have been good to our house to-day; the first one brought an order in every letter, and the last one brought a remittance in every letter." We all know (mayhap we are) persons who would have said: "Alas! we have fallen on evil times; the first mail brought no money and the last mail brought no trade."

Let us put aside these ugly tempers of ours; look toward the sun; smile at the shadow; all sunshine makes the desert. "It's a pretty world, senor;" enjoy its beauties; let us borrow no trouble; shed light on our neighbors; quit us like men, and times will seem (as they are) good.

Chicago. BARNHART BROS. & SPINDLER.

The man who advertises one day and expects to find his trade doubled the next day is a good deal like the boy who, in the afternoon, digs up the seed he planted in the morning to see why it doesn't come up.—Spatula.

Written for the CLAY-WORKER

THE MODERN BRICK PLANT

Suggestions for Its Construction and Operation.

I HAVE SEEN some who thought all that was required was a good clay. Others go a step further, and add a very necessary feature, namely, a good line of machinery, and, perhaps, driers, and then stop without selecting the proper kilns for burning, or even making the necessary plans to guide in building the plant.

But the real, up-to-date clayworker has learned that, in order to satisfy the constantly growing demands of trade and increase his bank account, he must have not only good clay and his plant equipped with ample power, machinery and driers, but he must also have good kilns for burning the kind of clay wares he is manufacturing.

The successful manufacturer tells us that next to good clay in importance is a good kiln. That is to say, no matter how excellent the quality of your clay may be, or how perfect a green brick your machinery may form, or how well it may be dried, unless it is perfectly burned you cannot have No. 1 ware or a real success.

A brick may be poorly made, and yet, if it is well burned, it becomes a useful article, though perhaps not the most useful. But a poorly made and burned brick or piece of clay ware is almost if not altogether worthless.

It is not a difficult task to find many manufacturers who have a No. 1 quality of clay, with good machinery, but who are constantly failing because of spoiling their wares in the burning. Yet, notwithstanding the bad experience and failures of so many on account of not having suitable kilns for burning, still there are many "beginners" who are starting in the same old way, with the same old ideas, namely, that all they need is good clay, some sort of machinery and driers, and trust to luck for the burning.

I have known a number of large companies to be organized entirely upon the appearance of a few green or unburned brick, the capital paid in, the plant built, the stockholders invited, with a grand flourish, to see the start, without ever having given the question of burning a second thought, much less to have investigated the question with a view of determining the best kiln or system for burning the particular kind of brick or other wares proposed to be made.

In starting any clay manufacturing plant, not only the clay, machinery and driers, but the kilns as well, must be thoroughly considered in advance.

—Planning the Plant.—

Before the ground is broken on which to build the plant, a complete plan of the plant should be made by a man who is practical and who has had some experience in the particular line you propose to make. To illustrate: Many good common brickmakers, by the old methods, make failures as pressed or paving brickmakers, and I believe the reverse also is often true.

The plan of the plant should show the relative size and location of every part, together with the appliances to be used in each department. In locating and planning a brick plant there is no more important thing to be considered than the kilns. Their size, number and location with reference to the shipping facilities, storage space, driers and machinery should all be determined in advance.

A very large proportion of the cost of manufacturing is expended for labor and fuel at the kilns. This department requires the brick to be taken from the driers, set in the kilns, burned, cooled, selected and loaded on cars or wagons for delivery, or selected and hacked in the storage sheds.

It is readily understood that if the arrangement of the plant and kilns with reference to each other and the railroad or wagon delivery is not convenient a great deal of time and labor will necessarily be lost in moving the brick from the kilns. Too many, in planning plants, do not allow kiln space enough. Others allow entirely too much space, on the theory that too much is better than too little. But in clayworking too much space is often a great detriment. Why not have just enough room, and have the plant properly located on the space allotted, especially when it is quite as easy as to do otherwise, and much more profitable in the end?

In locating and building plants of kilns on old yards, or new ones that had not been planned in the beginning with reference to a suitable plant of kilns for burning, I have often found it very difficult to arrange the kilns, as to size and location, so as to handle the labor necessary to produce the output in an economical way.

In these days to say that any kind or location of a kiln will do is very poor logic. The progressive, money-making clayworker must have the best. That is, the kilns which will produce, economically, the best brick of the kind his market demands, together with the best possible arrangement.

I believe I am safe in asserting that a very large per cent. of clayworkers lose more money at their kilns than in any other department of their business. Too many never stop to think that it costs as much, if not more, to produce a worthless or inferior brick than it does to produce a good one; nevertheless, such is the case. It certainly costs more to set, burn and deliver a kiln of poorly burned brick than it does a kiln of good, hard, well-burned, uniform brick, to say nothing of the advantage in the selling price.

Any one who has had much experience in the handling of brick knows that from 10 to 20 cents per thousand is easily lost in the setting and emptying of a plant of kilns which are inconveniently located or arranged with reference to the drying and shipping departments.

I believe it is advisable to avoid the use of turntables as far as possible. Of course, this cannot always be done, because of the peculiar shape of the land and its surroundings, and consequently the necessary plan of the plant.

The kiln ground should be solid and dry, with good surface drainage. It is not safe to rely upon underdrainage, for the reason that the water from heavy, dashing rains should not be allowed to soak into the ground surrounding the kilns. If it can be avoided, the surface of the ground in front of the furnaces at the sides of the kiln should not be depressed. But when the use of the firing pit cannot be avoided there should be ample drainage provided. If possible, the kilns should be built of equal lengths and parallel to each other, with ample fuel and firing space between them. This space between the kilns should be provided with a good roof to protect the fuel and firemen from storms and rains.

In the burning of common building brick, when it is not required that they should be absolutely all hard, up-draft kilns, ranging in size from 250,000 to 500,000 each, are the most economical and convenient, while in the burning of all hard brick, street pavers or fine press brick down-draft kilns, ranging in size from 100,000 to 250,000 capacity each, are the most economical. Of course, the kind of brick, the daily capacity of the plant and the time required to properly burn a given clay will determine, to a great extent, the best kind and size of kiln to build.

—Constructing the Kilns.—

After the kind, location, size and number of a plant of kilns have been determined comes, naturally, the question of construction. I do not think, among all the questions pertaining to the manufacturing of clays, any one receives so little attention as the construction of the kilns. Especially is this true of the brickmaker, yet there is no piece of machinery or appliance on a brickyard upon which there is placed so great a strain or upon which so much depends.

It is certainly very unwise to go to the expense of procuring and preparing the materials necessary to build any kind of a plant of kilns unless the materials are suitable and are put together in a good, strong, workmanlike manner.

In every business one should make the most of everything and every advantage, and the brick business or the building and using of brick kilns certainly afford no valid exception to the rule. Therefore, procure the very best materials and workmanship for the kind of kilns you propose to build.

—Materials.—

Mortar—Cement or lime mortar should, under no circumstances, be used in any part of a kiln liable to become heated. I have only seen a few instances where it was necessary to use cement in the kiln foundations, and in these instances it was for the purpose of keeping the water out of the kiln bottom. To my mind, when it becomes necessary to surround a kiln foundation with a cement wall you had better not build it. Lime mortar makes a good, strong kiln foundation, if kept from the heat. In order to protect the kiln from rainy or snowy weather it is also well to use lime mortar in the outside courses of the brickwork.

I have built many excellent kilns entirely with mud mortar for the common brick and fire clay for the fire brick work, though, of course, an entire job of mud mortar would not be so strong.

The average bricklayer insists upon using entirely too much mortar in kiln building. I think a very excellent way is to have the mud mortar very thin, of a uniform consistency, and certainly without lumps; then lay a course of common brick, dry, and pour the mortar on until all the cracks are well filled, then another course, and so on. In fact, I think this a good way to use any kind of mortar in common brickwork.

Fire clay mortar should be very thin, and should be used as sparingly as possible if you want a good job. Under no circumstances should lime mortar, and very rarely should mud mortar, be used with fire brick, and certainly it is not necessary to use fire clay mortar with common brick, though I have heard this advocated in some instances.

(To be continued.)

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THANKSGIVING.

The President has issued his annual proclamation for Thanksgiving, Thursday, Nov. 26. No Nation on earth has more occasion for rejoicing than ours. With the usual and inevitable local and individual sorrows, the general health and prosperity of the country has been remarkable, and we have again shown to the world that we are capable of meeting at our respective places, of expressing our political preferences in a quiet and orderly way, and saying our say, and then retiring to our homes to let the will of the majority become law for all. We, the people, know how to govern and how to be governed. Let us be thankful for this. Let the day be generally observed as a day of festivity, in which it shall be as much the pleasure of those who have abundance to minister to the comforts of the less fortunate as to their own gratification. Let it be the greatest of our national holidays, and when rendering thanks to the Giver of all good let us resolve to deserve still greater blessings in the year to follow.

NOW FOR THE CONVENTION.

It will be seen from the official announcement on a preceding page that our next annual N. B. M. A. Convention is to be held in the city of Buffalo, beginning the 2d day of February, 1897. We commend our friends in Boston for their generosity in consenting to allow Buffalo, the beautiful city on the lake, to entertain us, and we thank Buffalo for her cordial invitation, while we most heartily congratulate the brickmakers of the Nation on being so well provided for. Buffalo is one of the prettiest cities in America, just near enough to the only Niagara Falls in the world to make it pleasant to drop down there on the finest electric railway in the land for a few hours' sightseeing. It will be all the more enjoyable if the thermometer shall have been playing in the neighborhood of zero for a few weeks. Niagara is always interesting, but never at her best until the ice bridge is in complete order for visitors. Of course, we will all take a ride down the gorge on the new electric railway, and think, as we go, what a cold bath it would be to be tumbled into the whirlpool only ten feet away, when the thermometer is in the lower regions. Even Chicago has nothing to compare with it. Begin at once to arrange for the Convention, and let nothing keep you away. You will be in a better humor all the season for the relaxation and fellowship of the occasion, and the wiser for the information you will have received, and happier because, mayhap, you have helped some brother to be better and do better than ever. Of course, every man who has a wife he is proud of will bring her along. Remember, the first week in February is the time and Buffalo the place.

AFTER THE ELECTION—WHAT?

We very gladly announce that the election is over. We are not all highly delighted with the result, perhaps, but we opine that there are very few, if any, who are not rejoiced that it is over for another four years. Now, the question for the brickmakers is what to do next. After all, the season just closing has not been wholly bad on our industry. From economic more than from political causes all callings have yielded to conditions which are only remotely affected by purely political questions, and against which no human foresight has ever been able to guard. Some people trace everything, even the price of potatoes, and conspicuously the price of wheat, to this or that political condition, but potatoes and wheat alike laugh at their folly and bob up and down at their own sweet will, oblivious to everything but the weather, and the hungry world learns to adapt itself to the weather and its influences. So must we accept the inevitable in common with all callings. In all likelihood there will be a great demand for brick the coming season. At what price no one can predict, but the price will not be severely affected, nor the demand, by any possible change of political policy. There has been a great deal of unwisdom in the past in laying every business disappointment at the door of the government. We might as well trace cyclones to the tariff or to silver, or the want of either or both. The Clay-Worker suggests a cheerful acceptance of the situation and an earnest purpose to make good brick and a great many of them.

FOREIGN METHODS AND MARKETS.

The articles in the Clay-Worker under the caption of "In Deutschland" require no commendation from us. We are quite certain that our readers have already come to realize their merits. It is both profitable and entertaining to note the methods of our foreign neighbors in conducting industries which are akin to ours. It is well to bear in mind that conditions surrounding the manufacture of clay products in foreign countries are quite different from ours. By the people at large burned clay is much more highly appreciated in continental countries than with us. A much larger proportion of clay work per inhabitant is used than with us. Generally speaking, their building is more substantial than with us. They get better prices for their product, and they sell more of it, relatively and absolutely. With them a frame structure is little known, and they use proportionately more brick and other clay products in the same size building than do we. All this has an effect upon the character of a brick plant and other clay manufactories of the continental countries. They are better built and better arranged than ours. We who complacently sit in our homes and read the newspaper about the phenomenal growth of our American cities do not realize that the German cities have been growing faster and doing more building than have we. In 1870 New York was a more populous city than Berlin. In 1880 Berlin had outgrown New York. In 1890 it was still larger. Thirty years ago Philadelphia was a larger city than Berlin. Since then Philadelphia has added a half million to its population and Berlin a million. In 1875 Hamburg had 348,000 people, Boston 342,000. In 1890 Hamburg had 569,000, Boston 448,000. In 1875 Munich had 193,000; in 1890, 349,000. Cincinnati had grown from 255,000 to 296,000; Pittsburg from 156,000 to 238,000. The increase has been proportionately as great in Cologne, Dresden, Altoona, Nuremburg and other cities.

BRICK BUILDING AND THE RATE OF INSURANCE.

The largest tax paid by the people of this country is the fire tax. It is the one which they pay the most uncomplainingly. We hear a constant chorus of complaint, a series of chronic kicks about State, county and municipal taxes, but never a general, deep-seated complaint about insurance. Insurance costs the least where there are the fewest fires. The cost of insurance is fixed by two factors: the cost of conducting the business and the losses. Where the losses are relatively great the rate is relatively higher. The cost of insurance is higher in America than it is in Great Britain and the continental cities. The difference is caused by the difference in the character of the construction of the buildings. The general character of the buildings in Glasgow, for instance, is much better than those of Chicago. The buildings of Paris are infinitely better than those of New York or Boston. In foreign cities one sees few frame buildings. One sees a larger proportion of brick used. Where wood is the cheapest the rate of insurance is the highest. In Glasgow, in 1890, the writer remembers that the losses by fire in that city of over 800,000 inhabitants were about half as great as in the city of Indianapolis, a city of only 125,000 inhabitants. The cost of fire protection by apparatus in Indianapolis was more than four times per inhabitant what it was in Glasgow. They build largely of brick in Glasgow.

MOVING IN THE RIGHT DIRECTION.

An authority speaks of the good building outlook in Pittsburg and of the large number of sales of realties and the inquiry therefor in New York city. It comes to us that in many of the Eastern cities where capital is abundant and times conservative, investments are being made not alone in real estate, but the plans are being prepared for new and important structures. This shows a restoration of confidence in the sections where it counts for the most. From another source comes the information that manufacturers throughout the East are adding to their equipment and getting everything ready for a strong business move. They realize that stocks of all kinds are very light. This is true in families, in the retail stores, in the jobbing houses and warehouses. It will be for the manufacturers to supply this deficiency. Prices are down. Now is the time to invest.

PROSPERITY NOT ALONE DEPENDENT UPON SOUND CURRENCY.

In the excitement of a political campaign there are questions in connection with the welfare of the country at large which it is a waste of time to present. During a political campaign people will listen only to that which is made an issue of one of the great political parties. There are, however, questions of momentous importance which should come up for consideration and which should be urged upon our legislators with a view of securing definite, prompt attention. We refer to the question of the increase of foreign trade. We produce more than we can consume ourselves, and our markets are limited. We cannot secure permanent prosperity through any financial system unless we have business. There are other nations of the world that are more aggressive in the matter of foreign trade than are we. This is notably true of England and Germany. Great Britain is a great merchant country. Its trade reaches out all over the world. It has been aggressive in that direction. Its government has helped its merchants. It has extended trade for its merchants in all directions. It has done this by all means possible. It has conducted quiet, diplomatic negotiations. It has sent forth its armies and its navies, and nearly always in the cause of business for its own people. Our government should have a department of foreign trade. It should have agencies all over the world. Where there is an opportunity to ship in American goods our people should be notified. They should be notified of all the trade conditions which surround that country. Thus it is that our markets might be widened. Every man, woman and child in our country would be benefited thereby.

BRICK AND BUILDING REGULATIONS.

The use of brick has been increased probably one-third in this city by the adoption of proper building regulations. Our merchants used to erect business buildings four stories high, separated only by a twelve-inch brick wall. Now the walls are required to be from twenty-two to twelve inches. This makes a great difference in the stability of the structure, in its capacity to resist fire, its safety from collapse, and also brings about a larger use of brick, in which the brickmaker is interested. However, the law was not devised for the latter purpose. If let alone, people will put up buildings which will collapse readily, which are easily destroyed by fire. But under the guidance of a proper lawmaking body the experience of the best engineers, architects and builders can be formulated and made into a law which will compel people to protect themselves, and, as well, the lives and property of others. One way to stimulate the use of brick is for brickmakers to see to it that their various towns and cities are provided with building regulations. Previous to the operation of our building regulations in this city very little flue lining was used. Then a large number of fires was caused by defective flues. Now flue lining is required for all new structures, and in the newer parts of the city a fire from a defective flue is rarely or never known. Here, again, is protection to persons and property, a reduction in the rate of insurance and an increased patronage of the clayworker. All of which is very satisfactory.

BETTER BUILDINGS FOR CLAYWORKERS.

The appreciation of clay products, the relatively larger use of brick, terra cotta and tile have dignified the character of continental clay manufacturing establishments. They are substantial, well arranged and diligently cared for.

While we have improved our methods of manufacture, very many of our establishments look like a series of dilapidations. Our brick manufacturers conduct their business in ramshackle sheds, which carry no argument for better building.

PAVING STREETS IN SMALL CITIES.

The difficulties of repair and the expense of maintenance is a quality belonging to asphalt paving which must largely militate against its use in smaller cities. While recent inventions have done something in the direction of cheapening the repairs of asphalt pavement, there are strong arguments against its use, the idea being that the material immediately under it and next to the parts burned out are injured by the less expensive processes. The maintenance of an expensive plant in a small city is out of the question. It could be done, of course, but at an expense so great that it is a commercial absurdity. A small city cannot afford the same quality of supervision over asphalt pavement that is given in the larger cities, and, as so much depends upon such service, the result cannot be satisfactory. No one can question that there are different qualities of asphalt pavement put down by the same companies. All we have to do is to look at pavements to prove this fact, and with their less efficient organization it is not to be expected that the smaller cities will receive the best treatment in the matter of asphalt street covering. There can be no question but that good brick paving will prove eminently more satisfactory for paving in cities of this class—and in all cities, for the matter of that.

A LARGE BUT PROFITABLE INVESTMENT.

One of the most interesting magazines that comes to the editor's table is the Inland Printer, of Chicago. Being a printers' paper, it properly should reflect the best achievement of the printer's art. Its mission is to set before the printing craft the best ideas and the most advanced processes, and it is no exaggeration to say that it fills the measure to the brim. Thus it is a model trade magazine, and, as such, is highly appreciated by the trade, as shown by very liberal patronage. In this respect, as in the character of its matter and make-up, it represents to printers what the Clay-Worker does to its readers—the very best.

The current issue of the Inland Printer displays a remarkable bit of enterprise on the part of one regular patron, the Campbell Company, who come up smiling with eleven full-page ads.—and they do not get them for a song, either. This may seem like wanton extravagance to conservative advertisers, but the Campbell Company know their business. They know that eleven pages in a magazine like this is worth far more than one page each in eleven commonplace papers.

TO ENCOURAGE CLAY MODELING.

There has been a revival of the old art of making pottery, and women with artistic tastes are experimenting with the clay in many sections of America. To encourage this sort of modeling Mrs. S. F. Frackelton, of Milwaukee, Wis., former President of the National League of Mineral Painters, is, it is said, offering a diamond badge for the best model for a cup and saucer. Mrs. Frackelton wshes to see if something original and truly American cannot be called forth. She believes that if students will only commence at the clay in time they may arrive at splendid results in pottery, especially as this country abounds in choice clays. The badge which she offers is well worth contending for, and no doubt will spur women who can model in clay to renewed efforts.

ASPHALT PAVEMENTS TRIED AND FOUND WANTING.

Indianapolis has had seven or eight years' experience with asphalt pavements. The experience has been unsatisfactory. The Board of Public Works recently announced that it would let no more contracts for asphalt pavements. For certain streets wood block will be used, and on others brick. The asphalt was at first hailed with joy. Indianapolis was originally a very muddy city. It was difficult to drain it by ordinary grading and graveling. The asphalt made a smooth surface; it had been used in other cities, and, in a way, it tickled the pride of the citizens to know that their streets were being covered with this distinguished material. It was the great pavement of Paris and London, and its advent was hailed with satisfaction. The first pavement that was put down was an acknowledged fraud. It wasn't asphalt at all. The contractors afterwards acknowledged that it was a tar pavement, and said: "If we guarantee it for five years, what is the difference?" Municipal business was done in a very loose way in this city at that time. Political pull and the sop that goes with it had their influence. The contractors had the hardihood to ask for other paving contracts, and to claim that they would do better next time—and they got them. The other streets which followed were of varying qualities. They have been put in under a five years' contract; depressions and bad places appear, and when they get very bad the asphalt companies make repairs. At the end of five years the guarantee has expired, the city has a bad pavement on its hands and no means of repairing it excepting with the help of the asphalt companies, who are in a position to make a heavy charge for their work. The reason assigned by the Board of Works for abandoning asphalt is the expense of caring for it.

TRINIDAD PITCH, NOT ASHALT.

The asphalt pavement with which we of America are familiar is not the material known as asphalt in the paving of foreign cities. In fact, we use the word asphalt in connection with the American paving material with a mental protest. It is not asphalt at all. It is a counterfeit of the material which justly earned the reputation for foreign asphalt pavements. Our pavements which are known as asphalt are really made from Trinidad pitch. The foreign asphalt is mined, and, as an unadulterated natural product, is pulverized, heated and applied directly to the streets in its absolutely natural condition, without any other material being in any way added to it. The American paving material is a composition in which sand and other products form the mixture. It is a material which is dependent upon the skill, integrity and watchfulness of a large number of people, even when the maximum results of this composition are secured. With the best of intention a bad mixture or one with improper material may come about. The fact is, this thing does happen. In special instances in this city, where it was apparent that the intentions were right, results have been unsatisfactory because of the many chances of failure which must present themselves in the mixture which we know as asphalt. In the use of natural asphalt rock, which gave the reputation to the material under this name, none of these questions of integrity, skill or attention came up. Mr. Green, one of the managers of the Barber Asphalt Company, said in a public address, a good many years ago, that the Trinidad composition which has since that time been used under the name of asphalt was devised in order to get a cheaper paving material than the natural asphalt rock which has been used with such splendid results abroad. It is our judgment that the race of the counterfeit asphalt pavement has been nearly run.

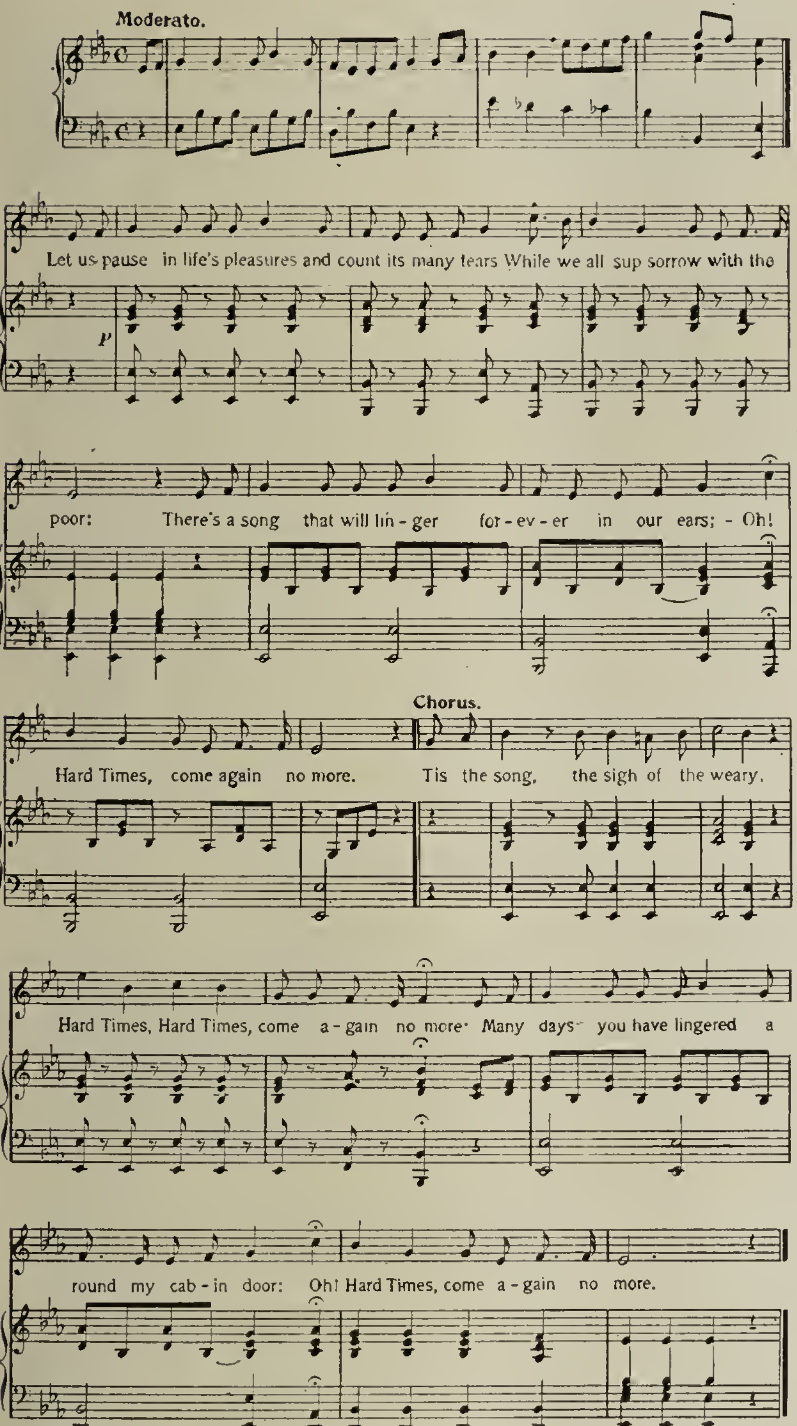
WHY ASPHALT IS SOMETIMES PREFERRED TO BRICK.

The financial success attending the manufacture of counterfeit asphalt has been due to the energetic and brainy efforts of a compact, thoroughly organized body of highly educated men. No effort which is known to men of ability in doing business with municipal bodies has been neglected. This is a weakness in connection with the larger introduction of brick paving material. Brick is probably the best material now known for paving. The manufacturers of brick paving material are without distinct organization. There are manufacturers here and there making brick which they are ready to sell, but without the organization necessary to unitedly, forcefully and irresistibly bring the material before municipal bodies. There have been failures in connection with the use of brick as a paving material, but when have there been failures to compare with those of the Barber Asphalt Company? This energetic organization had the courage to go to Paris and undertake to put down pavements for that municipality. But how did it succeed? They were compelled to take up their pavements and spend many thousands of dollars in rectifying their mistake. At the same time they abandoned contracts undertaken in Berlin and London.

Where has there been the record of failure in any material that our own eyes have witnessed in counterfeit asphalt? A certain number of bad brick pavements have been put down in this and other cities, and the cause of brick pavements has unnecessarily suffered in this way. An organization engaged in the manufacture of paving brick, which would do the necessary amount of educational and explanatory work before municipal bodies, would measurably override the disadvantage of the present isolated efforts of the manufacturers of brick paving material. The difference between counterfeit asphalt and brick is that the latter has intrinsic merit and the former has not. A properly trained corps of agents or advocates could drive this idea into the heads of municipal bodies, explain to them, skillfully and intelligently, how the pavement could be best made, and thus contribute to the enlargement of the markets of clay products.

HARD TIMES, HARD TIMES, COME AGAIN NO MORE.

Poetry and Music by STEPHEN C. FOSTER.


Moderato.
Let us pause in life's pleasures and count its many tears While we all sup sorrow with the
p
poor: There's a song that will lin-ger for-ev-er in our ears; - Oh!
Hard Times, come again no more.
Chorus.
'Tis the song, the sigh of the weary,
Hard Times, Hard Times, come a-gain no more. Many days you have lingered a
round my cab-in door: Oh! Hard Times, come a-gain no more.

While we seek mirth and beauty, and music light and gay,
There are frail forms fainting at the door;
Though their voices are silent, their pleading looks will say,
Oh! hard times, come again no more!

Chorus:

There is a pale, drooping maiden who toils her life away,
With a worn heart whose better days are o'er;
Though her voice would be merry, 'tis sighing all the day:
Oh! hard times, come again no more!

Chorus:

'Tis a sigh that is wafted across the troubled wave;
'Tis a wail that is heard upon the shore;
'Tis a dirge that is murmured around the lowly grave—
Oh! hard times, come again no more!

Chorus:

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BOOKS FOR BRICKMAKERS.

IT IS pretty generally conceded that wonderful progress is being made in the ancient and heretofore unprogressive art of brickmaking. Among the best evidences of this is the fact that the brickmaking craft is no longer without a literature of its own. There are now some good practical books treating on the manipulation of clay—the making, drying and burning of brick. The list is not so large but that every brickmaker can afford to have them all. Get them and read them.

"BRICKMAKERS' MANUAL," Morrison and Reep	$3.00
"BRICKMAKING AND BURNING," J. W. Crary, Sr	2.50
"TABLE OF ANALYSES OF CLAYS," Alfred Crossley	1.00
"VITRIFIED PAVING BRICK," H. A. Wheeler, E. M	1.00
"PRACTICAL FARM DRAINAGE," J. J. W. Billingsley	1.00

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER. Telephone Building, ST. LOUIS, MO.

LITTLE CLASSICS.

—The Chemistry of Character.—

John and Peter and Robert and Paul:
God in His wisdom created them all.
John was a statesman and Peter a slave,
Robert a preacher, and Paul was a knave.
Evil or good, as the case might be,
White or colored, or bond or free;
John and Peter and Robert and Paul:
God in His wisdom created them all.

Out of earth's elements, mingled with flame;
Out of life's compounds of glory and shame,
Fashioned and shaped by no will of their own,
And helplessly into life's history thrown;
Born by the law that compels men to be,
Born to conditions they could not foresee,
John and Peter and Robert and Paul:
God in His wisdom created them all.

John was the head and the heart of his State,
Was trusted and honored, was noble and great;
Peter was made 'neath life's burdens to groan,
And never once dreamed that his soul was his own;
Robert great glory and honor received
For zealously preaching what no one believed;
While Paul of the pleasures of sin took his fill,
And gave up his life to the service of ill.

It chanced that these men, in their passing away
From earth and its conflicts, all died the same day.
John was mourned through the length and breadth of the land;
Peter fell 'neath the lash of a merciless hand;
Robert died with the praise of the Lord on his tongue,
While Paul was convicted of murder and hung.
John and Peter and Robert and Paul:
God in His wisdom created them all.

Men said of the statesman, "How noble and brave!"
But of Peter, alas! "He was only a slave;"
Of Robert, "'Tis well with his soul, it is well;"
While Paul they consigned to the torments of hell.
Born by one law, through all nature the same,
What made them differ, and who was to blame?
John and Peter and Robert and Paul:
God in His wisdom created them all.

Out in that region of infinite light,
Where the soul of the black man is pure as the white;
Out where the spirits, through sorrows made wise,
No longer resort to deception and lies;
Out where the flesh can no longer control
The freedom and faith of the God-given soul,
Who shall determine what change shall befall
John and Peter and Robert and Paul?

John may in wisdom and goodness increase;
Peter rejoice in infinite peace;
Robert may learn that the truths of the Lord
Are more in the spirit and less in the word,
And Paul may be blessed with a holier birth
Than the passions of men had allowed him on earth.
John and Peter and Robert and Paul:
God in His wisdom created them all.

—Lizzie Doten.

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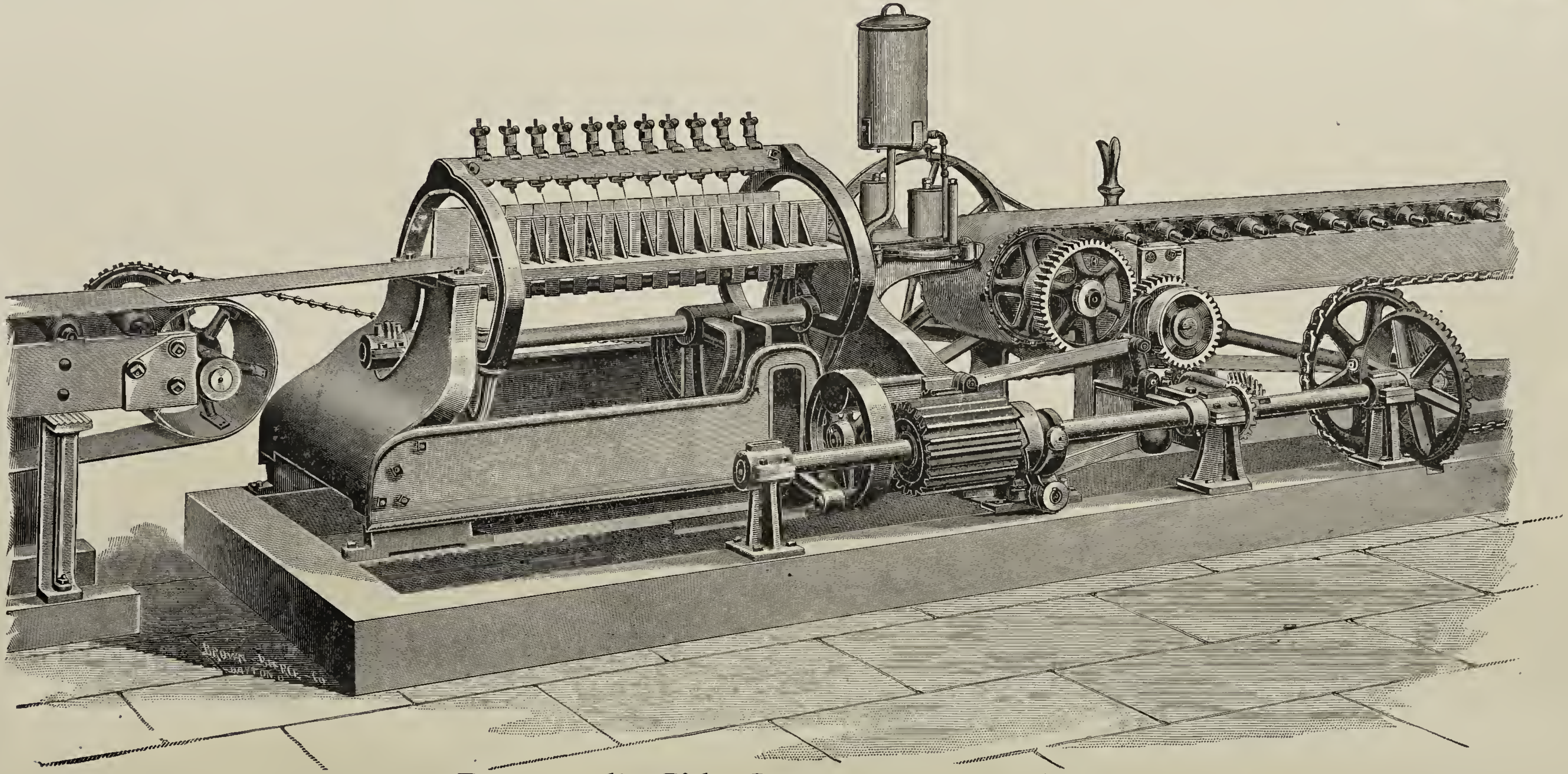
WHEN WRITING TO ADVERTISERS
Mention the Clay-Worker

IT IS ALL OVER NOW,



Raymond's Side Cut Automatic Table.

And, as you again return to making brick, we would remind you that we are on the market with a larger line of brickyard supplies than ever before, which we can furnish promptly and at reasonable prices. We furnish everything from the clay pit to the Kiln.

* * *

C. W. RAYMOND & CO.,

Send for Catalogue. **DAYTON, OHIO.**

Written for the CLAY-WORKER.

THE NEW YORK MARKET.

THE BRICKMAKERS on tide water, to some extent, still continue to mold. It would require a keener intellect than the Philadelphia lawyer is credited with to tell why they keep at it, if those who are still molding are of the opinion that the stock that they now make will advance in price to a figure which will remunerate them for the increased cost of production at this late season of the year.

The loss of at least two hours per day on labor, not to say anything about the extra work of covering hacks, as well as length of time it takes for the green brick to dry on the yard, so they can be hacked, and the hacks doubled, which entails extra cost, to say nothing of the wet brick which must be set to make room to turn out more, as well as the use of more wood in burning, and a less percentage of good brick in the kiln when burned—all this so adds to the cost that in the judgment of at least 90 per cent. of the manufacturers it was not advisable to take any such risk in the condition of the market six weeks ago, and they took advantage of the weather and length of days to close up. It may be possible that they made a mistake, but thus far the market has not reached a point to warrant the saying that they made a mistake. The loss of daylight and the increased number of washed brick this month amounts to more in cost than the market advanced.

It is the old brickmakers, not those who lately entered the business, that are found turning out brick the first of November. One would think the new beginner would be the one likely to make the mistake of holding on too long. Not so; the only yard in Haverstraw that is running at the present time is managed by one of the oldest manufacturers of common brick in this section, and the only yard that is in operation in Hackensack to-day, the 29th of October, is operated by one of the oldest men in the trade, and who has been a brickmaker from boyhood.

The practical brickmaker, who is so often spoken of in your columns, one would suppose, meant a man who had thoroughly mastered the art of brickmaking by long years of apprenticeship to the trade, so that his knowledge of the business as a worker of clay, as well as proprietor, would enable him, from past experience, to guard against mistakes which those not so long in the trade are liable to make. It would be interesting reading if your readers would give their opinions of the practical brickmaker. Is he the man who started as machine boy, and so passed through all the grades, till he finally operated his own yard? And did he make better brick than the man who thought there were millions in brick, but knew nothing about the manufacture of brick, and had to depend on other knowledge than his own?

The grade of brick made on some of the yards where the proprietor is an old brickmaker—by that I mean one who has mastered the trade and is competent to take charge of a yard and run it, as well as burn the brick, or a yard where you would look for system, a place for everything and everything in its place—would be found on inspection very far short of the ideal in all that we are taught by the writers for the Clay-Worker as to what constitutes good brickmaking.

—Good and Bad Brickyard Management.—

What you would look for would be the best of tools to work with; what you would find on the majority of the yards would be machines out of line, trucks with the axle worn flat, so that it took all the strength of the trucker to push it, the mold in use two or three years; the yard nearly as rough as the highway, the facing worn off, so that when the green brick are dumped the sand sticks to the brick and makes the green brick look as if they were molded in a "shoe;" the green brick barrow braces loose, the head blocks so worn by the axle that the wheelers will look the barrows over to pick one out to use that is not so badly worn as the rest—if such can be found; the hack plank so worn and rotten that the knots stick up so that the wheeler has all he can do to keep on the plank, and once in awhile he will strike a soft spot, down goes the wheel, over goes the barrow, and in what condition are the brick? Broken and badly chipped. The battens and saddles are broken and split, yet all good enough. Can good, smooth brick be made with such a yard and tools?

Under the shed it looks as if a cyclone had struck it. Barrows standing just where they were dropped, piles of brick scattered over the kiln ground, the wood to burn with coarse and rough. Watch the men tending kiln, and you will see them overhaul the pile to get a small stick to throw over, so that when night comes the men's arms are so tired that they can hardly lift them up.

Why such wood? Simply because it was bought from an eighth to a quarter less the cord than good, smooth wood could be purchased for. The same boss, when he was running for some one else, would growl and grumble if such wood was furnished him, and say no one could burn brick with such wood. Look at the burnt kilns that are open; they speak for themselves. The boss will talk about the foreman, when, as a practical man, he knows that it is his fault that such a state of things exists.

When one examines the barrows to load burnt brick, they are found to be worn out; in fact, they are in such a shaky condition that the wheeler will have to set the barrow down and straighten his load before he gets on board the boat, or, in all likelihood, it will dump in the river. Some of the men who you will see on one yard one day will be on another the next. Ask them what the trouble is. With an oath, they will say: "I can't work with the old traps he has on his yard."

If an arch iron is required, go to a burnt kiln and get one out. Just so all along the line; let everything go till it will go no longer, then have it patched up. In conversation with other members of the craft he will say: "I cannot see why my brick are so rough." As a proprietor it is his way of making cheap brick; as a practical brickmaker, when he worked for others, he had things kept in good condition. Some of your readers may think this is overdrawn; nevertheless, it is easy of proof along the Hudson river yards. Of course, all old brickmakers are not in this class.

—A Good Grade of Brick—

Is made on yards that are owned and operated by men who never did a day's work on a brickyard. From their ranks some of the best brick are turned out, and has been for years. It is a pleasure for a brickmaker to go to their yards, where everything is in good shape—yard smooth and well faced, shed cleaned up at all times. When the men are through at night the barrows are all run in one place, lumber piled up, so that one could pass through the shed in the night time without fear of breaking his neck over a plank or wheelbarrow. The wood for burnings is as good as can be found; the burnt brick show it. Compare the returns of sales from the two yards; the rates will favor the manufacturer who did not know it all, only that he wanted to turn out a first-class article and keep it in that condition. Strange as it may seem, the best open-yard brick that have been sent to the New York market have come from yards where the proprietors had followed other occupations before they embarked in the making of brick.

Some will say the clay has a great deal to do with it; yes, but the man more, and I will quote a case. About sixteen years ago two men leased a yard. One was an old brickmaker; the other was, I think, a farmer. He knew as much about brickmaking as a brickyard knew about him. The yard was noted for its poor grade of brick; in fact, the clay was so poor that when loaded in the cart it would run out in transit to the pit. Nevertheless, they made the best brick that was ever turned out on the yard before the lease expired. The practical brickmaker died. His partner kept the yard going, and turned out just as good a grade of material as when the practical brickmaker was in charge.

Forty years ago brick that rated the highest in the New York market were made by men who were carpenters by occupation till they embarked in the brick trade and made a success of it. Another manufacturer, who had always followed the trade from a boy and burnt his own stock, and was considered the most particular brickmaker in the trade at the time, and, I must say, all time, as he would not mold if it looked the least like rain, failed, while the men who had worked at other trades succeeded. Like many other men in other branches of trade, those whom we look to for the greatest success often turn out the most dismal failures. The brick trade seems to be a field that many drop in. To-day in the trade the men who are in the best shape are men who took up the brick trade as a money maker when there was money in it, and they took care of it. There is one thing that is peculiar about the two classes of men engaged in it. The practical man is apt to make more "spread" than the other, and thereby load himself and go to the wall. How it is in other parts of this country I cannot say, but the tide-water men change places quite often.

—Result of High Tide.—

The yards on the Hackensack river are not very high above high tide, and some are flooded under the shed when we have a heavy easterly storm. About the middle of the month there was a storm of two days' duration, and on one of the yards they had set fire to a kiln on Sunday night. On Tuesday, just as they were beginning to heat the kiln up, the tide came in

WANTED:

To Give Information About,

The "Monarch" Brick Machine, (Horizontal,)

It is big, strong and simple. Weighs almost 12,000 pounds.

Has double pug-mills giving 14 feet of tempering capacity; double presses, which produce the most powerful pressure of any machine, and being "all in the mud," don't wear a bit; bearings where clay **cannot** get into them.

It is the only "soft mud" machine put on the market for years that had a new **fundamental** idea in it. All others have been improvements or modifications only of fundamentally **wrong principles.** Fully explained in circular. Seventy-five in daily use.

The "Iron Quaker" Brick Machines, Horse and Steam Power.

For 15 years, the acknowledged leading Upright Machines. Comparitively low in price. List of hundreds in circular.

The "Wellington" Mould-Sanding Machine.

A new one. The simplest, best, and at same time, lowest priced.

Ball Bearing Brick Barrows.

These good things don't need even pushing along. Load them, balance them, and then a slight inclination carries them along. Wheelers increase their days work 20 to 30 per cent. Order a sample one.

Double-Deck Pallet Trucks. The best of all.

Moulds. All kinds. Machine; hand; shapes; lined, etc., etc.

Cast Iron Dryer Cars. The best pattern. Roller bearings. Low prices.

Kiln Castings. Doors and frames. Furnace fronts. All kinds grate bars.

FOR SALE.

Odd sizes of molds. New. Not been used:
5 Molds, 8¾ x 4¼ x 2⅜ in. 9-16 in. partitions.
20 Molds, 8 13-16x4 3-16x2 7-16 in. 9-16 in. partitions.

Second-hand, but used a few days only:
10 Molds, 9½ x 4⅝ x 2¾ in. 9-16 in. partitions.
19 Molds, 9½ x 4 9-16 x 2¾ in. ½ in. partitions.

All of above are six-brick Machine Moulds. Cherry.

Also, 10 3-brick hand molds, new, 8¾ x 4¼ x 2½ in.

Elevators, Dump Tables, Sand Barrows,
All Styles of Trucks, Dump Carts, Represses,
Disintegrators, Engines, Boilers,
Shafting, Pulleys, Hangers, Etc.

The Wellington Machine Co.,

Wellington, Ohio.

so fast that they could not dam it off, so that the tide rose one foot in the arches, putting out the fires in all the arches.

—The Market—

Has gradually felt the holding back of stock the past month, and there has been an advance—not very large, but still more money. As the season for shipping shortens there will be a desire to market stock by the up-river men, as they will be cut off at least a month earlier than Haverstraw. Possibly freer shipment may check the advance; certainly if the accumulation in sellers' hands becomes large the other fellow will take advantage of it. The quotation at present is:

Haverstraw	$4⅜@4¾
Fishkills	4¼@4¾
Up-rivers	4⅛@4½
Jerseys	3¾@4¼

Hackensack, Oct. 31. A. N. OLDTIMER.

PACIFIC COAST NEWS.

THE STOCKHOLDERS of the Stockton Art Pottery Company have determined to start up their works on Sacramento street, of that city, which have been closed down for the past year. The pottery was started five years ago, at first manufacturing only terra cotta pipe, finally going into fancy pottery, which has received considerable praise at the various exhibits which it has made. Reverses came, the company going into insolvency about a year ago. Recently a reorganization was attempted, resulting in articles of incorporation, with a capital stock of 4,000 shares, or $100,000, of which $50,000 has been subscribed. It will purchase the plant and machinery of the Stockton Terra Cotta Company, insolvent. The directors for the first year are: P. A. Buell, S. N. Cross, George W. Tatterson, C. M. Weber and S. G. Wood. At the meeting this week the following officers were elected: G. W. Tatterson, President; S. N. Cross, Vice President; C. M. Weber, Treasurer; S. G. Wood, Secretary; P. A. Buell, Manager.

Alexander McBean, of Gladding & McBean, San Francisco, is in New York on business and pleasure. He is expected back in December.

George R. Chambers, Secretary and silent partner of the firm of Gladding, McBean & Co., is now in Chicago, called by the death of his father, who was connected with the construction of the La Salle street tunnel, the new aqueduct in New York city and other important engineering operations. He is expected home next week. This firm has secured the terra cotta and brick contract for the Affiliated Colleges Building to be erected by the State in this city. They have begun work on the structure. The terra cotta is very handsome, being of tan color and matching the brick mottled. Bids on another large structure, a new municipal building, were opened on Saturday, and will be awarded next week. Two hundred and twenty-five thousand dollars was appropriated for this building, the lowest bidder being Bateman Bros.—$254,600.

According to rumor, another enterprise is to be started on this coast in the near future. A Trenton capitalist, whose name is not forthcoming, is reported to be arranging to begin the manufacture here of Rockingham ware and some other lines of pottery.

Several of the larger pottery firms were represented in the great political parade on Saturday, the 31st, which was the greatest demonstration of the kind ever held on the coast. Gladding, McBean & Co. state that they were not represented directly, as, while their wagons were Republicans, their teamsters were mostly Democratic, and they did not wish to be accused of coercion in bringing the two together.

The California Stone Brick Company, of San Francisco, has been incorporated, with the following directors: P. W. Madera, A. D. Hart, P. W. Rochester, E. A. Mudgett and K. J. McHugh.

The real estate and personal property, including the entire plant of the Steiger Pottery, was sold under foreclosure of mortgage by Sheriff McEvoy, at Redwood City, Cal., on Nov. 9.

The Board of Supervisors of San Francisco are advertising for supplies of hard-burned brick of the best quality of clay for the year of 1897 for repairs on public streets and highways.

The Antioch Pottery is at present busy on sewer pipe and pressed brick. They have just opened a new kiln, which has proved one of their best.

A. H. Fessler, of Miles City, Mont., has found on his ranch a vein of pure clay, and intends to use it for pressed brick and tile manufacturing.

The Board of Park Commissioners of Los Angeles, Cal., have authorized the Superintendent of Hollenbeck Park to purchase 10,000 four-inch pots for the parks.

The Socorro, N. M., Fire Clay Works are kept busy, and work quite a number of hands. El Paso is their chief customer.

S. C. Pierce has started the fires in a kiln of 600,000 brick. This is the largest kiln ever burned in Salinas, Cal.

After three weeks of work at the Weston, Ore., brickyard, a kiln was completed and burning has commenced. It contains about 144,000 brick. The yard has been operated by the Farmers' Bank, of Weston, with H. B. Nelson as Manager, and it is hoped that the result of this fall's work will occasion the permanent revival of an industry that has been of great advantage to Weston in the past.

W. G. Palmer, of McMinnville, Ore., has found a valuable bank of clay. It is possible that a pottery will be established soon.

Telford & Minor are making 100,000 brick at Ramona, Cal.

James R. Holt, of Redding, Cal., has just completed the burning of a kiln of 700,000 brick near Anderson.

The Pasadena firm of Houlahan & Griffith is furnishing 700,000 brick for the big Spreckels warehouse at Los Angeles, Cal.

The Portland Cement Company, of Utah, is advertising for bids for the construction of a large cement kiln.

Mr. Roberts, of Shelley, Ida., is putting up a large building for the purpose of manufacturing pottery. He has the kiln completed now, and soon will be turning out first-class crockery ware.

Messrs. Stevens & Smith, of Shelley, Ida., have just burned a large kiln of fine brick, which are contracted for building purposes.

The following are the officers of the Brickmakers' Union, No. 1, of Los Angeles, Cal.: C. M. Reynolds, Chairman; E. B. Brunning, Recording Secretary; J. J. Chamberlain, Financial Secretary; Godfrey Alexander, Treasurer.

Mr. Chambers, one of the founders of the pottery at Lincoln, Cal., died last week of paralysis.

About 100,000 brick will be used in the construction of the chimney and oven of the new Helena, Mont., crematory. The stack will be eighty feet high.

The first brick has been molded in Arroyo Grande, Cal., about 4,000 per day being turned out. The kiln will be ready to fire in a couple of weeks.

Mr. Peter Grant, of Santa Barbara, Cal., has the only brick manufactory in Santa Barbara county which makes machine-formed bricks or pressed bricks. No hand-made bricks are manufactured or burned by Mr. Grant. He has two machines, one of which turns out ordinary brick at an average rate of 8,000 per day, and a fine pressed brick machine capable of turning out 1,000 daily of the best grade. An up-draft ordinary kiln, holding 250,000 brick, and one of the most modern style of down-draft kilns, having a capacity for 35,000 brick, which cost $1,500, and is used only for the highest grade of pressed work, are part of Mr. Grant's manufactory.

The Monterey Brick Manufacturing Company has appointed Henry Herschkovitz, of Cinco de Mayo, No. 6, its agent in the City of Mexico.

A. J. Robertson, of the Monterey, Mexico, brick works, has signed a contract with the Mexican Central Railroad to furnish the railway with four million bricks for use at Tampico.

Dr. H. Ries, of the United States Geological Survey, expert in clay, has been in Santa Fe, N. M., examining into the commercial value of the clays which abound in that region, which he declares to be a superior quality.

J. A. Robertson, of Monterey, Mexico, has signed a contract with the city authorities for the paving of thirty blocks in the center of the town with the vitrified red brick.

San Francisco, Nov. 6. SUNSET.

PUT YOUR HOUSE IN ORDER.

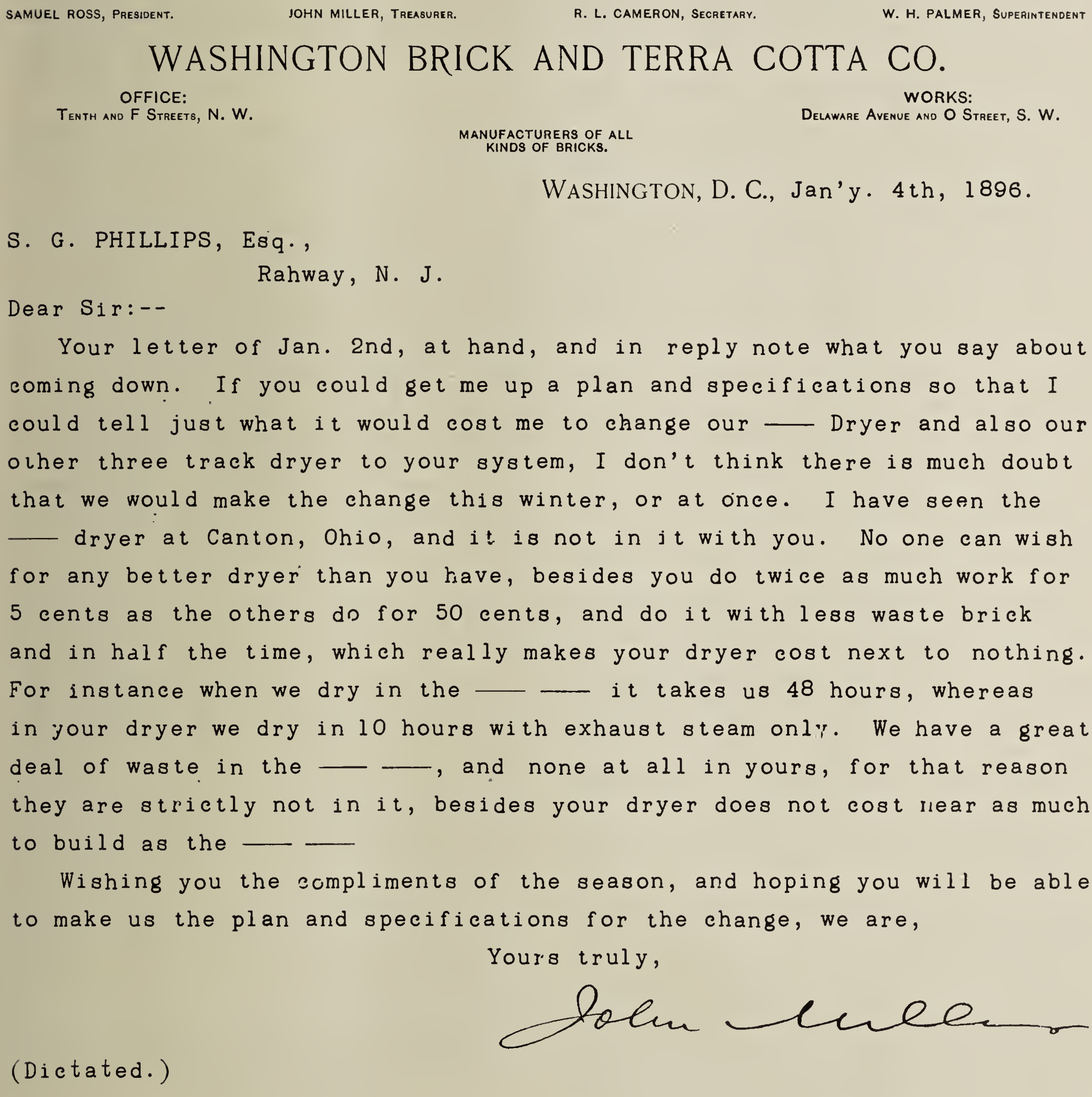
Now that the noise and turmoil of politics have ceased, let us all get down to business. Look over your works, every one, and see what is needed to resume work, for you will want to make an early start. Order the needed machinery and repairs in good time, so as to avoid delays when you will want to be making brick. If you put in new machinery and the old is still serviceable, you can sell it. Try the "For Sale," "Wanted," etc., columns.

Mention the Clay-Worker
WHEN WRITING TO ADVERTISERS
Mention the Clay-Worker

THE

Best Up-to-Date Brick Dryer.

The PHILLIPS DRYER is THE BEST DRYER because it dries brick Quickly, Safely and Cheaply. By this system there is really no cost for fuel for it saves more fuel than it uses. This may sound queer but it's A PROVEN FACT.



SAMUEL ROSS, President. JOHN MILLER, Treasurer. R. L. CAMERON, Secretary. W. H. PALMER, Superintendent

WASHINGTON BRICK AND TERRA COTTA CO.

OFFICE:
Tenth and F Streets, N. W.

WORKS:
Delaware Avenue and O Street, S. W.

MANUFACTURERS OF ALL
KINDS OF BRICKS.

Washington, D. C., Jan'y. 4th, 1896.

S. G. PHILLIPS, Esq.,
Rahway, N. J.

Dear Sir:--

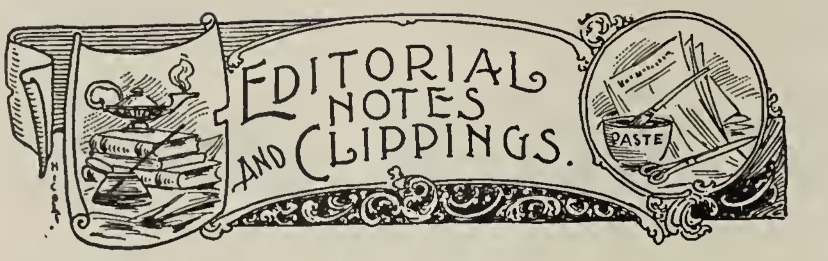
Your letter of Jan. 2nd, at hand, and in reply note what you say about coming down. If you could get me up a plan and specifications so that I could tell just what it would cost me to change our —— Dryer and also our other three track dryer to your system, I don't think there is much doubt that we would make the change this winter, or at once. I have seen the —— dryer at Canton, Ohio, and it is not in it with you. No one can wish for any better dryer than you have, besides you do twice as much work for 5 cents as the others do for 50 cents, and do it with less waste brick and in half the time, which really makes your dryer cost next to nothing. For instance when we dry in the —— —— it takes us 48 hours, whereas in your dryer we dry in 10 hours with exhaust steam only. We have a great deal of waste in the —— ——, and none at all in yours, for that reason they are strictly not in it, besides your dryer does not cost near as much to build as the —— ——

Wishing you the compliments of the season, and hoping you will be able to make us the plan and specifications for the change, we are,

Yours truly,

John Miller

(Dictated.)



EDITORIAL NOTES AND CLIPPINGS.

Robert Robbins, of Ladoga, will start a brick plant at Jamestown, Ind.

J. H. Mathes, of Rock Hill, Ala., has established a pottery at Columbus, Ga.

The Southern Mill Works, Mossy Creek, Tenn., is in the market for brick machinery.

A cyclone struck the brick plant at Stockbridge, Wis., Oct. 30, doing considerable damage.

J. T. Budd, formerly of Cincinnati, has opened up a new brick and tile plant at Prebles, O.

A. F. Feagin has started a new plant at Georgiana, Ala., for the manufacture of building brick.

Gustave Haut is adding new machinery to his brick plant at Perham, Minn., with a view of increasing his capacity.

The Great Western Pottery, of Kokomo, Ind., whose works have been practically closed for four months, has resumed operations.

George C. Frederick, Secretary and one of the founders of the Globe Pottery Company, East Liverpool, O., died in that city Oct. 29.

C. E. Bryan, of Floyd, N. C., writes us that he wants to purchase a brick machine having a daily capacity of from 5,000 to 8,000.

Extensive improvements will be made at the Ferguson Brick Plant, Troy, N. Y., which will materially increase the capacity of the yard.

The Terra Cotta and Supply Company, of Corning, N. Y., started up on full time again the 5th, after an enforced idleness of several weeks.

Geo. F. Gephart, Cumberland, Md., advises us that he desires to purchase some brick machinery, and would like to receive prices and catalogues.

E. J. Keim, Danville, Pa., writes that he has some money he desires to invest in a brickyard, and would be glad to correspond with desirable parties.

The Davy Burnt Clay Ballast Company, Hillsboro, Tex., has bought a large tract of land near that place, on which it will erect a plant for the manufacture of ballast.

The Druid Brick Company's plant, near Baltimore, Md., was completely destroyed by fire last month. The Manager, F. Debelins, says they will in all probability rebuild.

The Sewickley Brick and Stone Works at West Newton, Pa., were sold recently to Grantham & Humphries, of Scottdale, Pa., for $15,000. Operation will be resumed at once.

Jos. D. Sponsler, a well-known citizen of York, Pa., died at his home Oct. 19, in his seventy-fourth year. Mr. Sponsler was for many years engaged in the manufacture of brick.

J. H. Park & Co., of New Sewickley, Pa., have purchased the brick plant of the Brady's Run Fire Clay Company, near Fallston, Pa., and will operate the same in the near future.

Mead, Mason & Co., of Epping, N. H., have recently booked an order for 7,000,000 brick, to be used by the Lancaster, Mass., mills in constructing a conduit thirteen miles long.

The Frost Brick Company's plant, near Alexandria, Va., was sold at public auction to Mr. Jno. Miller, of Washington, D. C. Operation at the plant will be resumed in the spring.

Peter Hanson, of Blooming Grove, Texas, commited suicide Nov. 3, after first killing his wife. He left a note stating the cause for the deed as jealousy and bequeathing his estate to his children.

Edward P. Yale, of the Yale Brick Co., Berlin, Conn., died at his home in Meridian, Conn., the 7th inst. Mr. Yale was 64 years old and had been interested in the manufacture of brick for some years.

The Findlay (Ohio) Clay Pottery Works and Bell Bros.' Pottery have started up once more on full time, and with an increased number of hands, to fill conditional orders received before the election.

The Standard Dry Kiln Company, Indianapolis, state that on election day they closed a contract for a $6,000 drier. Their customer stipulated that it was to be rushed out as quickly as possible if McKinley was elected, and "held up" for further instructions if Bryan was the lucky man. It's needless to add that they are rushing it.

W. J. Reeder, La Belle, Ill., has just finished some tests of potters' clay found north of that place, which have proven so satisfactory that he is making arrangements to establish a pottery at La Belle in the spring.

Sioux City, Ia., is going to put down hundreds of thousands of square feet of paving next year, not a small portion of which will be of brick. It is the intention to make it one of the best paved cities in the country.

W. A. Eudaly is remodeling some old-style round down-draft kilns for the Rome (Ga.) Brick Works, and expects ere long to build some of his square down-draft kilns for burning press and paving brick at the same plant.

Obediah Durkin, member of the brick manufacturing firm of Martin & Durkin, of Saco, Me., died in that city Oct. 9. The deceased was seventy-four years old, and had been in the brick manufacturing business for many years.

The Hamilton Pressed Brick Company is the name of a new firm at Scranton, Pa., incorporated by A. M. Atherton, M. Baumgardner and A. Hitchcock, for the purpose of manufacturing pressed brick. They have a capital stock of $100,000.

The Davis Brick Company has been chartered to manufacture brick at Manchester, Va. The officers are: W. B. Davis, President; W. C. Davis, Vice President; J. M. Davis, Secretary and Treasurer. These gentlemen also constitute the Board of Directors.

A large fire at Beaver Falls, Pa., resulted in the destruction of the Mayer Bros.' Pottery. The fire is supposed to have started from a gas explosion. It is estimated that the loss will be over $100,000 on buildings and contents, on which there is a large insurance.

A spring of medicinal water has been struck at the plant of the Hoosier Brick Company, New Albany, Ind. The curative properties of the water for certain ailments are said to be equal to the springs at West Baden. They will erect a building over the springs.

The Karthaus Fire Brick and Clay Company has been organized at Lock Haven, Pa., with a capital stock of $10,000. The company will at once proceed to build its plant. W. I. Gillfland, F. L. Condreit, J. A. Heckerdorn, L. M. Impson and J. A. Black are interested.

Geo. B. Reed and Miss Eucie E. Maynard were united in marriage Wednesday evening, Oct. 8, at Trinity Church, Williamsport, Pa. Mr. Reed is connected with his father in the Clearfield (Pa.) Clayworking Company, and the young couple will make their home in Clearfield.

Mr. Oehler, St. Louis, Manager of the Illinois Hydraulic Pressed Brick Company, and Miss Fannie J. Swire were married Oct. 15, at the bride's home, in Council Bluffs, Ia. Immediately after the ceremony Mr. and Mrs. Oehler left for St. Louis, where they will make their home.

The plant of the Riverside Brick Company, Montgomery, Ala., was almost totally destroyed by fire on the morning of Oct. 30, including boiler, engine, brick machinery and other appurtenances. The fire originated in the engine house. The loss is estimated at $3,500, on which there was $1,500 insurance.

The Fish Pressed Brick Company, of Columbus, O., have resumed operations, after having been closed down for some time on account of dull times. They had an order for 1,000,000 brick contingent upon McKinley's election. It is not necessary to state that they started the factory on the morning of the 5th.

The death of W. S. Buckler, junior member of the firm of Buckler Brick Company, occurred at his residence in Annapolis, N. S. The deceased was young, having just reached the age of twenty-three, but by his genial good nature and upright living had won the esteem of all with whom he came in contact.

The extensive pottery of R. C. Remmey, Philadelphia, Pa., which was burned down in July, is being rebuilt. The new plant will comprise twelve buildings in all, which, with improved modern machinery, will call for the expenditure of about $55,000. It is expected to have the works ready for operation in January.

The election of officers of the Ceramic Association of the Ohio State University, Oct. 16, resulted in the following officers being chosen: A. Z. DeLong, President; J. C. Adams, Vice President; Lawrence Barringer, Second Vice President; A. V. Bleininger, Secretary and Treasurer. The latter writes

[CONTINUED ON PAGE 400.]

Now Will You Stop

Talking Politics, and give us a chance to explain the merits of the Wonder Brick and Tile Machinery, Cunningham's Automatic Cutting Tables, and other Clay Preparing Machinery, manufactured by . . . . .

See "Ad." on Back Inside Cover Page.

The Wallace Mfg. Co.,
FRANKFORT, IND.

EDITORIAL NOTES AND CLIPPINGS.—Continued.

us that the Association is in a flourishing condition, and expects to accomplish a good deal of work along the line of matters pertaining to ceramics by means of discussion and reviews of trade journals. One of the main features of their programmes will be original papers. The Association extends a cordial invitation to all clayworkers visiting Columbus to pay them a visit.

Frank Johnson, Manager of Hawkins Bros.' brick plant, Miles City, Mont., has been making experiments with their clay, with a view of manufacturing pressed brick as well as common building brick. If the experiment turns out as well as it now promises they will add a department to their plant for the manufacture of press brick.

Our Detroit correspondent advises us that all the yards in that vicinity are closed, and that while the season has been quite dull there, the manufacturers have been successful in securing a number of large orders, one alone being for 2,000,000 brick for St. Joseph's Retreat, at Dearborn, Mich. Our correspondent says the outlook for next year is very good.

The brickmakers of Iowa are feeling good over the election. The bankers of that State several months ago notified them that they would advance no more money on county scrip issued for improvement purposes, but promised, in the event of McKinley's election, to advance all the money necessary on scrip issued by any county in the State. They now announce that they will make their promise good.—Ex.

On the evening of Oct. 1 occurred the marriage of Grant Dibert and Miss Nannie Eva Armstrong, at the home of the bride's parents, on Shetland avenue, Pittsburg, Pa. After a large reception, the happy couple departed on a trip for the East. After their return they will reside in their own new home on Fairmount avenue. Mr. Dibert is a prominent brick manufacturer of Pittsburg and a member of the National Brick Manufacturers' Association. The Clay-Worker extends to Mr. Dibert heartiest congratulations.

The Monmouth (Ill.) Pottery have just made a count of the jugs they have turned out and sold since the 1st of last January, and the result reached 626,000. One thousand nine hundred of these were made last week, and still they have not made all that are wanted. During the last year they have found a splendid market for this branch of their ware. They think that the success, however, has not been undeserved, for they have turned out a very fine article. They have secured their share of the best jug trade in the country, and more is in sight.

Mr. Geo. Furniss, now with Deblois & Eldridge, 9 West Twenty-seventh street, New York city, is interested in an extensive and valuable deposit of clay near Montreal, Canada, and has had samples of it tested by the dry press manufacturers. From their reports and pieces of the burned specimens, we judge the clay to be remarkably fine. The Simpson Brick Press Company, who have tested clays from all portions of the globe, say: "We believe this clay is entirely unique, differing not only in its physical, but in its chemical construction, from any material we have tested during the past twelve years. We consider it specially adapted for making paving brick, inasmuch as it has all the fluxing properties usually associated with shale, with the advantage of being much more easily reduced to a workable condition than hard shale can possibly be, and hence feel sure that your clay is not only well adapted to the manufacture of pavers, but is equally excellent for building and face brick." Mr. Furniss is considering the feasibility of establishing a brick and tile factory on this property, whch includes several hundred acres, and will be pleased to correspond with persons desiring further information relative to the enterprise.

W. D. Richardson & Co., of Cleveland, O., have finally got into their new shops, which they are equipping with modern tools specially adapted for the manufacture of clayworking machinery. In addition to appliances heretofore advertised in our columns, they will soon be turning out a full line of presses, molds and dies for ornamental brick. Mr. Richardson's years of experience in making fine ornamental brick will enable them to meet the requirements in that line very fully. They solicit correspondence from brickmakers desiring supplies, and will cheerfully give advice in any department of press brick manufacture.

A NEW USE FOR BRICK.

A brickmaker at Kingston, N. Y., adopted a new and successful way of illuminating for a parade during the campaign. He took pale brick and soaked them several hours in kerosene oil, each brick absorbing about a pint of oil, and then suspended them by a wire along the front of his residence, and then, lighting them with a match, produced a brilliant illumination "while the band plays on."

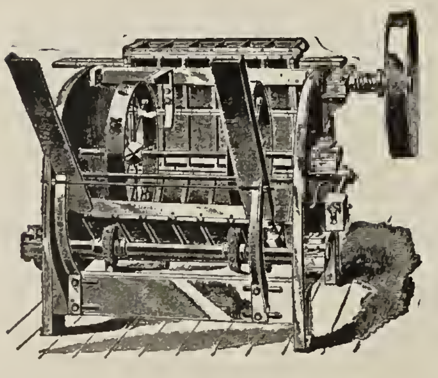
THE CHICAGO MARKET.

Activity in Building Trade Prospects Stirs Matters at Once.

Common building brick in Chicago went up 25 cents a thousand the day after election. The present price, $4.50 a thousand, is only a trifle above the actual cost of production, but previous to the election the stagnation in the building trades was so complete and the stocks of brick so excessive that a few dealers were forced to sell at almost any price. The election has released several enterprises and considerable capital, and brickmakers therefore stiffened their prices a trifle.

Mr. Meyenberg, of the Meyenberg Fire-proofing Company, 167 Dearborn street, cannot be convinced that the election Tuesday did not go right. His telephone was jingling all day with calls from the various architects' offices. At the close of the day the work ordered made a footing of between $75,000 and $100,000. This compares with a total of but $5,000 for October and of $10,000 in September and August, whereas the business in June aggregated over $200,000. Mr. Meyenberg estimates that the total business for this month will reach fully $400,000, as there are in the neighborhood of fifteen buildings in Chicago costing $150,000 to $500,000 each, all of which were being laid over until after the election, which can now be proceeded with.—Times-Herald.

A change of ad. is often as necessary as a change of air or change of diet, and for the same reason—to keep your trade and body healthy.—Ex.



Your Best Friends

Are to be Found in

The Only Sander,

That will sand any size of mold. No expense to keep in repair.

The Jumbo Barrow

Which holds 150 brick is the best and cheapest. Is perfectly balanced.

The Disintegrator

Which saves your more and costs you less than inferior machines, and our

First-Class Supplies

Such as Barrows, Trucks, Molds, Dump Tables, Dump Carts, Conveyors, Pug Mills, Brick Wagons. Grates, Doors, etc.

No expensive Belts to Wear out.

Our Prices are away down to Rock Bottom. Give us a Trial. Send for Catalogues.

The HORTON M'F'G. CO., Painesville, Ohio.

FOR SALE, WANTED, ETC.

☞Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

FOR SALE—Old established brickyard, in good location. Twenty acres clay of good depth. For terms, etc., address

BOX 18,
11 1 c Spring Lake, Mich.

FOR SALE OR RENT—A brick plant, with steam drier, light colored clay; capacity, 70,000 per day; near Chicago. Address "A,"
11 1 d Care Clay-Worker.

FOR SALE—New steam drier, including 146 ball-bearing cars. Been in use about 60 days. Very cheap for cash. Address CHESTER,
11 1 d Care Clay-Worker.

WANTED—Position as superintendent of either dry-press or mud brick works, by a man who is thoroughly practical in every department of brick works. No. 1 references given. Address

W. C. M.,
11 1 1p Care of Clay-Worker.

FOR SALE—$1,500 will buy the brick plant at West Brattleboro, Vt. Chief machine, good clay; brick sell for $6 at yard; house, barn, 4 acres land. Write for particulars to E. S. MORSE, Brattleboro, Vt., or D. H. BOYD,
11 3 cm Brooklyn, N. Y.

WANTED—A second-hand Roman brick press, Boyd make preferred. In answering this, give name of press, length of time it has been used, and the price expected f. o. b. cars at point from which shipped. Address CHALLENGE,
11 1 d Care Clay-Worker.

WANTED—Experienced and competent brickmaker for the dry-press process. To the right man good wages and charge of the yard will be given. State experience and salary. References required. Address UNION,
11 1 dm Care Clay-Worker.

WANTED—Re-engagement as superintendent of fire brick works; thoroughly experienced in fire brick manufacture, also architectural and paving brick, particularly the former. First-class references. Address, "FIRE BRICK,"
10 1 d Care Clay-Worker.

THE CHEMISTRY OF POTTERY.

By Karl Langenbeck.

This book is written by a practical potter and chemist. It contains matter of great pecuniary value to every progressive potter, and is thoroughly up to date. Price, $2.00.

We also publish:

"Chemistry for Beginners," by Edward Hart; $1.50.

"Development of the Periodic Law," by F. P. Venable; $2.50.

"Notes on Metallurgical Analysis," by N. W. Lord; $1.25.

"Notes on Qualitative Analysis," by W. P. Mason; 80 cents.

"Engineering Chemistry," by T. B. Stillman; $3.50. CHEMICAL PUB. CO.,
11 3 d Easton, Pa.

PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

FOR SALE—3-ton incline hoist for conveying clay to machine house, made by the Trenton Iron Company.

9-foot Chisholm, Boyd & White dry pan.

Chisholm, Boyd & White revolving screen and mixer, with ⅛ screen, and bucket elevator, with 20 6-inch buckets.

75-horse-power Westinghouse engine.

All the above but little used and in first-class condition. Address, WALNUT,
10 2 d Care Clay-Worker.

FOR SALE—Nearly new brick and tile plant; fine location, good clay, good machinery, kilns and building, on Wisconsin Central Railroad, forty-six miles from Chicago. Will sell all or lease, or sell part to experienced man and allow him to run pant. For further information address,

LEONARD,
10 2 dm Care Clay-Worker.

WANTED—A young chemist, Dr. Phil., graduate of one of the universities of Europe, speaks German, French and English, now occupying a responsible position as chemist and assistant manager of one of the largest terra cotta and tiling factories in Europe, desires a position in this country. For further information address, B. K.,
10 1 d Care Clay-Worker.

BRICK MACHINERY FOR SALE.

One 2-mold Whittaker dry-press brick machine.

One 2-mold Whittaker semi-dry-press brick machine.

One 1-mold ornamental Whittaker brick machine.

One 4-mold dry-press brick machine, Simpson make.

One 4-mold dry-press Eureka brick machine.

Two repress brick machines.

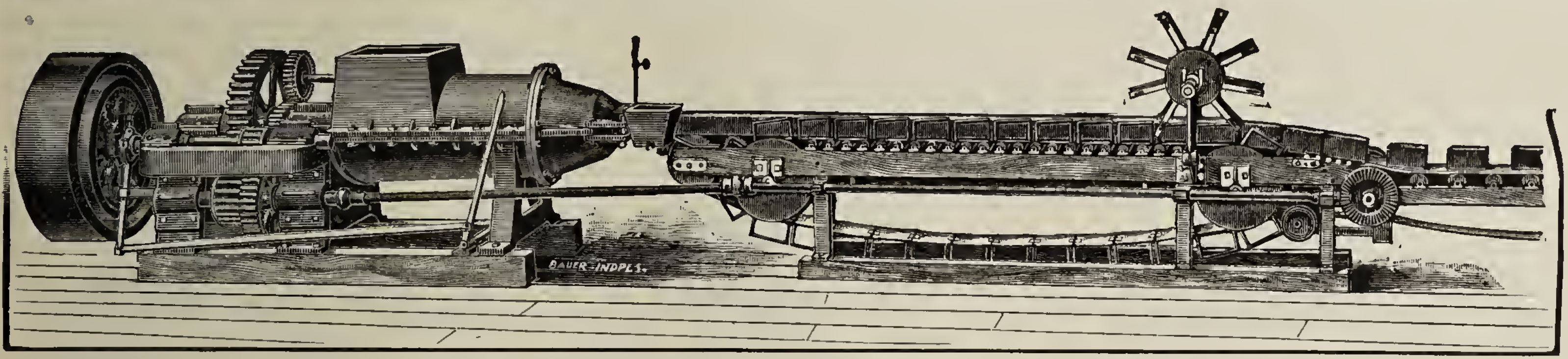
One stiff-mud brick machine.

One brick and tile machine combined.

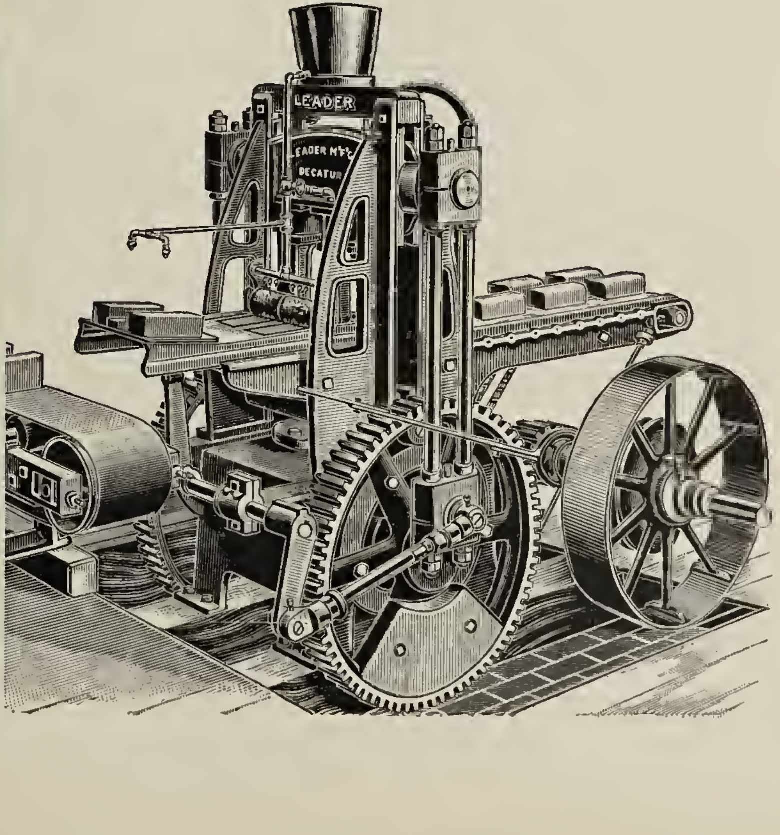
One dryer.

Also disintegrators, breakers, screens, trucks, etc.

SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.


BAUER-INDPLS.

✳ LEADER ✳
MANUFACTURING CO
DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
✢ ELEVATORS ✢
AND
COMPLETE OUTFITS.
SEND FOR PRINTED MATTER.



NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
6 t f d Wellsburg, W. Va.

FOR SALE—Two Simpson presses, one Plymouth brick and tile machine, Plymouth board delivery, brick cutting table, Plymouth tile cutting table, Freese "A Special" brick machine, Stevenson pug mill and Emens granulator. For description of this machinery see page 579, June Clay-Worker, or address
CLEVELAND VITRIFIED PRESSED BRICK CO., 809 Cuyahoga Bldg.,
7 tf d Cleveland, O.

I WILL LEASE OR SELL my plant at a reasonable price to one familiar with the roofing tile business. The factory cleared last year $20,000 (twenty thousand dollars), and is doing better than that at the present in all these hard times. Will sell all or part of it, or will give long lease at reasonable price to the right party. Why do I wish to dispose of a good thing? That's my business. ARTHUR,
9 t f d Care Clay-Worker.

NOTICE.

Parties wishing formulas for the manufacture of enameled or glaze brick (once or twice burning), either on clay or burnt brick, with full instructions; also, pure white dull enamel, or other colors, for terra cotta, new process, can obtain same by inclosing five dollars. Parties ordering must state nature and quality of clay they wish to enamel or glaze. In such cases, if instructions sent are strictly followed, a guarantee given that results will be obtained equal to anything manufactured, or money refunded. Address,
4 tf L EUREKA, care Clay-Worker.

EXPERT IN ROOFING TILE.

Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address,
CHARLES STOLP, Box 166,
3 tf 1 5p Chicago Heights, Ill.

ENGINES FOR SALE.

One 200-horse-power Corliss engine.
One 150-horse-power Corliss engine.
One 125-horse-power cut-off engine.
One 100-horse-power slide-valve engine.
One 80-horse-power slide-valve engine.
One 75-horse-power automatic cut-off engine.
One 60-horse-power center-crank engine.
One 55-horse-power self-contained engine.
One 50-horse-power self-contained engine.
One 40-horse-power self-contained engine.
One 35-horse-power slide-valve engine.
One 30-horse-power slide-valve engine.
One 25-horse-power slide-valve engine.
One 20-horse-power slide-valve engine.
One 15-horse-power slide-valve engine.
One 12-horse-power upright engine.
One 10-horse-power upright engine.
One 8-horse-power upright engine.
One 12-horse-power engine and boiler combined.
One 10-horse-power engine and boiler combined.
One 8-horse-power engine and boiler combined.
Two hoisting engines.
Three steam elevator engines.
Four pair of mining engines.
One Ingersol steam drill.
SCHOELLHORN-ALBRECHT MACH. CO.,
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FAST TIME AND THROUGH SERVICE TO SOUTH BEND.

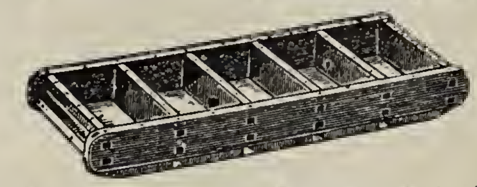
Commencing June 22, through parlor cars will be operated between Indianapolis and South Bend daily, except Sunday, on Big Four train No. 3, leaving Indianapolis at 5 p. m., making immediate connection with Vandalia line fast train at Colfax, which passes through Frankfort, Logansport, Lake Maxinkuckee and Plymouth, arriving at South Bend at 10:45 p. m. G. E. ROCKWELL, D. P. A., for details.

FIRE Dover Fire Brick Co., INCORPORATED 1870. MANUFACTURERS OF Dover and Buckeye Fire Brick, *Unexcelled for Kiln Purposes.* 44 Mercantile Bank Bldg., Cleveland, Ohio. **BRICK**

G. COLDEWE & CO.,

MANUFACTURERS OF ALL KINDS AND SHAPES OF

HAND and.... MACHINE **MOULDS**



We manufacture the the most substantial Moulds known, and guarantee every Mould to be first-class in material and workmanship.

A Special Discount on all orders received on or before March 1st.

No. 829 Sixth St., Milwaukee, Wis.

"LEVIATHAN."

"Upon Earth There is not His Like."

....Sept ....1896.

MAIN BELTING CO., 248 Randolph St., Chicago, Ill.

GENTLEMEN:—Please ship us via freight, 146 feet x 18" 8 ply "Leviathan" Belting. The reason you have not heard from us of late is, we have been trying the "just as good for less money" belting. You can count on our future orders for "LEVIATHAN."

Prompt shipment of the above will oblige. Yours very truly,

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Manufactured under Special Process.
A Guarantee of Superiority.

NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum

MAIN BELTING COMPANY,

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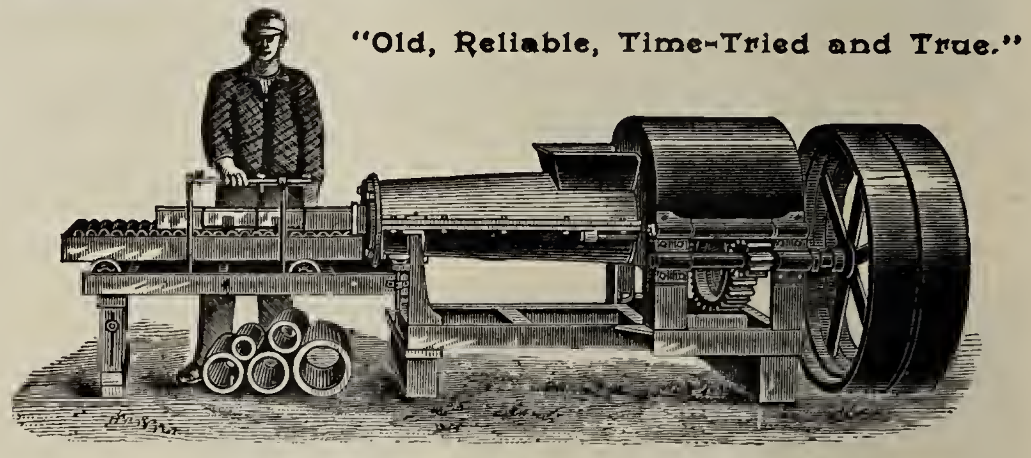
PHILADELPHIA: 1219 Carpenter Street. BOSTON: 120 Pearl Street.

KELLS & SON'S IMPROVED BRICK AND .... TILE MACHINES.

"Old, Reliable, Time-Tried and True."



P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

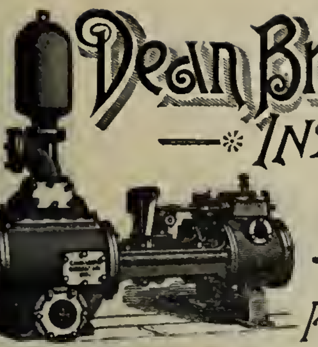
☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,

PARKHILL, ONTARIO,

Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.



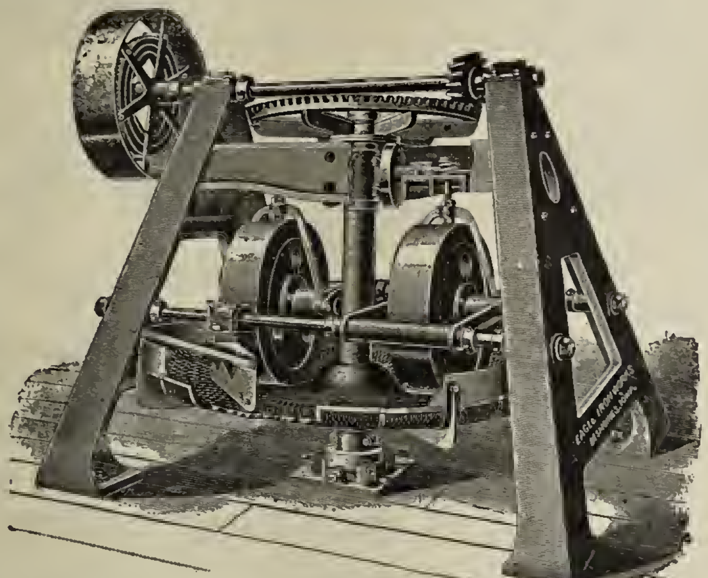
Dean Bros. Steam Pump Works,
INDIANAPOLIS, IND.

SINGLE & DUPLEX PUMPS.
HORIZONTAL AND VERTICAL PUMPS.
Best Design & Workmanship.
PRICES REDUCED Send for CATALOGUE.

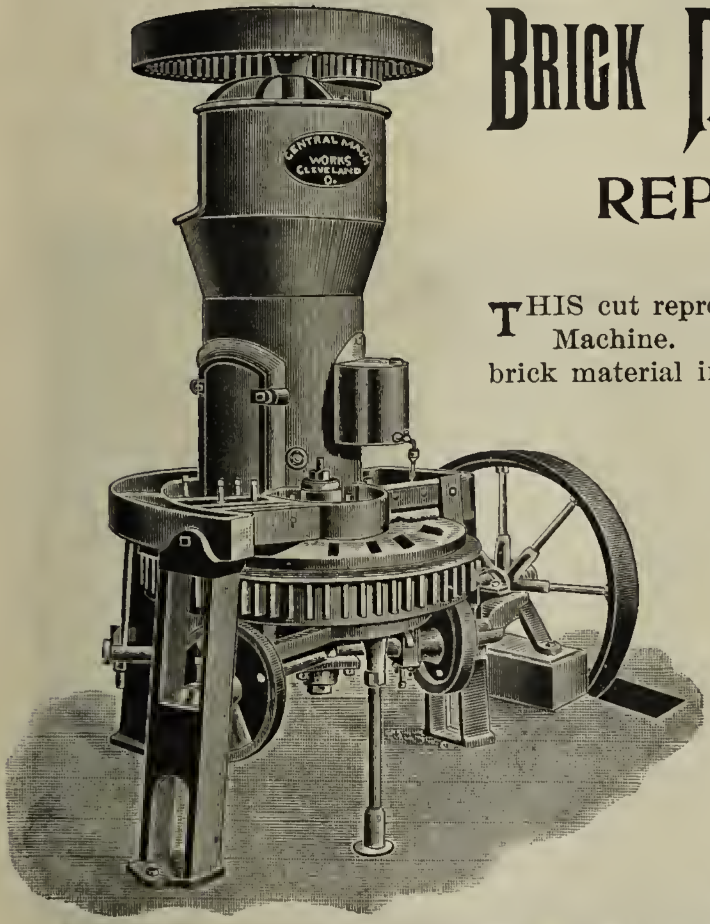
OUR NEW 9 Ft.
IRON FRAME DRY PAN

SEND for catalogue and read up on our patented features of this machine. Our motto in its construction and design is

"NOT HOW CHEAP, BUT HOW GOOD."



EAGLE IRON WORKS, Des Moines, Ia.



BRICK MACHINES AND REPRESSES.

●●●●

THIS cut represents our Stiff Mud Brick Machine. It will work any kind of brick material including fire clay, shale or common clay right from bank without the use of a pug mill. Each brick is pressed separately and can be haked 7 or 8 high, or repressed right from machine.

Over 500 in operation.

Send for price and circulars

Manufactured by

CENTRAL
MACHINE
WORKS,
226-236 Abbey St.
Cleveland, Ohio.

NOTICE—We furnish all supplies and repairs for any make of the "Sword" Brick Machine.

Davis's Brick, Tiles and Terra-Cotta. Third Edition. Revised, Improved and Enlarged.

RECENTLY PUBLISHED.

A Practical Treatise on the Manufacture of

BRICK, TILES AND TERRA-COTTA,

Including Stiff Clay, Dry Clay, Hand Made, Pressed or Front, and Roadway Paving Brick, Enameled Brick, with Glazes and Colors, Fire Brick and Blocks, Silica Brick, Carbon Brick, Glass Pots, Retorts, Architectural Terra Cotta, Drain Tile, Glazed and Unglazed Roofing Tile, Art Tile, Mosaics and Imitation of Intarsia or Inlaid Surfaces. Comprising every product of Clay employed in Architecture, Engineering and the Blast Furnace. With a detailed description of the different Clays employed, the Most Modern Machinery, Tools and Kilns used, and the Processes for Handling, Disintegrating, Tempering and Molding the Clay into Shape. Drying, Setting and Burning. By Charles Thomas Davis. Third Edition. Revised and in great part rewritten. Illustrated by 261 engravings, 662 pages, 8 vo.

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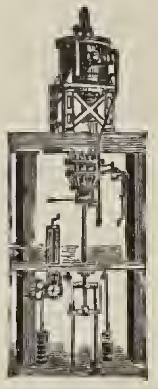

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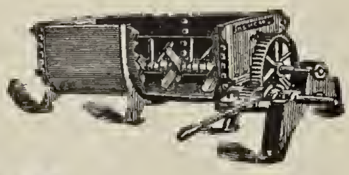

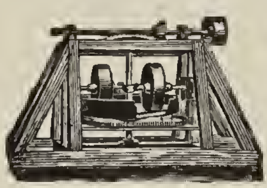

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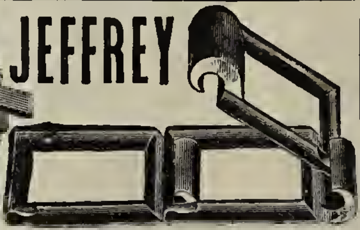

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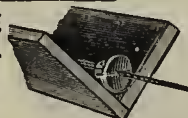

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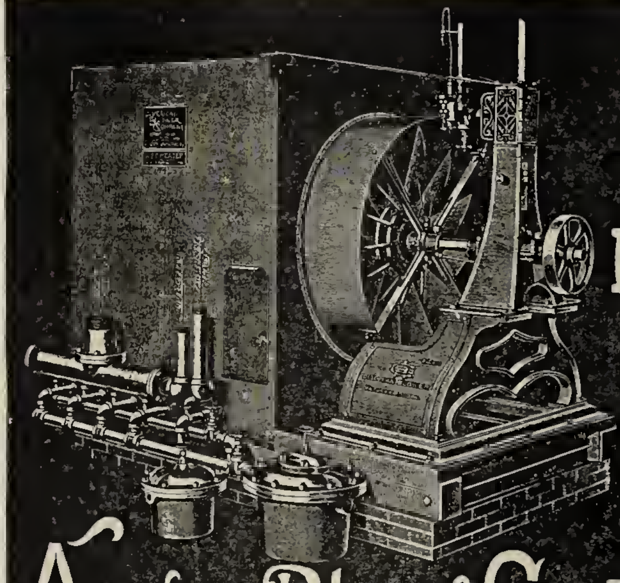

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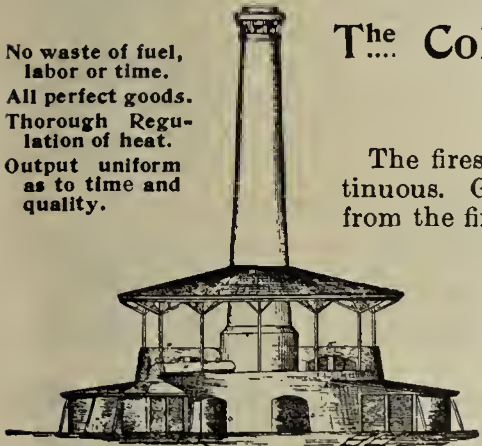

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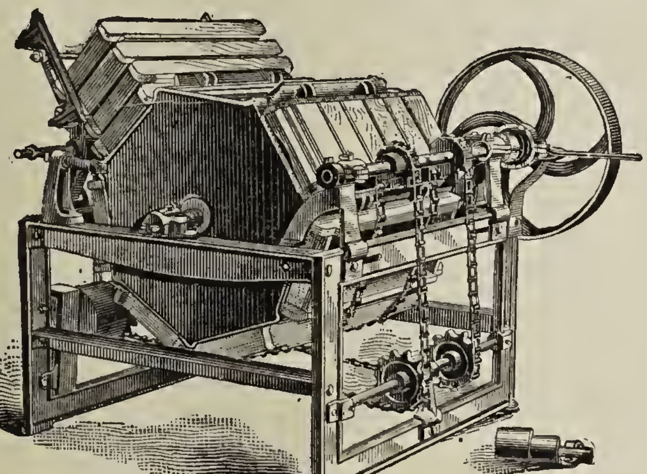

THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton. A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

4000 TO 5500

(Gallons of Water per hour.)

BY HAND-POWER.

Pumps, Hand-power Pumps,

(LOUD'S PATENT.)

These Pumps are simple, durable and low-priced.

A large capacity and easy working pump for **Brick Yards, Water Works, Sewer Contractors, Foundation Builders, Miners, Quarries** or wherever it is desired to raise a *large quantity* of water by *Hand-power.* The pump has large valves (*accessible by hand*) and will pump water containing *sand, gravel, mud, sewage matter, etc.,* without *choking* or any *perceptible wear.*

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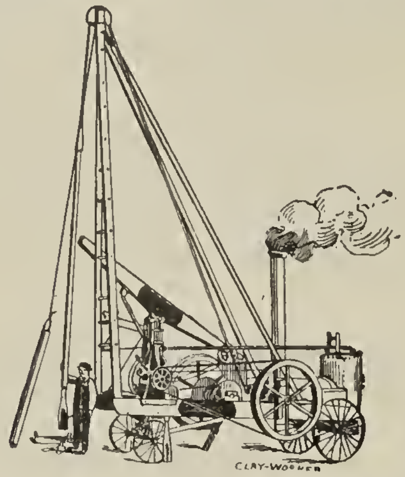

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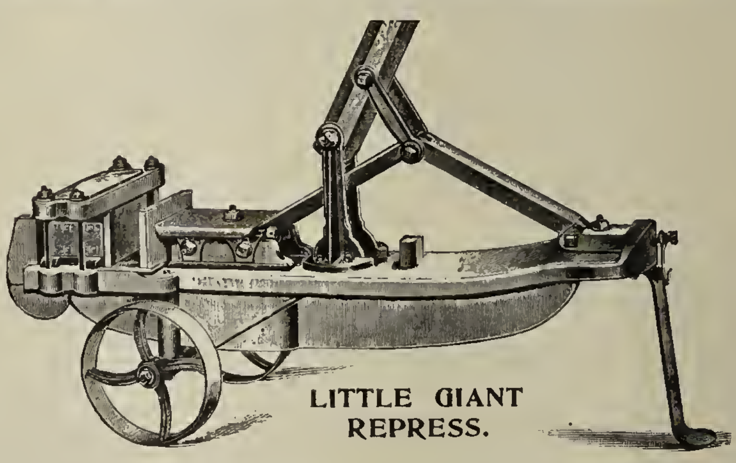
THE highest quality of Clay for Glass House Pots, Fire Brick, Tank and Furnace Blocks and all articles of Fire Clay used in the construction of Glass and Metallurgical Furnaces. Our XX Special Brick are absolutely indestructible and non-absorbing, specially adapted to smelting and refining furnaces and all furnaces and mills requiring high heat.

Read the analysis carefully and note that our clay is the superior of the imported article.

Silica	45.24
Alumina	39.31
Oxide Iron	.37
Lime	.29
Magnesia	.10
Alkalies	.27
Water	14.54
Total	100.12



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LITTLE ELI Auger Machine, Capacity 15,000 to 20,000.

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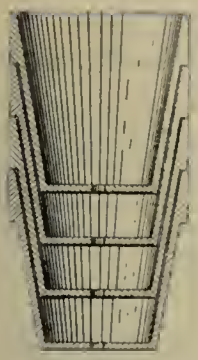

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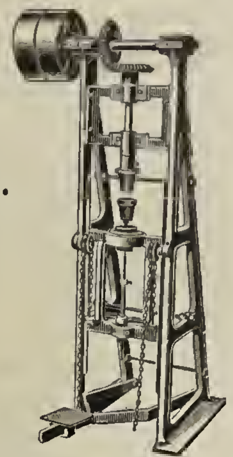
Flower Pot Machine.

(PATENTED.)

No expert workmen required.
Capacity in 10 hours:
6,000 two-inch Pots; 3,500 five-inch Pots;
4,000 four-inch " 2,000 seven-inch "
Write for Circular and prices.



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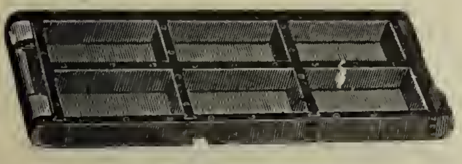
ARNOLD'S BRICKYARD SUPPLIES.

They are the Best that are Made.

3 Brick Hand Mold.



6 Brick Hand Mold

6 Brick Machine Mold.

Moulds. A large stock of Hand and Machine moulds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. **Two** grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best.** Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

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All-Metal Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

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Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.

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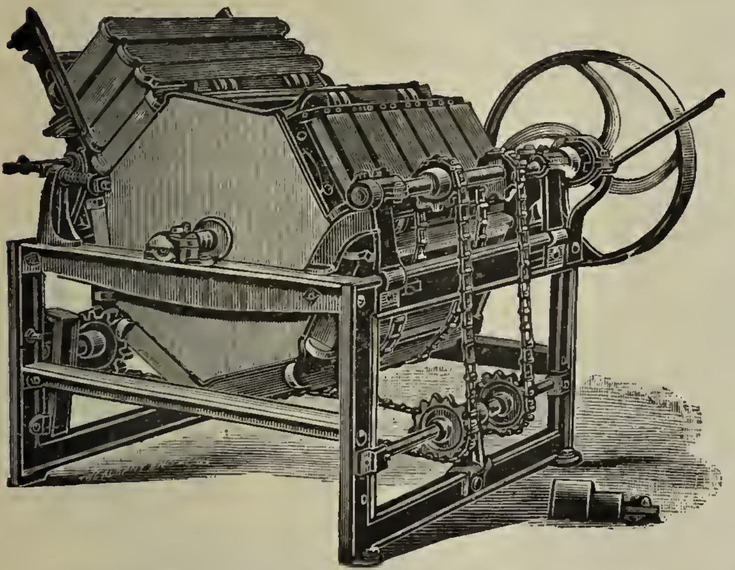
Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

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12:00 Noon. 8:20 pm. 7:20 am.

Lv Chicago	2:45 am.	11:50 am.	8:58 pm.
Arr Indianapolis	7:45 am.	4:37 pm.	3:30 am.

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LATEST EQUIPMENT.
ALWAYS "UP-TO-DATE."

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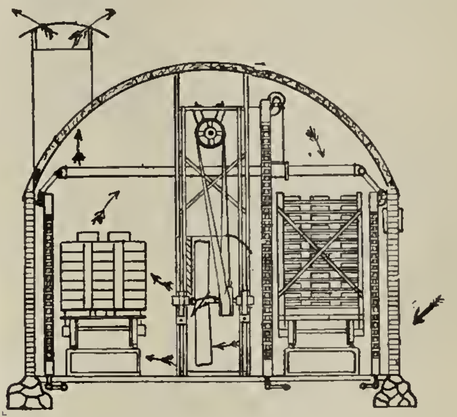
To sound industries, which will bear investigation, substantial inducements will be given by many of the places on the lines of the Illinois Central R. R., which is the only road under one management running through from the Northwestern States to the Gulf of Mexico. GEO. C. POWER, Industrial Commissioner I. C. R. R. Co., 506 Central Station, Chicago.

The Safety Dryer,

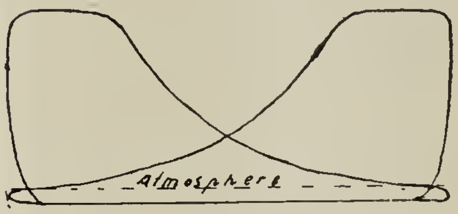
Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.

U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



Samuel Ross, President. John Miller, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.

WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

Washington, D. C., June 7th, 1895.

S. G. Phillips, Esq., Rahway, N. J.

Dear Sir—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our ——

You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

Fords, N. J., April 9th, 1894.

Mr. S. G. Phillips,

Dear Sir—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum.

The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes.

You may refer to me for full explanation.

I am yours very truly,
H. E. Raabe, M. E.

"And Met the Requirements in Every Case."

Philadelphia, December 14, 1892.

Mr. S. G. Phillips, Woodbridge, N. J.

Dear Sir—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

Yours respectfully,
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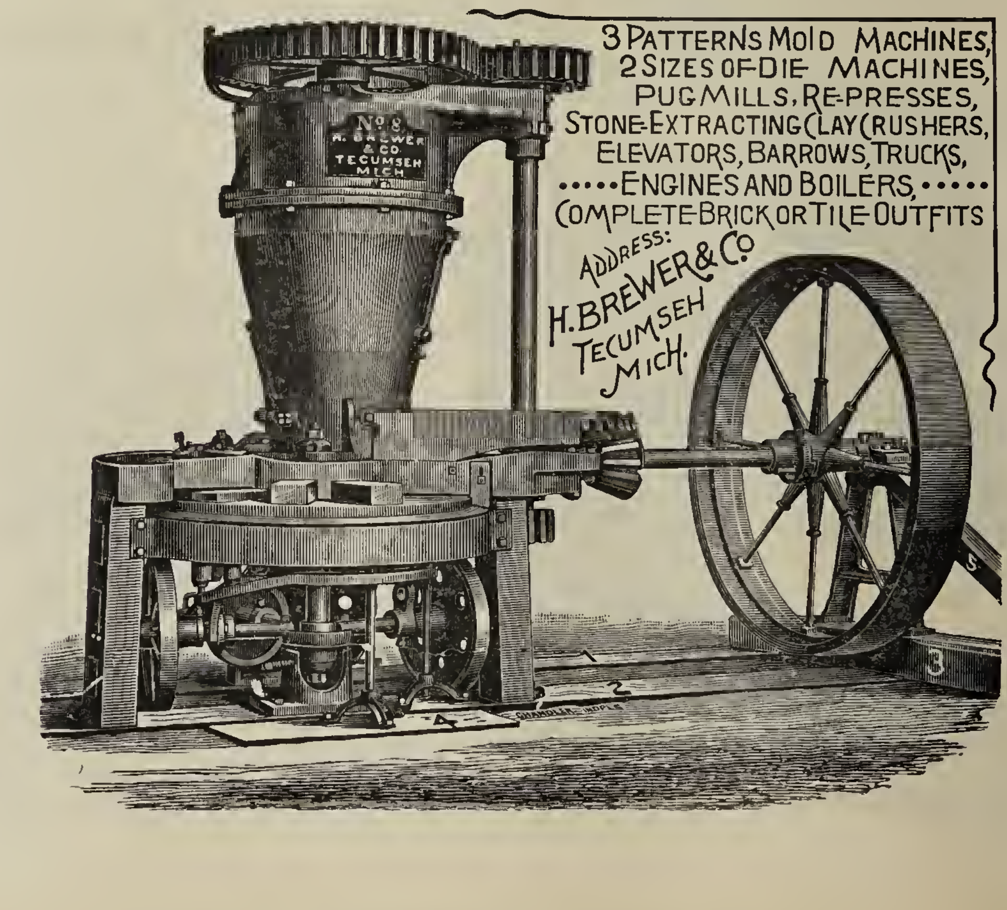
J. H. Chambers, Gen'l Mgr.

S. G. PHILLIPS,
Agent and Patentee,
161 Grand Street,
Rahway, N. J.



Prof. Dr. H. Seger and E. Cramer,

6 Krupp Street, BERLIN, GERMANY,

CHEMICAL LABORATORY FOR THE CLAY INDUSTRY.

Raw materials and products of the Brick, Stoneware, China, Lime and Cement industries examined and advice given.

Flaws in the methods of manufacture corrected.

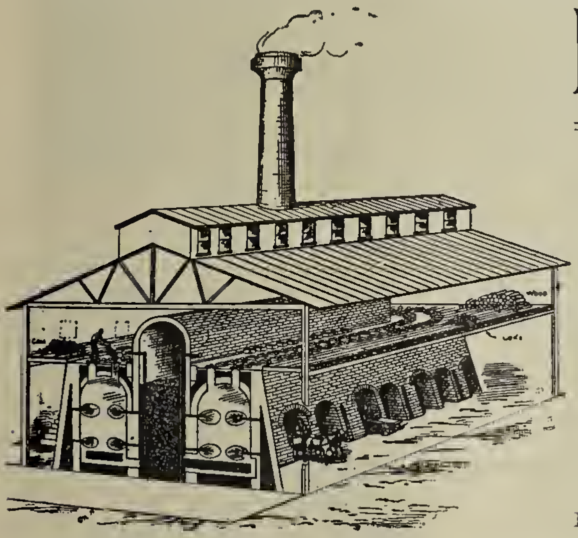
Many years experience.

Laboratory for the German Association of Refractory Clay Ware Manufacturers.

Manufacturers of the Seger pyrometrical cones.

Publishers of **Die Thonindustrie Zeitung**, the leading Ceramic weekly of Germany.

Organ of the German Association of Brick, Clay Ware, Lime and Cement Manufacturers; of the German Association of Refractory Clay Ware Manufacturers; of the Association of German Portland Cement Manufacturers, and of the Brick Trade Assembly.



Firestone's Continuous Kiln and Dryer.

THIS Kiln is especially adapted for the DRYING and BURNING of all kinds of Clay Products, costing no more when used for both processes than for one.

It takes only from twenty-five to thirty-five per cent of the fuel now used for the burning in other kilns to both dry and burn in these kilns.

No cold air strikes the fire or burning brick.

No soft or Salmon brick.

No yards or sheds needed.

It does not take a fortune to build this kiln. For particulars address,

GEO. C. FIRESTONE,

Mention the Clay-Worker. **HELENA, MONTANA.**

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.

Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.

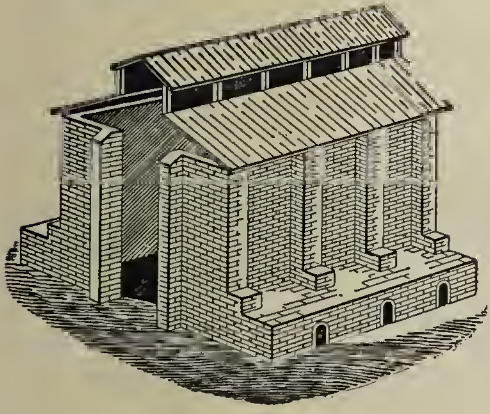
Second: Equalizing the drafts.

Third: More perfect combustion.

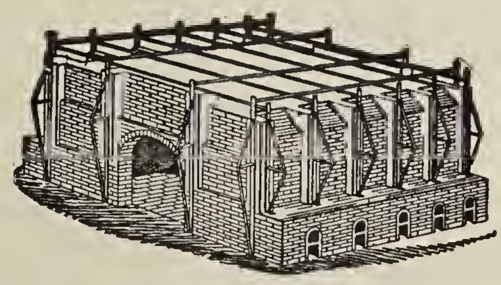
Fourth: Improved facilities for annealing.

Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., ***Minneapolis, Minn.***



Up-Draft Kiln.



Down-Draft Kiln.

LOUIS H. REPPELL'S

IMPROVED-KILNS

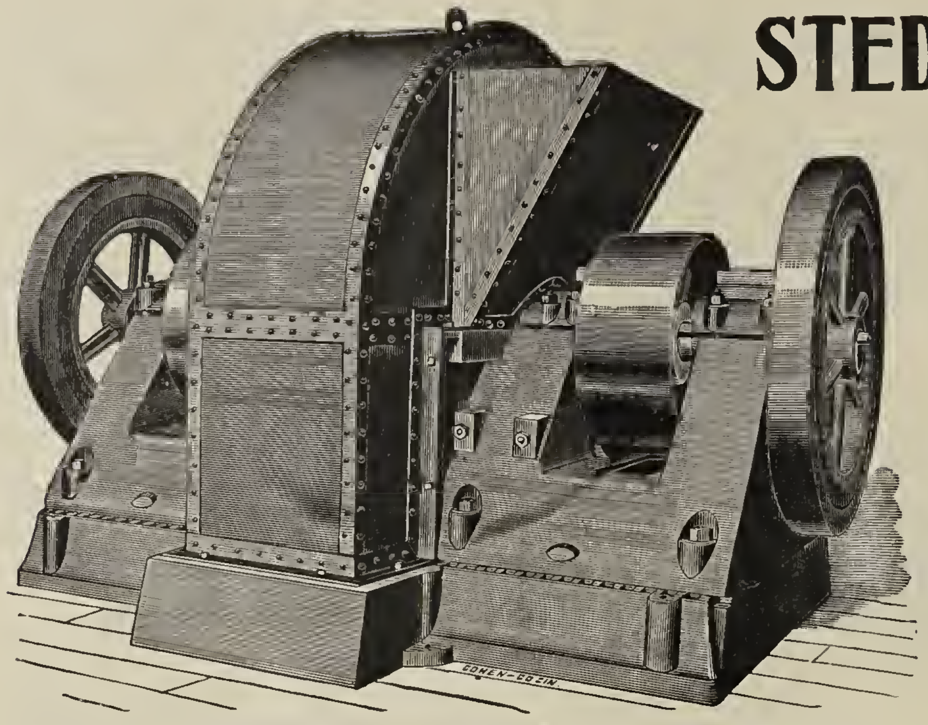
For Burning all Kinds of Wares.

Having had years of practical experience in the management and actual burning of all kinds of kilns, I claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., ***Kansas City, Mo.***



STEDMAN'S IMPROVED CLAY DISINTEGRATOR

For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

There. Are... Others

But If you want the Best, the most Modern, the most Scientific, the most Profitable Equipment for Brickmaking, you will patronize

W. D. Richardson & Co.,

Engineers,
809 Cuyahoga Building,
CLEVELAND, OHIO.

Manufacturers of....
The RICHARDSON DOUBLE-PRESSURE REPRESS, The RICHARDSON AUTOMATIC HOPPER and FEEDER, The RICHARDSON SHAKING SCREEN.

SEND FOR DETAILS.

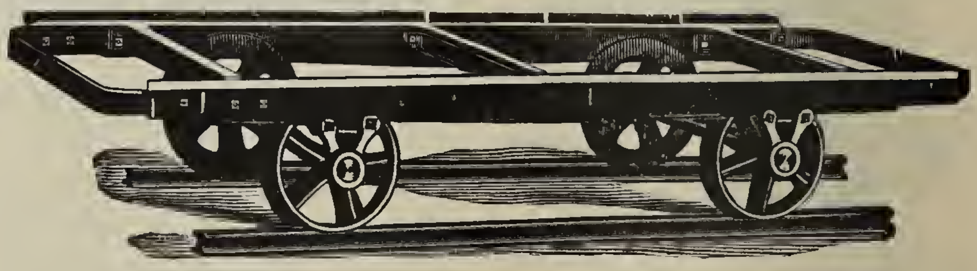
BRICK CARS.

THE BEST. NO EXPERIMENT.

Thirty styles of our cars in use in all parts of the United States and Canada. Nearly 2000 of our cars are in use in Cleveland alone by the following Brickmakers:

F. H. Eggers,
C. G. Barkwell,
Standard Brick Co.,
Peter Cullen,
Collinwood Brick Co.,
Cleveland Brick Co.,
Canadian Copper Co.,
George Gynn,
Warren Farr,
John Cullen.

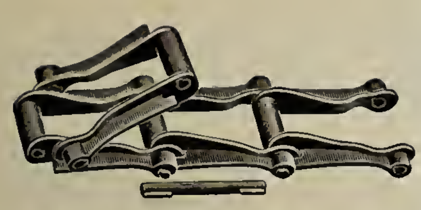
Write Them, Then Us.



Catalogue and Price List sent on application.

Style 28.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.
NEW BRUNSWICK FOUNDRY CO., New Brunswick, N. J.



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

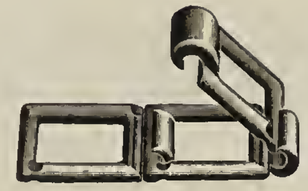
F. H. C. MEY,

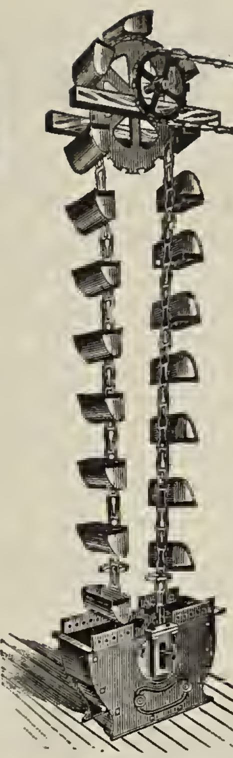
Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.





THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

of the best quality of brick in a day than he can by the old method, thereby saving time and making money.

MEY PATENT CLAY ELEVATOR.

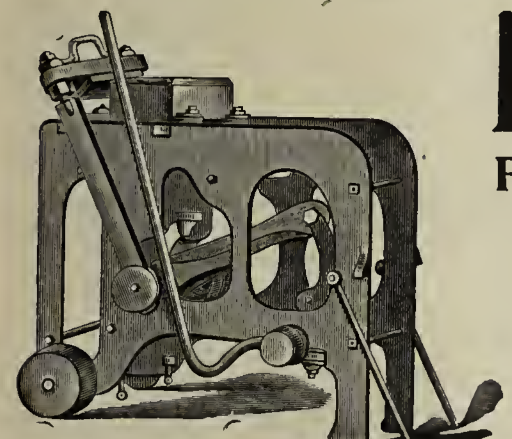
SEND FOR CATALOGUE.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

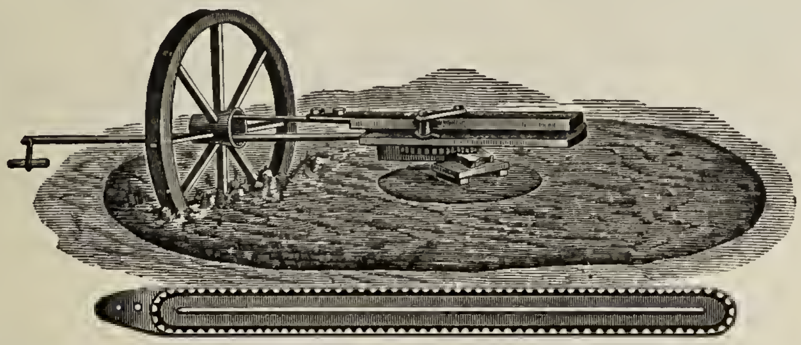


RED BRICK PRESS.

GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

☞Send for Circular and Price-List.



These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.

The Standard Brick Machines,

MANUFACTURED BY

A. M. & W. H. WILES CO.,

Grassy Point, Rockland Co., N. Y.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

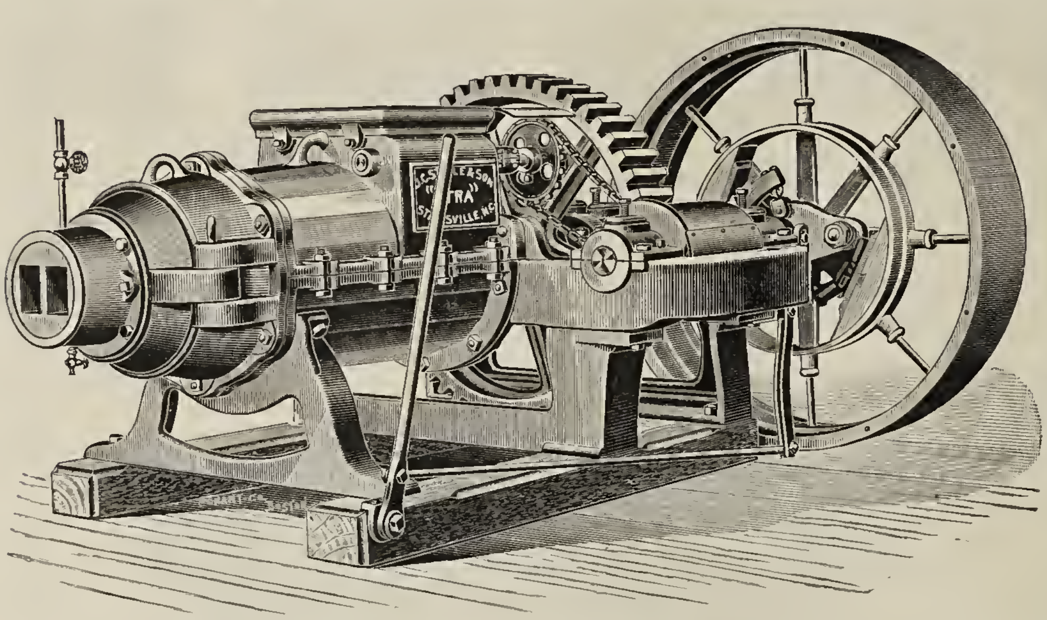
[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.

Vitrified Paving Brick

Do you make them? Are you interested in Brick Pavements? If so, don't fail to get a copy of the latest work on the subject, a handsome 84-page book by the well-known Civil Engineer and Clay Specialist, Prof. H. A. Wheeler. Mailed free on receipt of price, $1.00.

T. A. RANDALL & CO., Publishers,
INDIANAPOLIS, INDIANA.

The New South Brick Machinery



X-tra Machine. Capacity 25,000.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion** or **constipation.** No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

DANVILLE, VA., Sept. 22, 1896.
J. C. STEELE & SON, Statesville, N. C.

Gentlemen:—Answering your query as to how we are pleased with the outfit furnished us by you of brickmaking machinery and implements, we would say that it has given us good satisfaction. The brick machine does all that you claimed for it. The trucks are great labor saving implements and the winding drum and cars equally so. In our system we could hardly dispense with either the trucks or cars and drums.

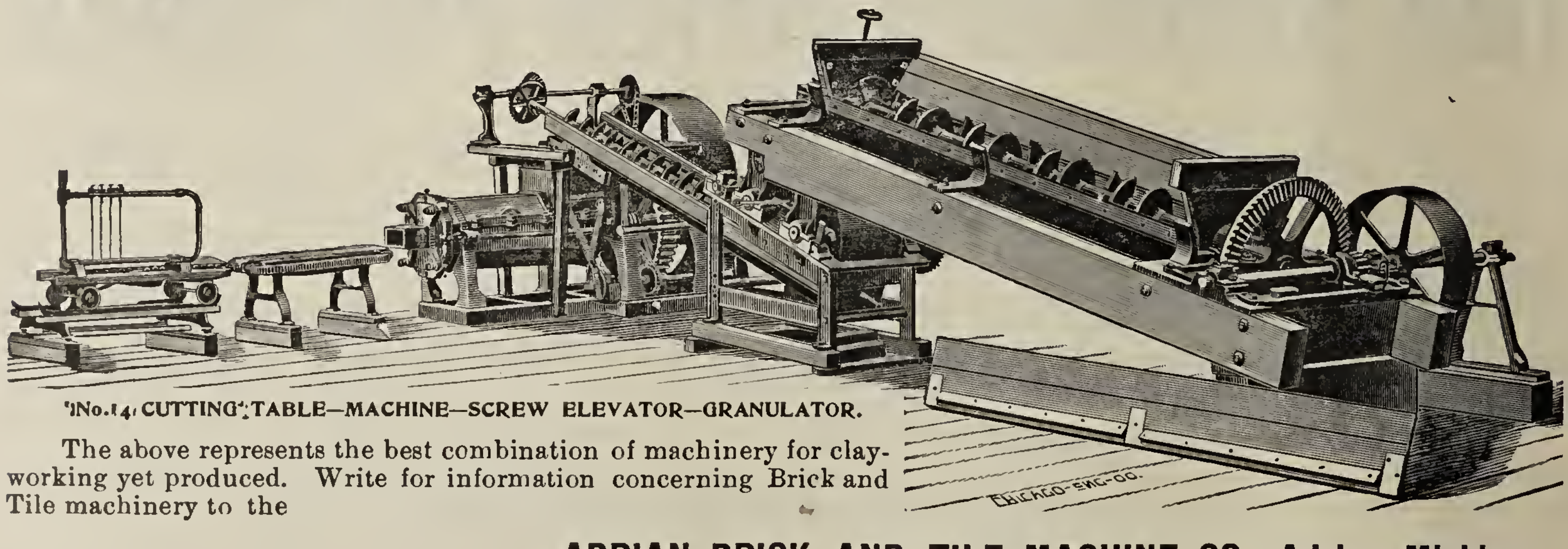
Respectfully,
DON VALLEY BRICK CO.

(This company is using the "X-tra" machine and make 30,000 brick per day.

Strictly modern machinery at the lowest price. Send for Catalogue.

J. C. STEELE & SON, Statesville, N. C.

ADRIAN BRICK AND TILE MACHINE CO.

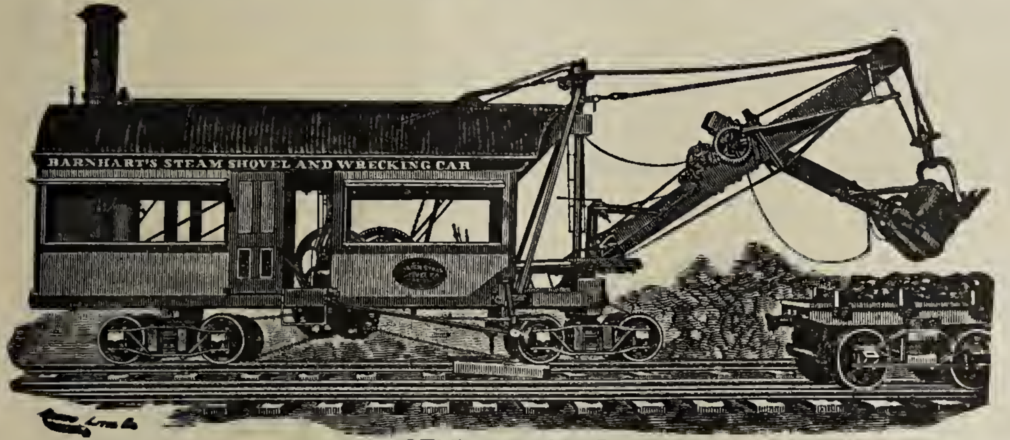

CHICAGO-ENG-CO.

'No.14' CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR

STYLE A—1½ YD.

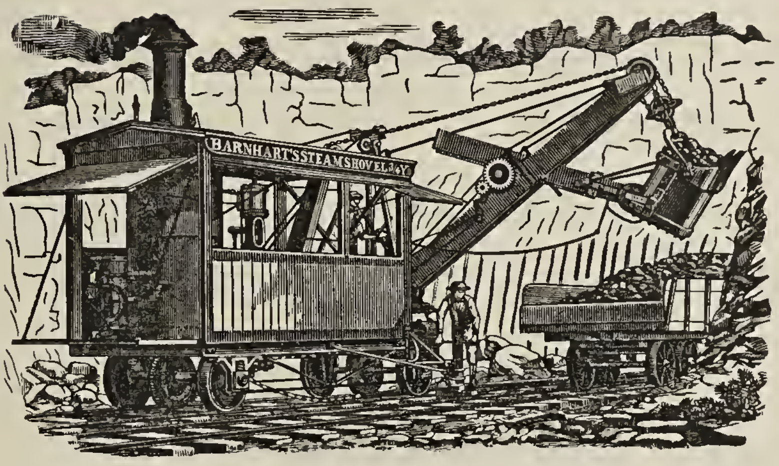
OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

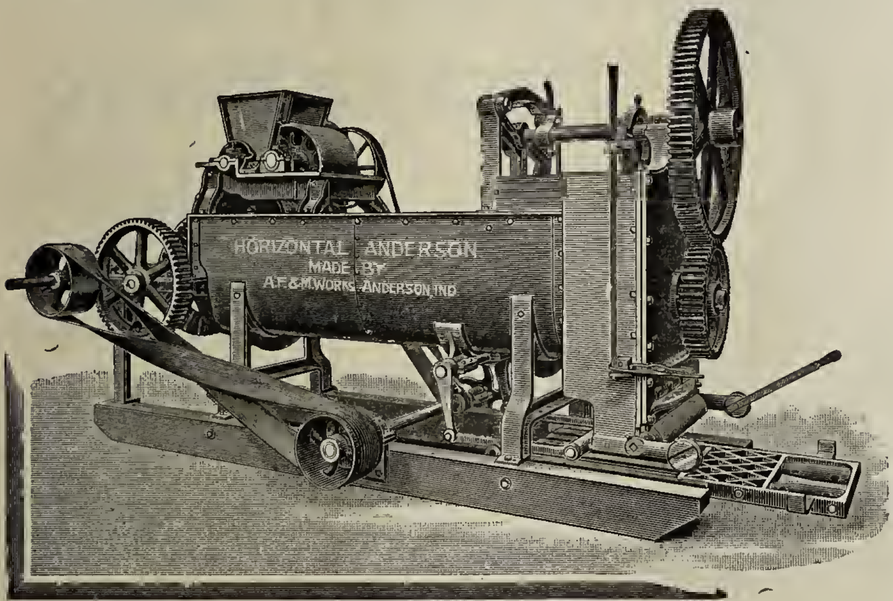
603 West Center Street, - MARION, OHIO.

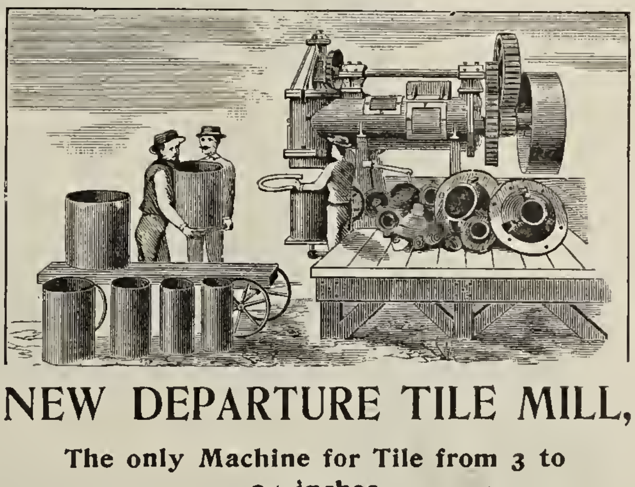


STYLE C—¾ YD.

The HORIZONTAL ANDERSON.

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY;** simple in construction and durable.





NEW DEPARTURE TILE MILL,

The only Machine for Tile from 3 to 24 inches.

DISINTEGRATORS, PUG MILLS, ELEVATORS, and BRICKYARD SUPPLIES.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana.

Would You Buy

A BRICK MACHINE
.....A DRY PAN
....A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King

A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

The Woolley Pug Mill,

All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
...AND...
SLIP PRESSES

For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

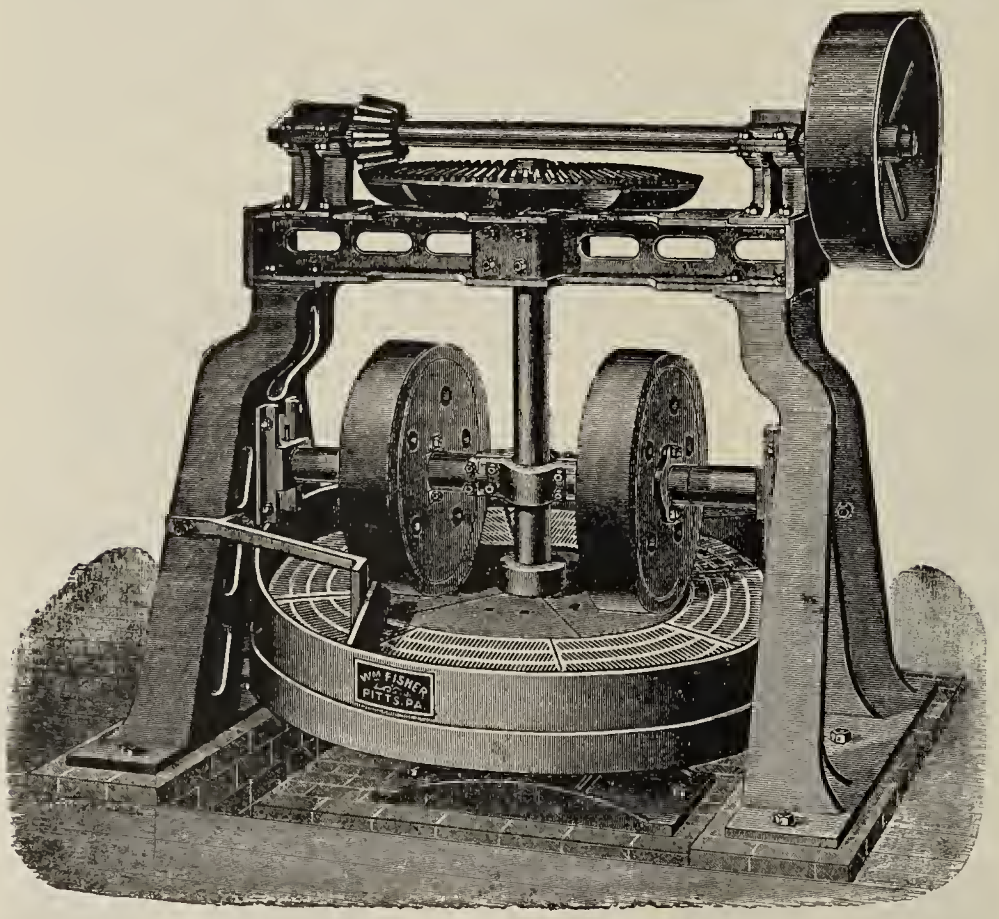
Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.


Wm FISHER PITTS.PA.

Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Proprietors,

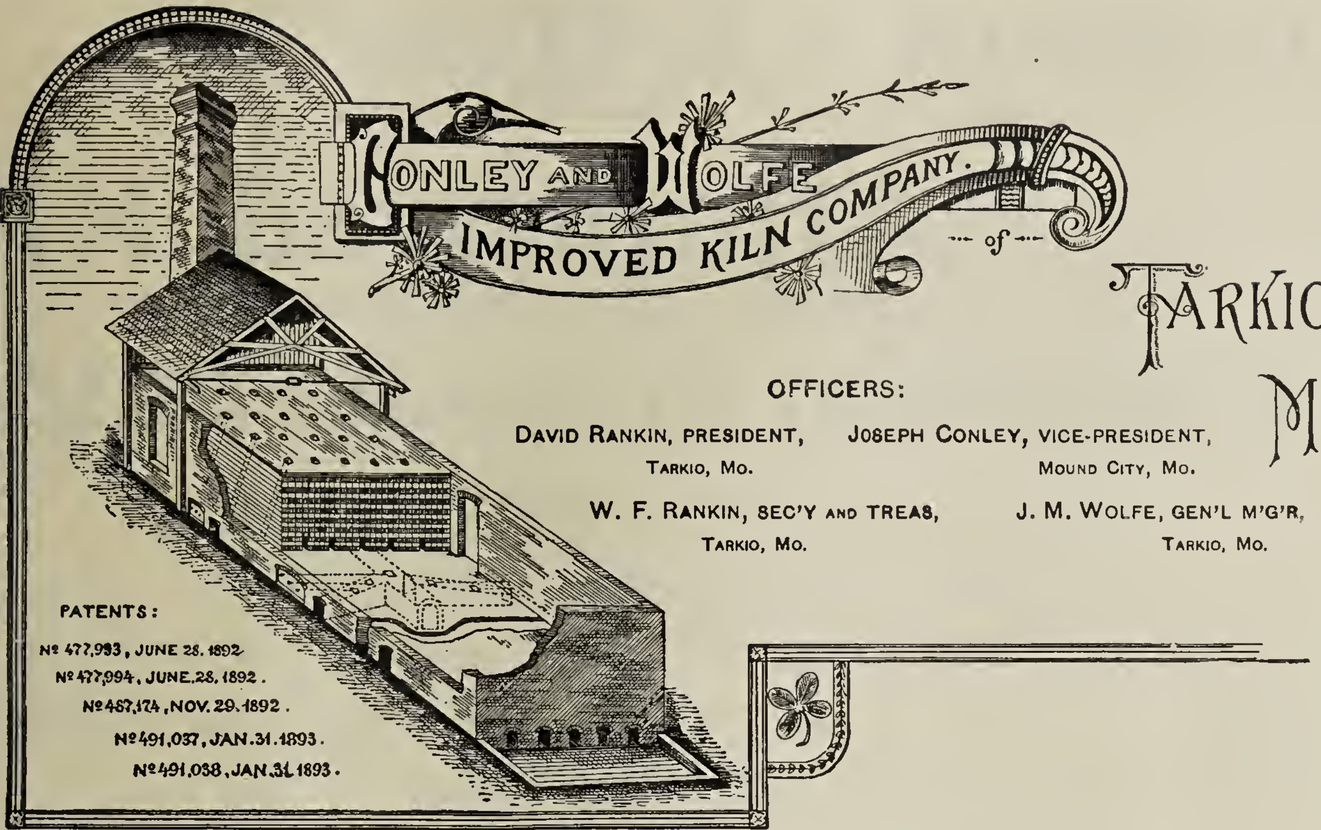
23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required



CONLEY AND WOLFE IMPROVED KILN COMPANY.
of
TARKIO, MO.

OFFICERS:
DAVID RANKIN, PRESIDENT, TARKIO, MO.
JOSEPH CONLEY, VICE-PRESIDENT, MOUND CITY, MO.
W. F. RANKIN, SEC'Y AND TREAS, TARKIO, MO.
J. M. WOLFE, GEN'L M'G'R, TARKIO, MO.

PATENTS:
Nº 477,993, JUNE 28. 1892.
Nº 477,994, JUNE.28, 1892.
Nº 487,174, NOV. 29, 1892.
Nº 491,037, JAN. 31. 1893.
Nº 491,038, JAN. 31. 1893.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

ALSIP'S LATEST IMPROVED

Down and Up=draft Kiln.

The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**

Morrison's Latest Improved Kiln,

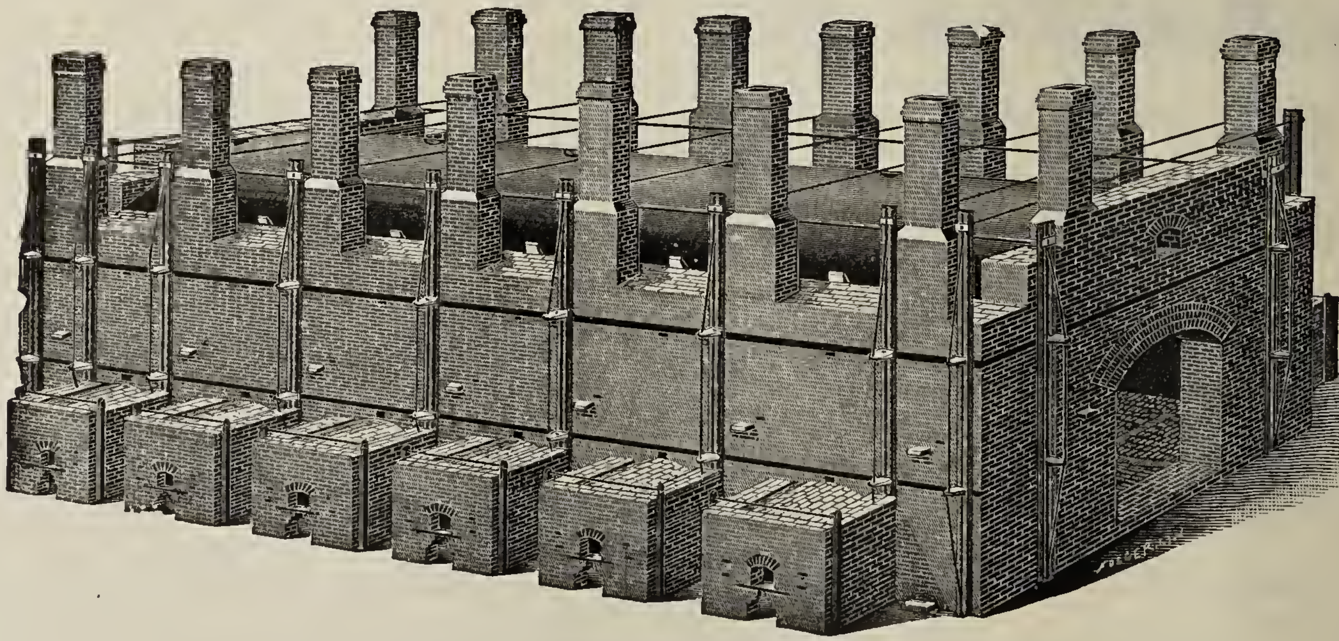
FOR BURNING BUILDING BRICK.

IT has no rival. Some of the largest brick plants in the country use it exclusively. Cost of construction within reach of every brickmaker. Price for license to use so reasonable that no one can object.

Write us for descriptive pamphlet, prices, etc., address

R. B. MORRISON & CO.,
P. O. Box 335. *ROME, GA., U. S. A.*

The EUDALY IMPROVED.... DOWN-DRAFT KILN.



A very large number of manufacturers are now using the EUDALY KILN for burning all kinds of clay wares, especially front, ornamental and paving brick. We have made a number of very important improvements since we first began the erecting of these Kilns. The square Kiln is especially adapted to plants of large capacity on account of economy in cost of construction and space occupied on the plant; while the Round Kiln is better adapted to plants of small capacity, drain tile, sewer pipe and fire brick in small quantities. These Kilns have gained a reputation for burning all hard and uniform. This Kiln is easily controlled and is in every way practical and desirable. We will take pleasure in giving any information we can on the subject of handling or burning clays. Address,

W. A. EUDALY, 509 Johnston Bldg. **Cincinnati, Ohio.**

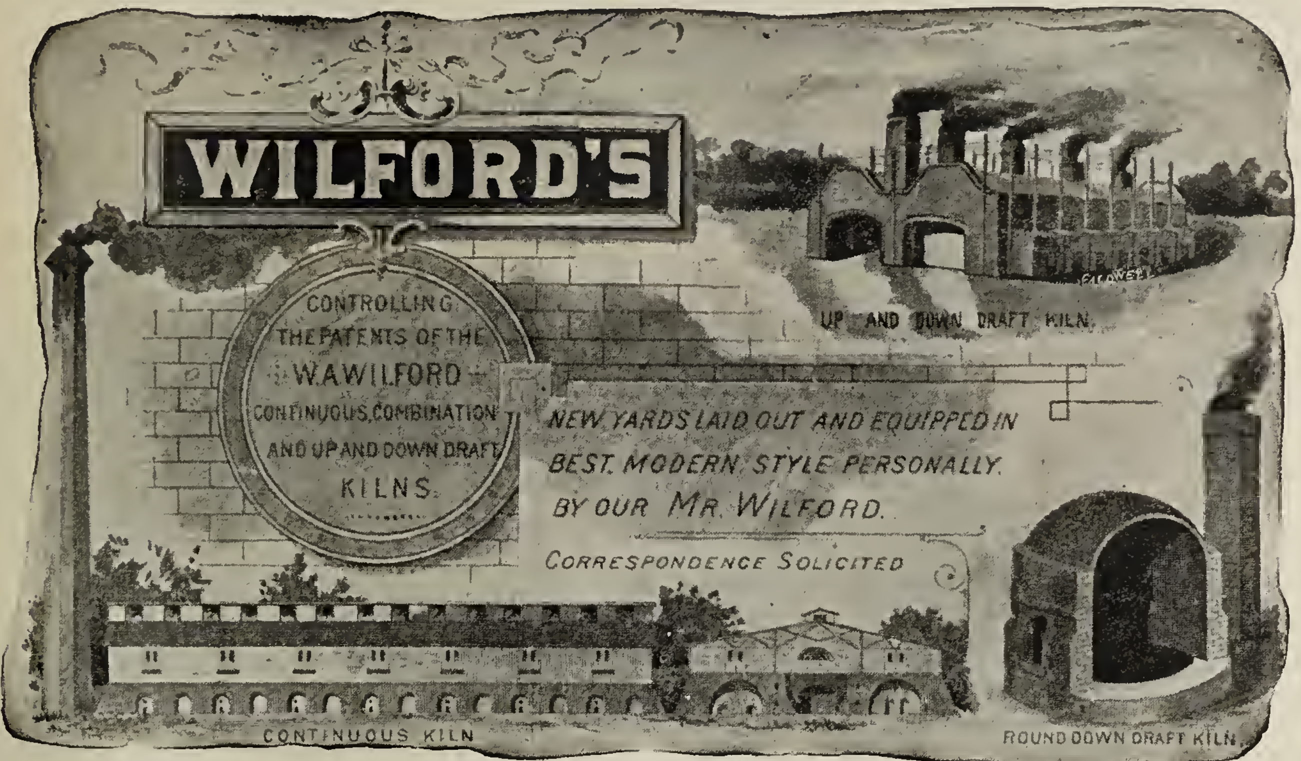
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W. A. WILFORD CONTINUOUS, COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD.
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

ROCHESTER BRICK & TILE M'F'G. CO.,
Brick and Drain Tiles, Hollow Brick, Etc.
243 *Power's Block.*

ROCHESTER, N. Y., June 19, 1896.

WILFORD PATENT KILN CO.

Dear Sir:—In answer to your inquiry as to what we can say in reference to your kiln recently constructed on our yard, we are very much pleased with it.

At the present time we have burned once and a half round, and we not only find it to be very economical in fuel, but the brick are coming out well burned, in first-class condition and very little waste.

After a little longer use we hope to make a still better showing.

Truly yours,
ROCHESTER BRICK & TILE M'F'G. CO.,
Per IRA L. OTIS, Pres.

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety).

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and 2 Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

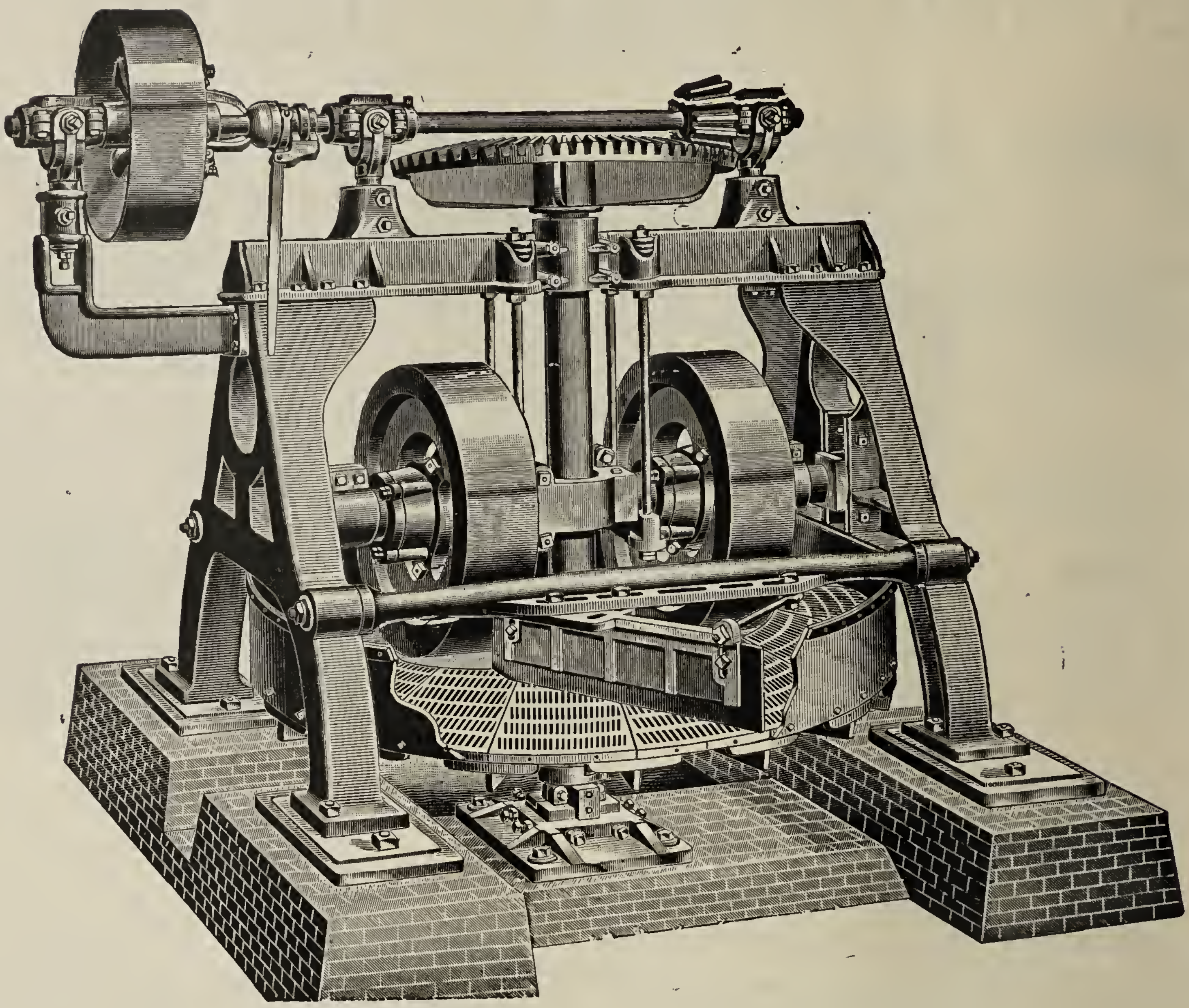
Yours very truly,
BRUSH BROS.

Let us give you full Particulars.

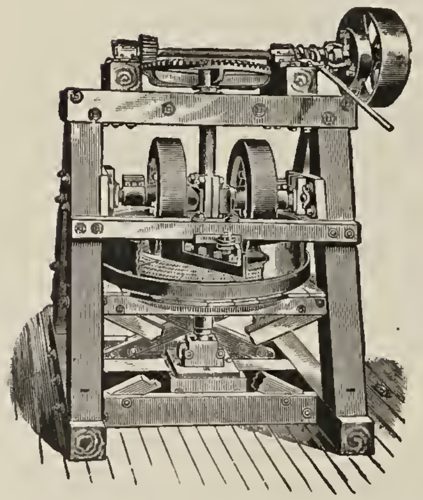
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

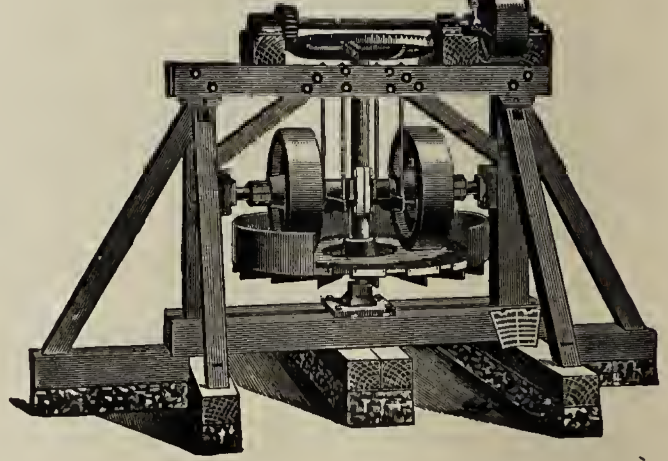


OUR SPECIALTY IS **DRY PANS.**



IRON FRAMES,
WOOD FRAMES.

All Sizes and Price
to suit
Any Size Plant.



......SEND FOR NEW ILLUSTRATED CATALOGUE......

FROST ENGINE CO., Galesburg, Ill.,
U. S. A.

WANTED:

Every Brickmaker to read this letter, and write us giving his opinion of a Machine that will make 40 M good brick every day in the year.

Geo. B. Parry, Pres. A. D. Cady, Treas.

MECHANICVILLE BRICK COMPANY,

High Grade Building Brick.

Capacity 10 Million.

Mechanicville, N. Y., Sept. 7, 1896.

C. & A. Potts & Co., Indianapolis, Ind.

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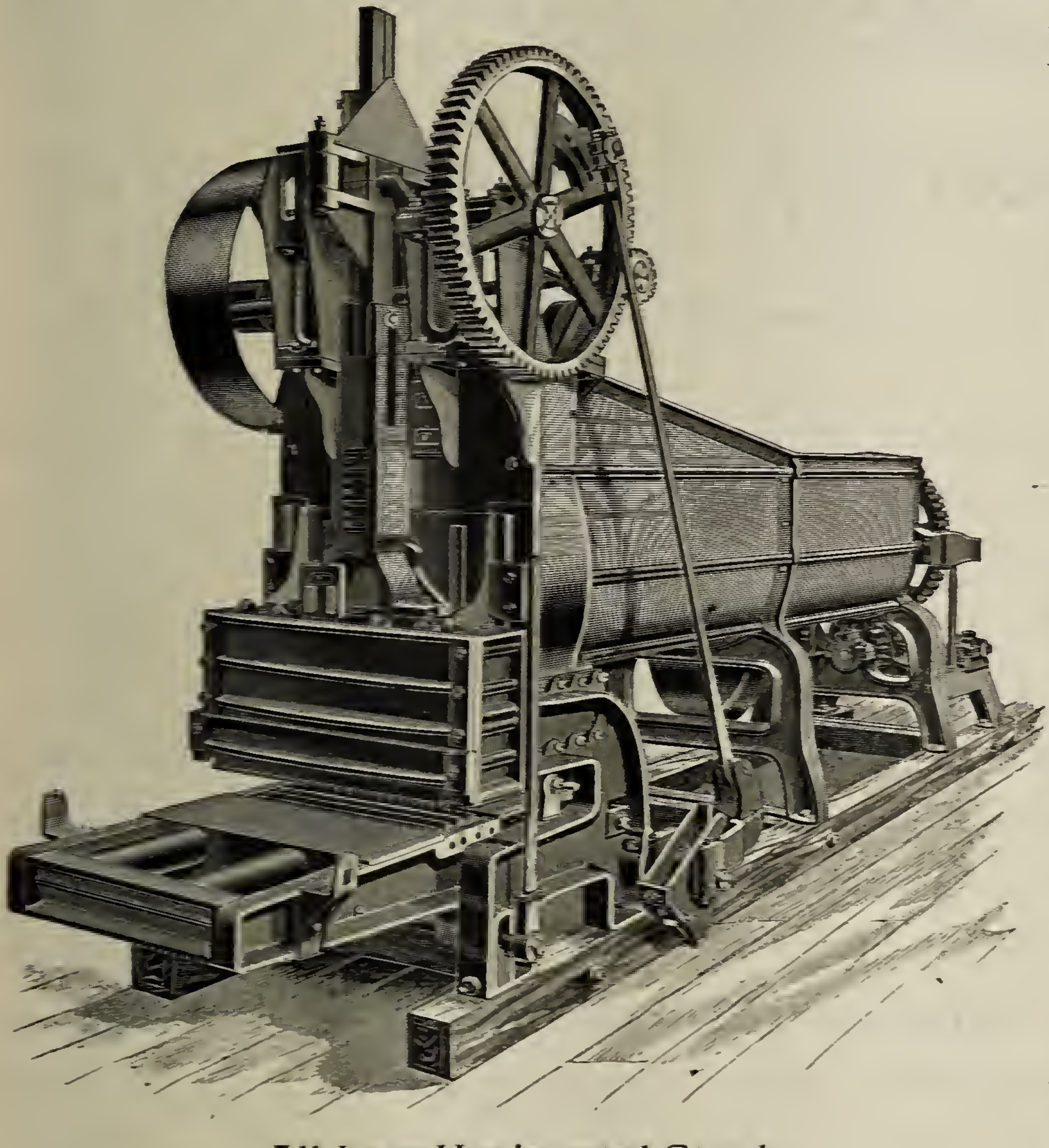

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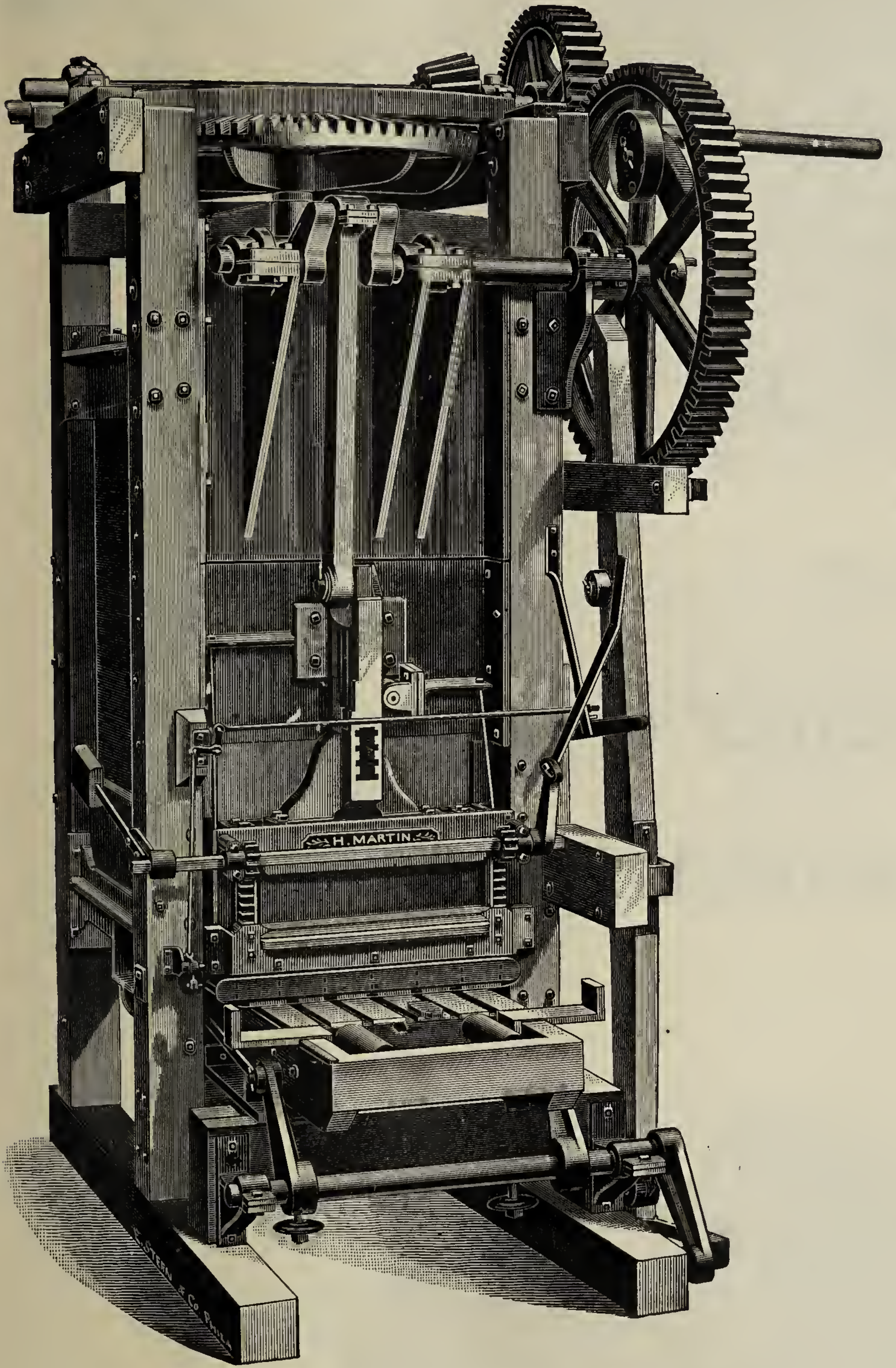

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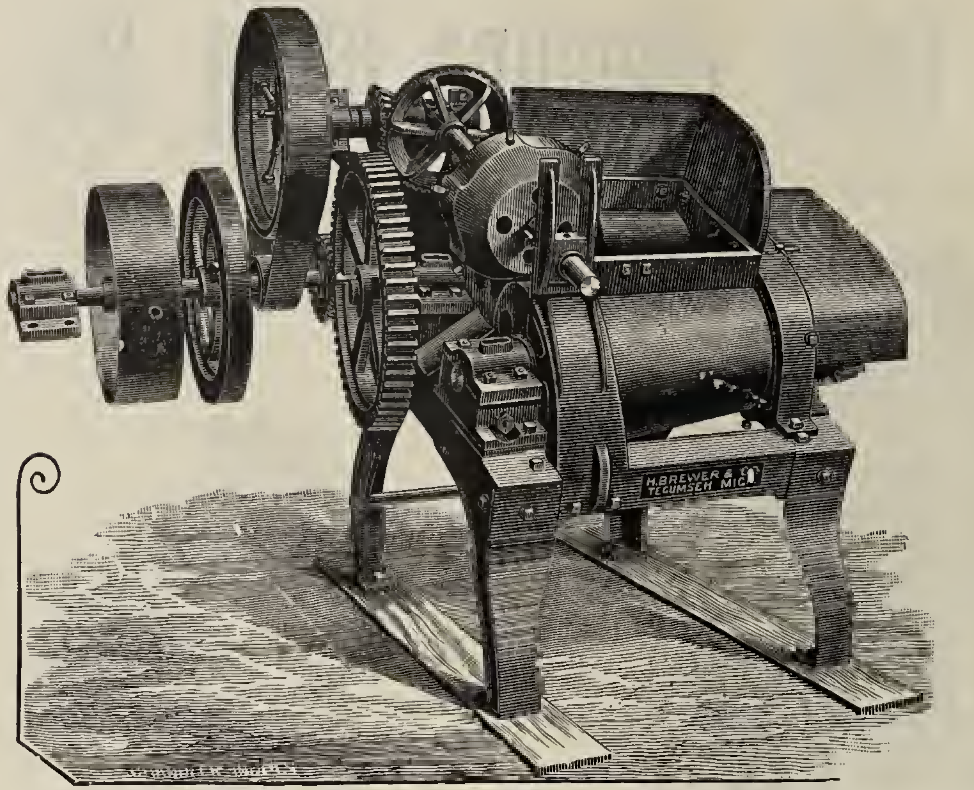
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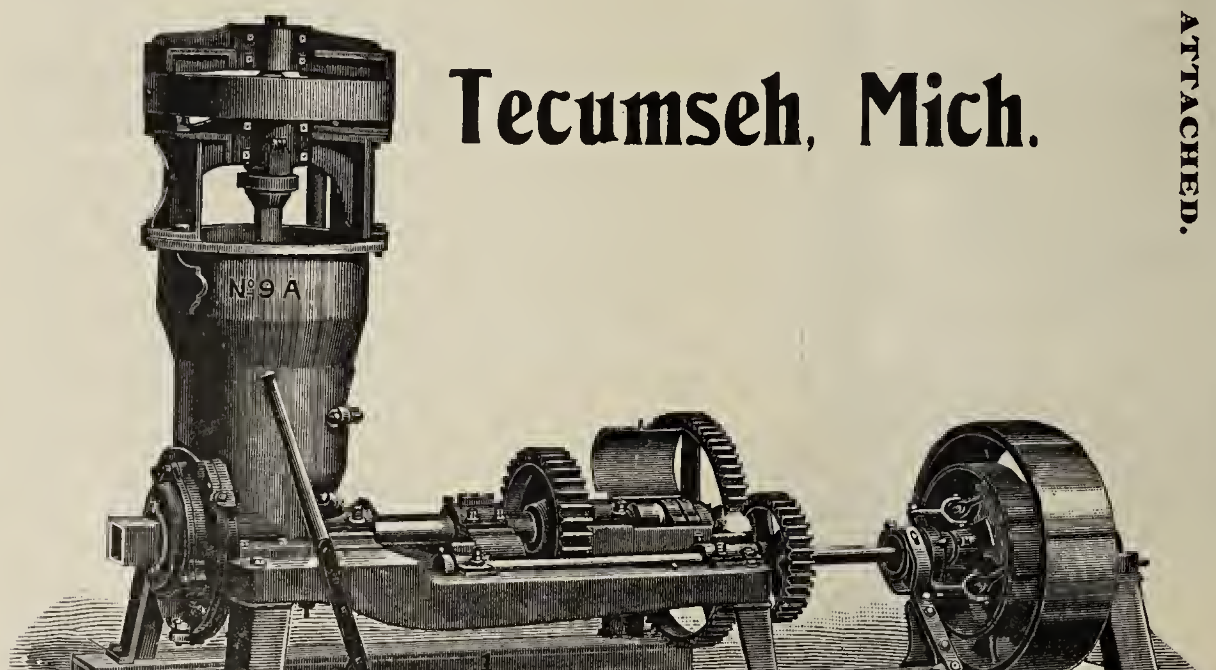

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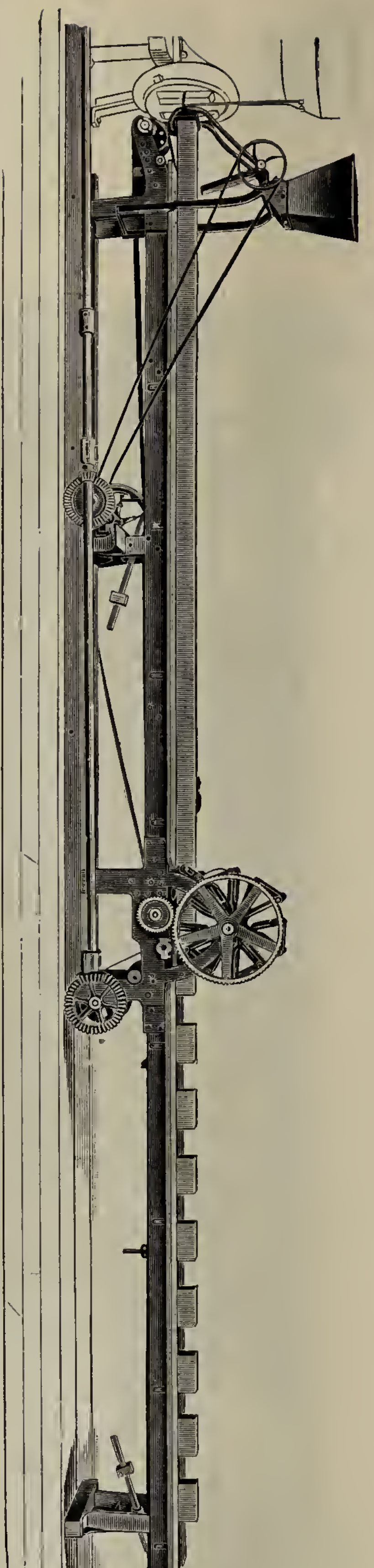

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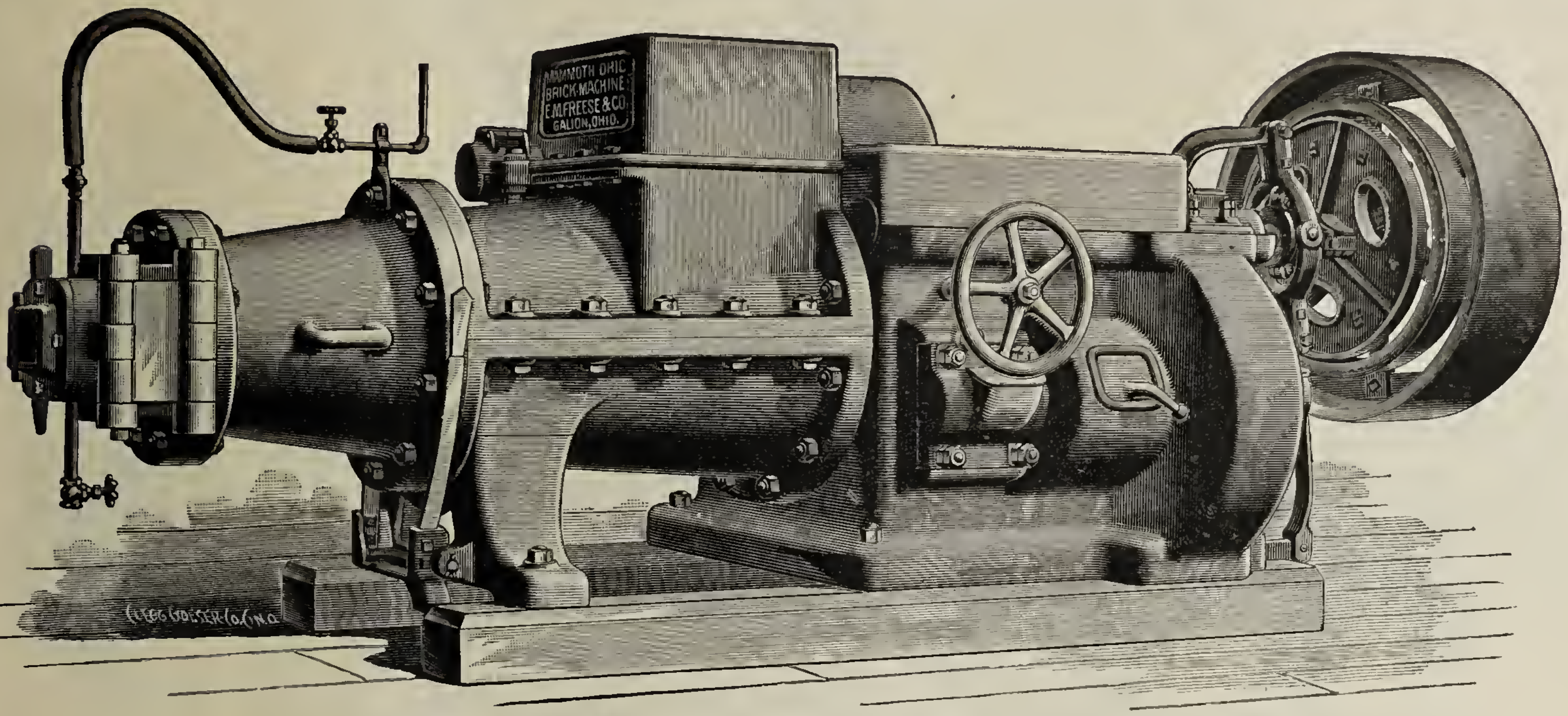
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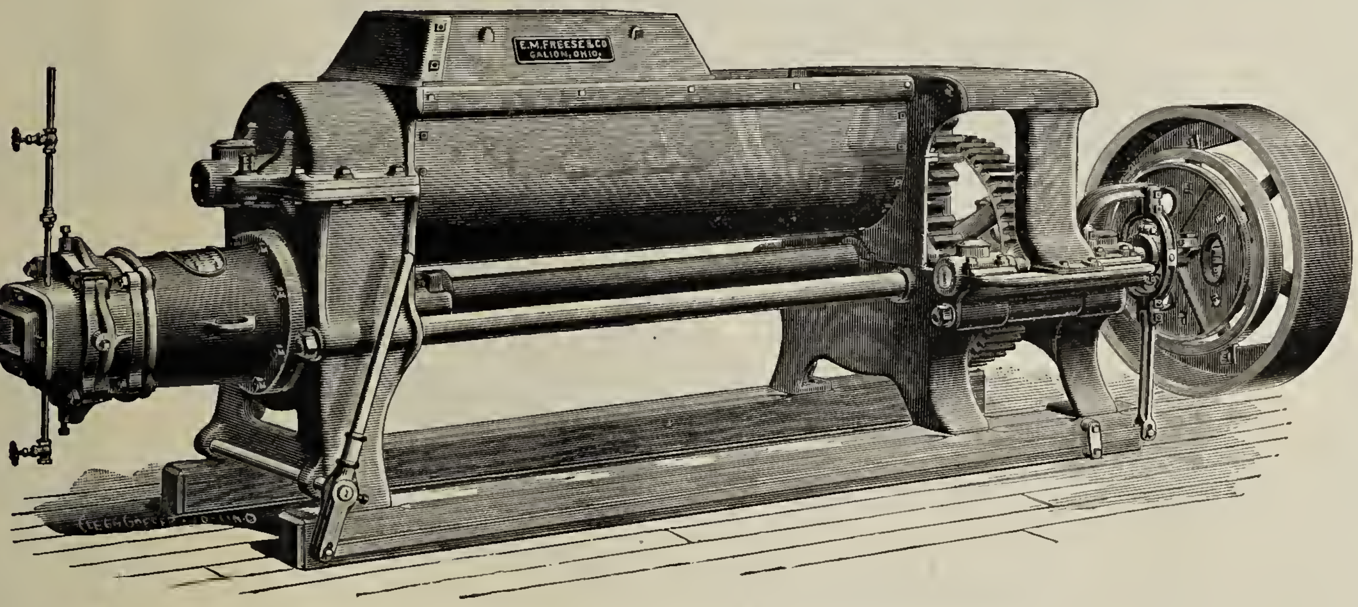

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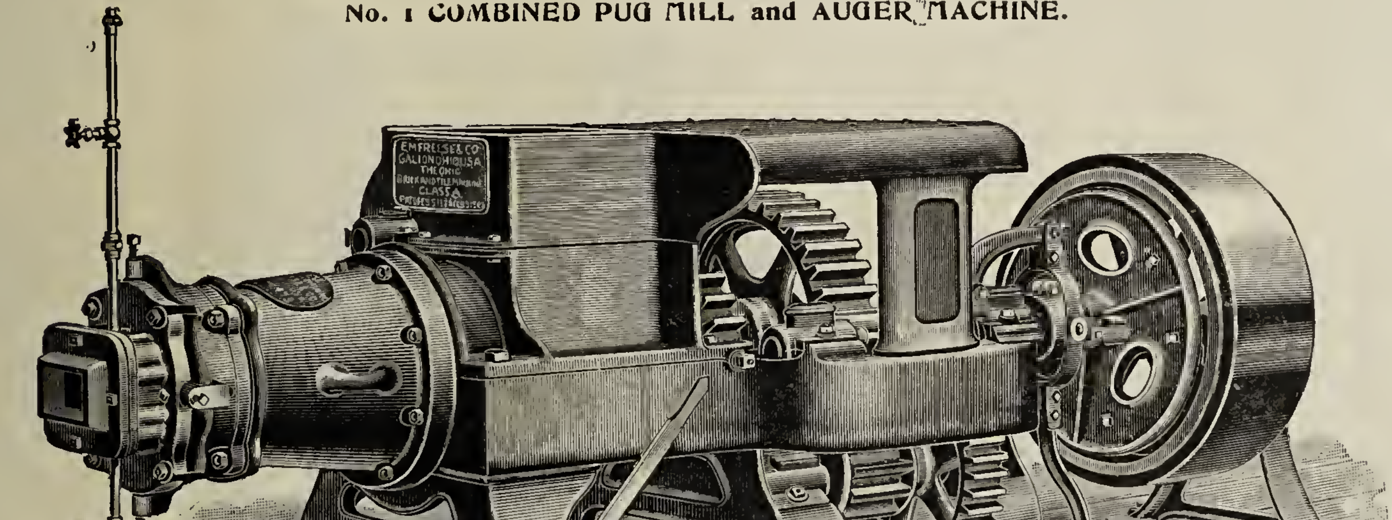

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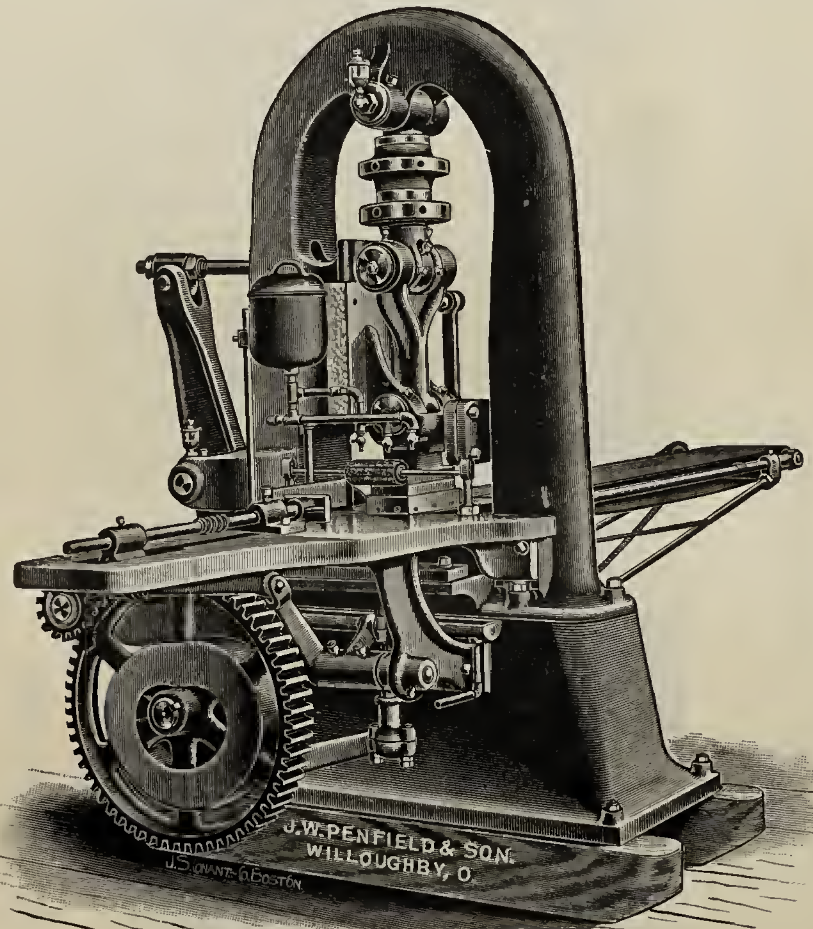
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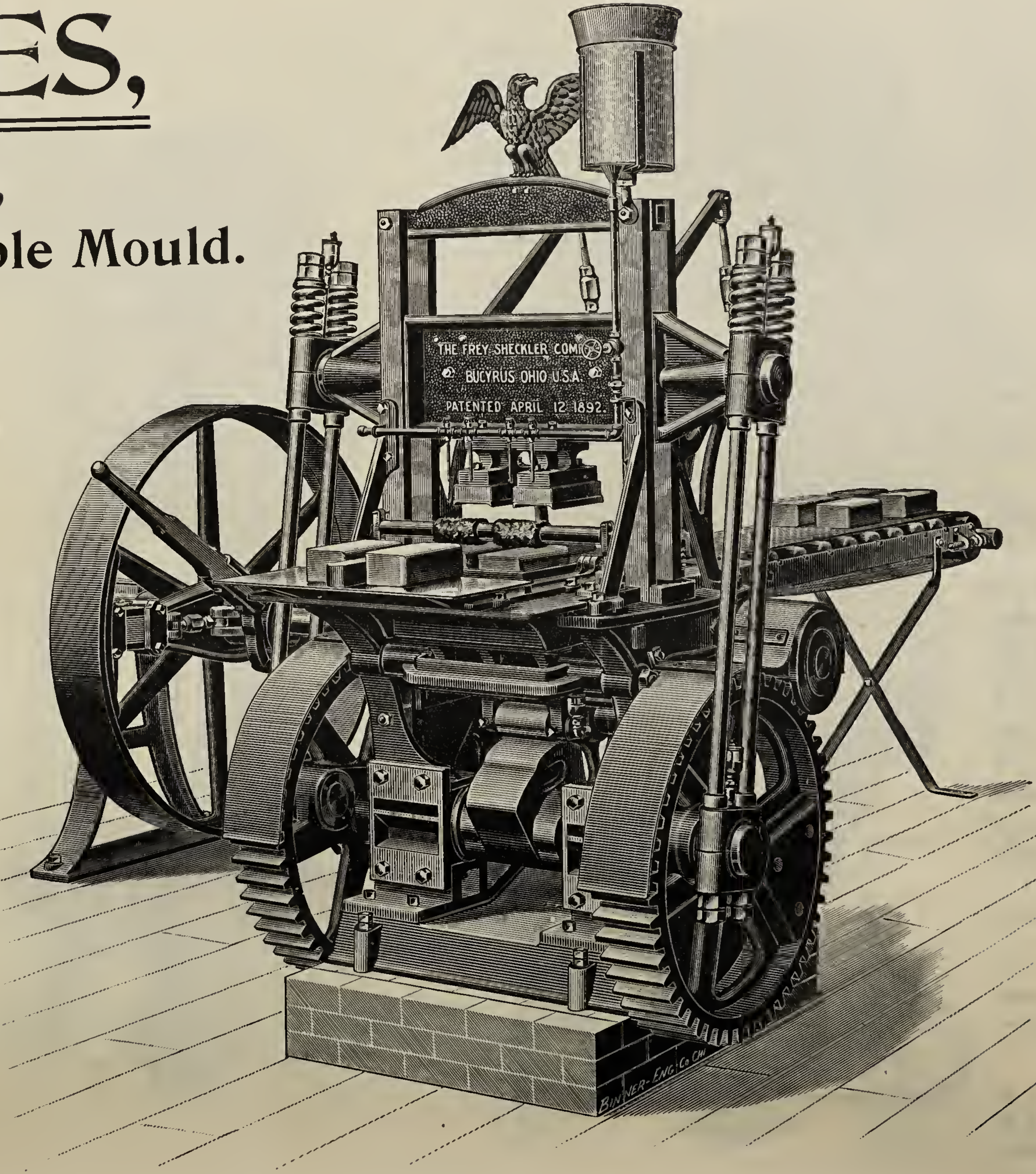
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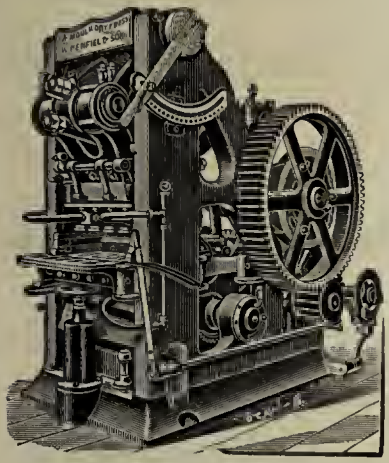
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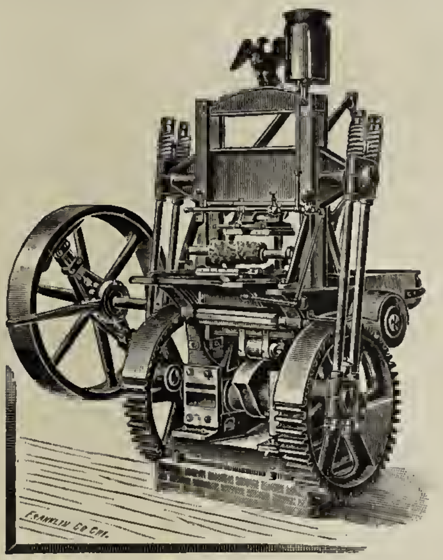
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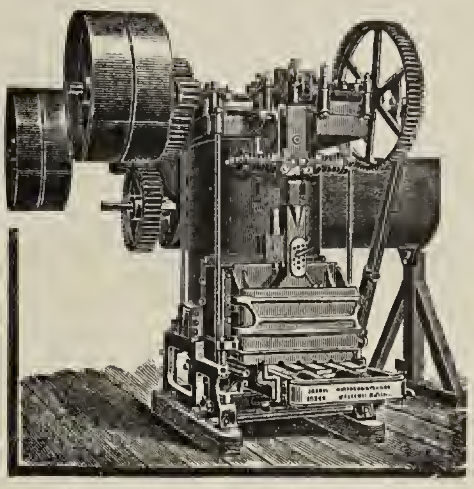
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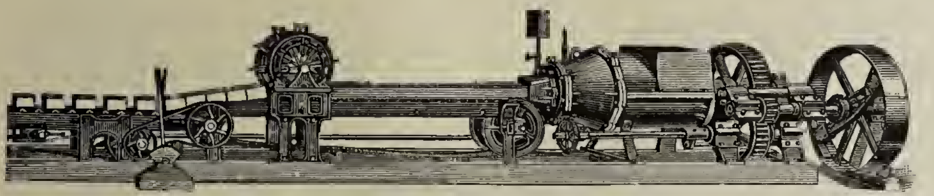
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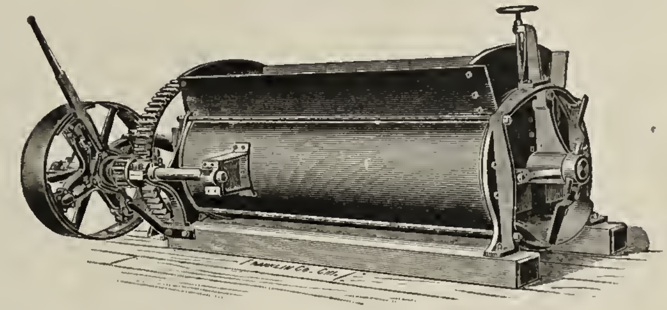
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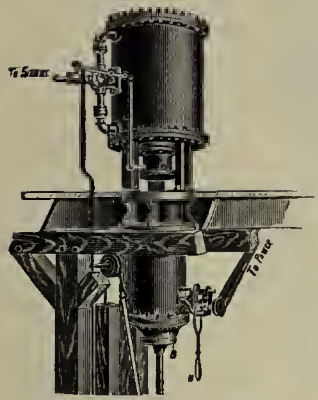
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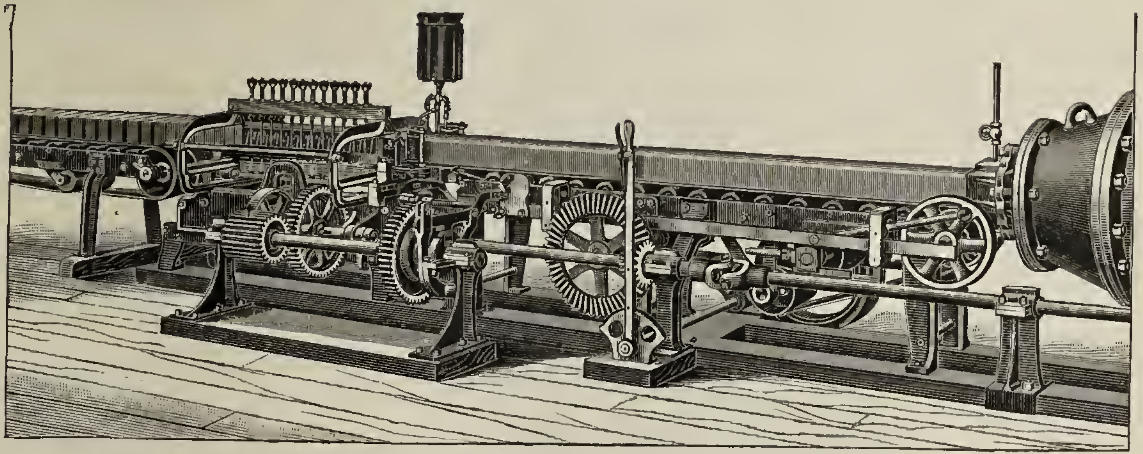
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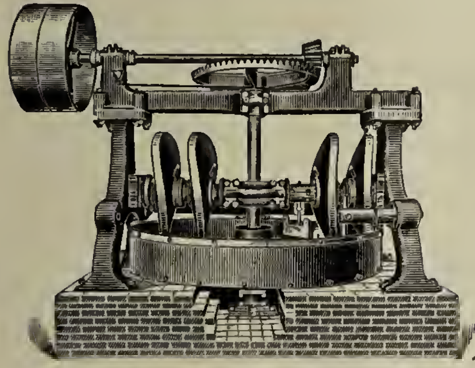
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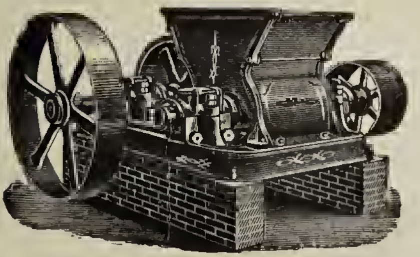
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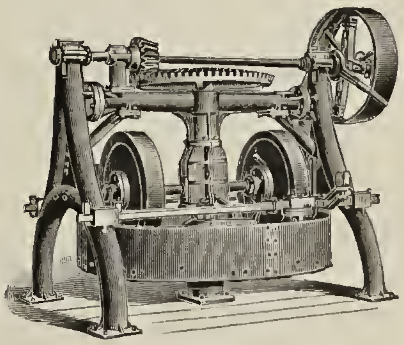
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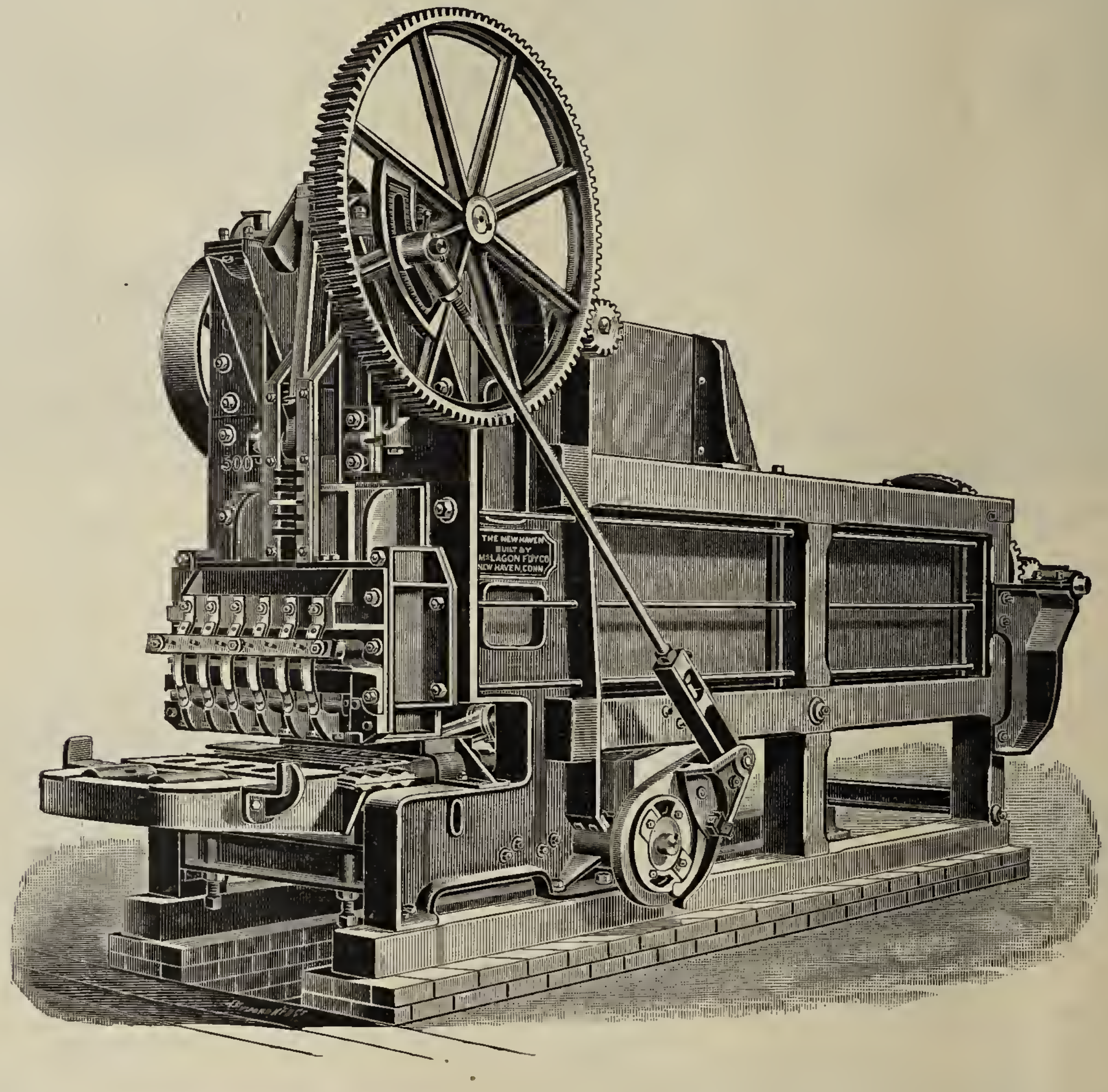

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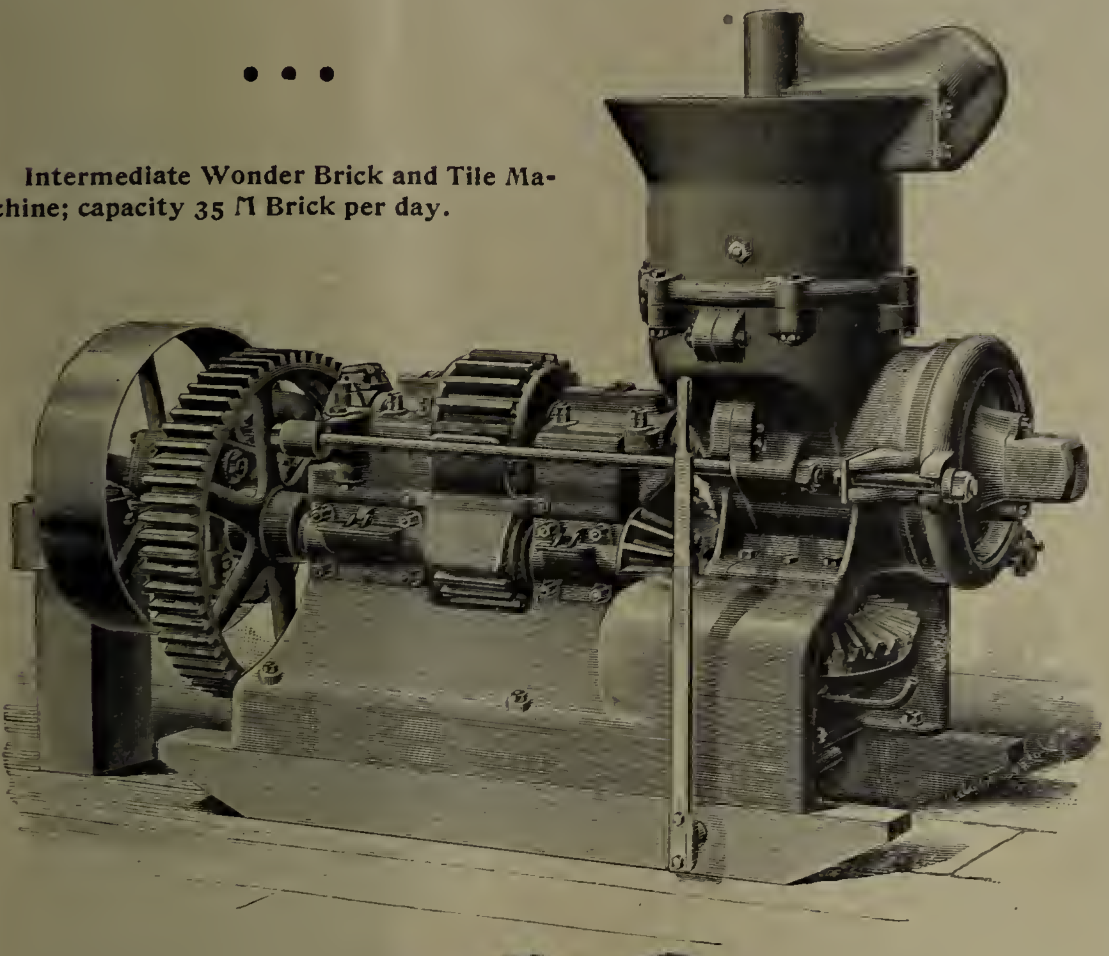

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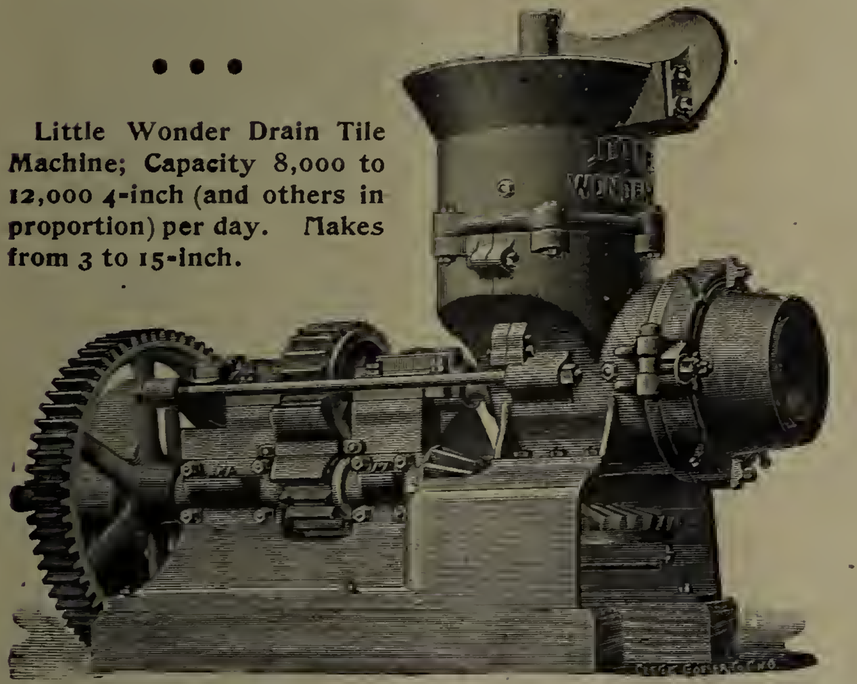

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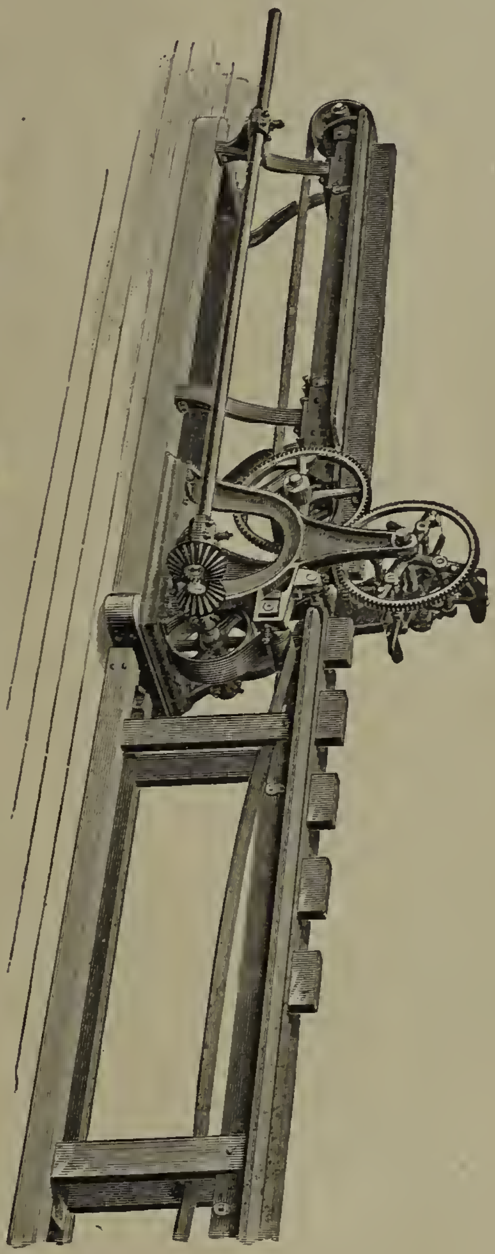

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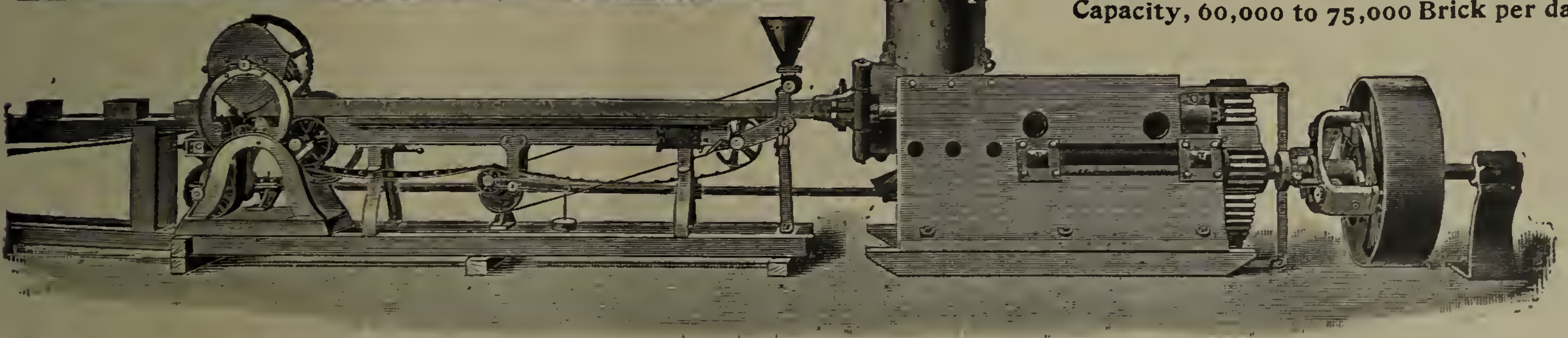

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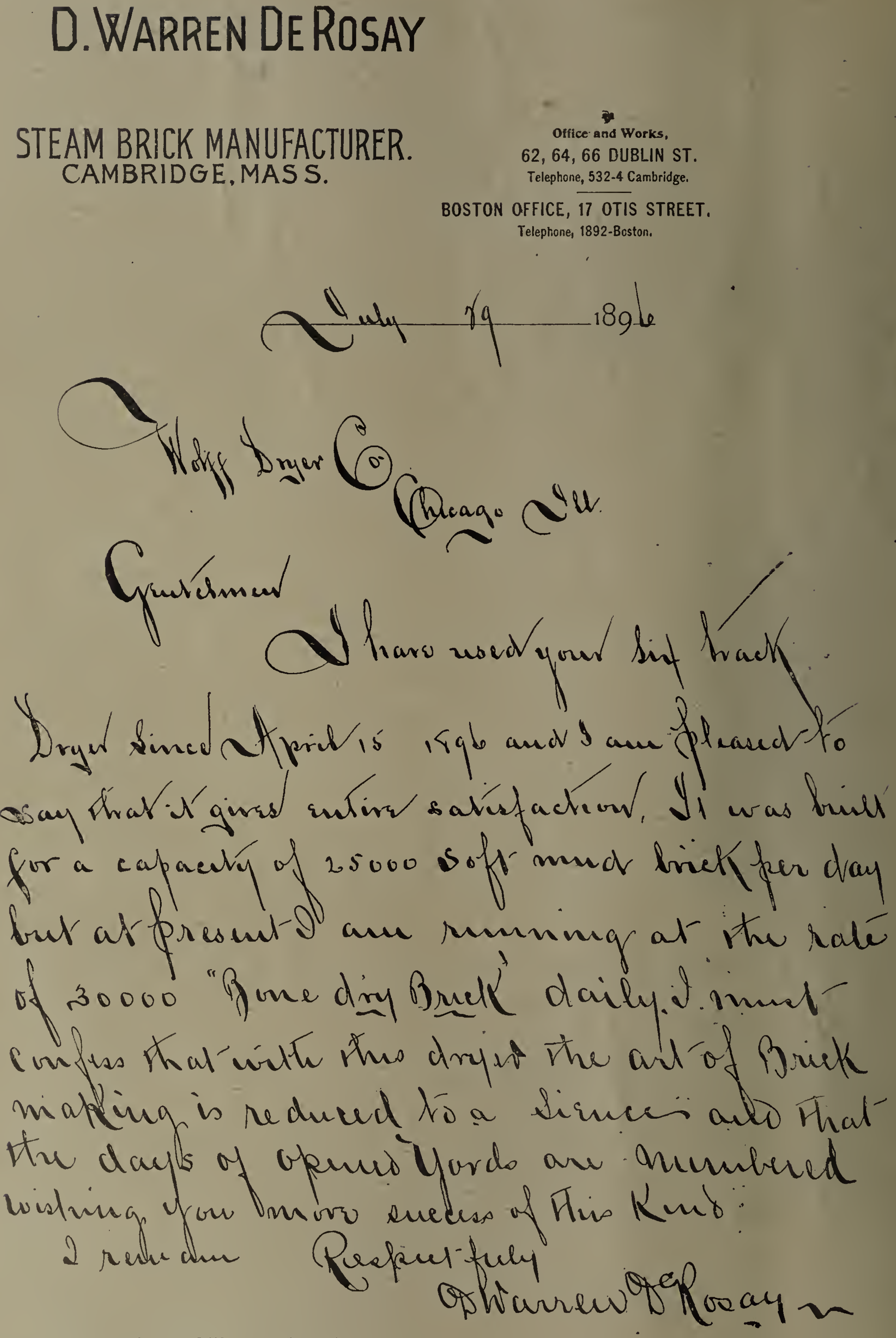

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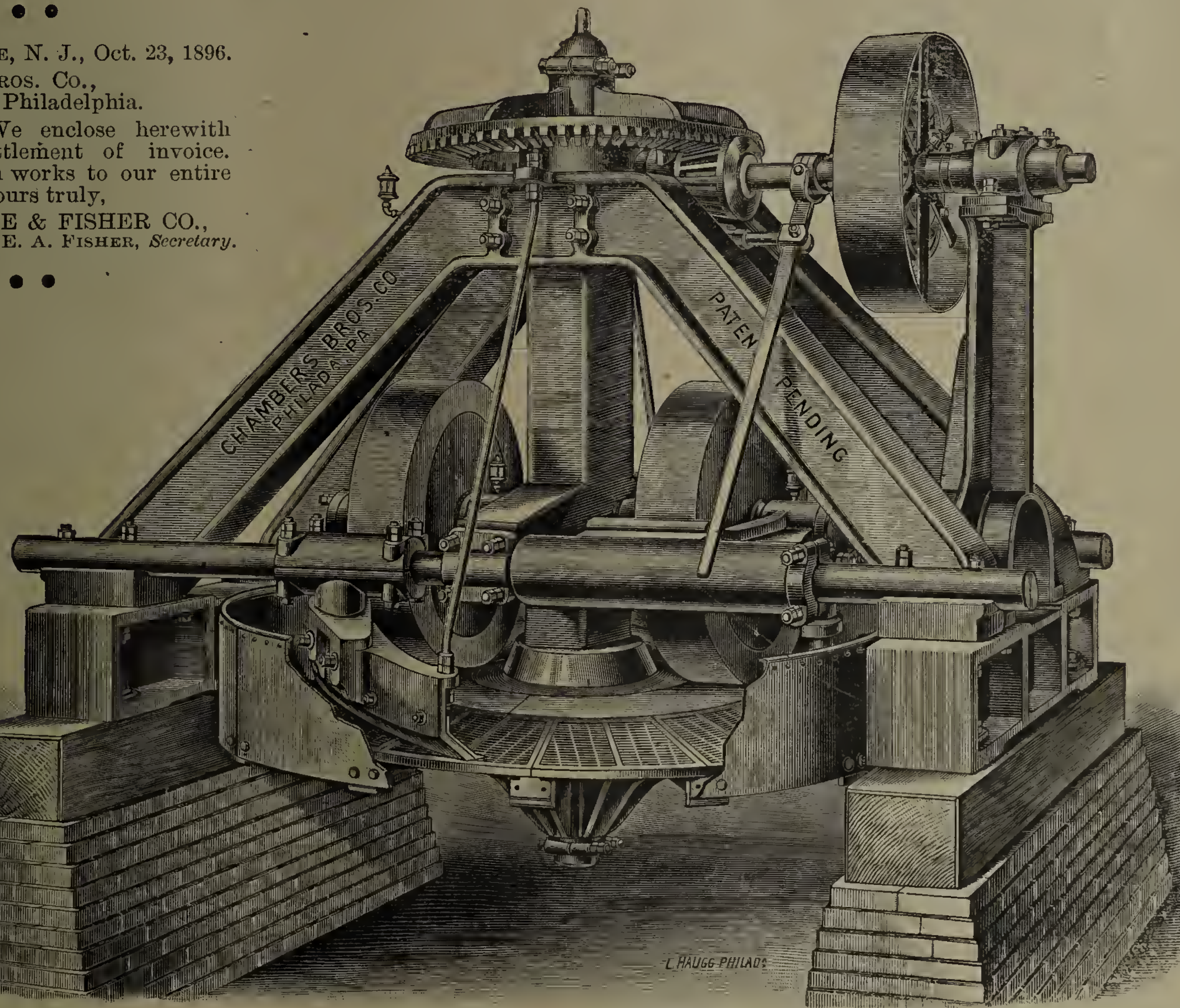

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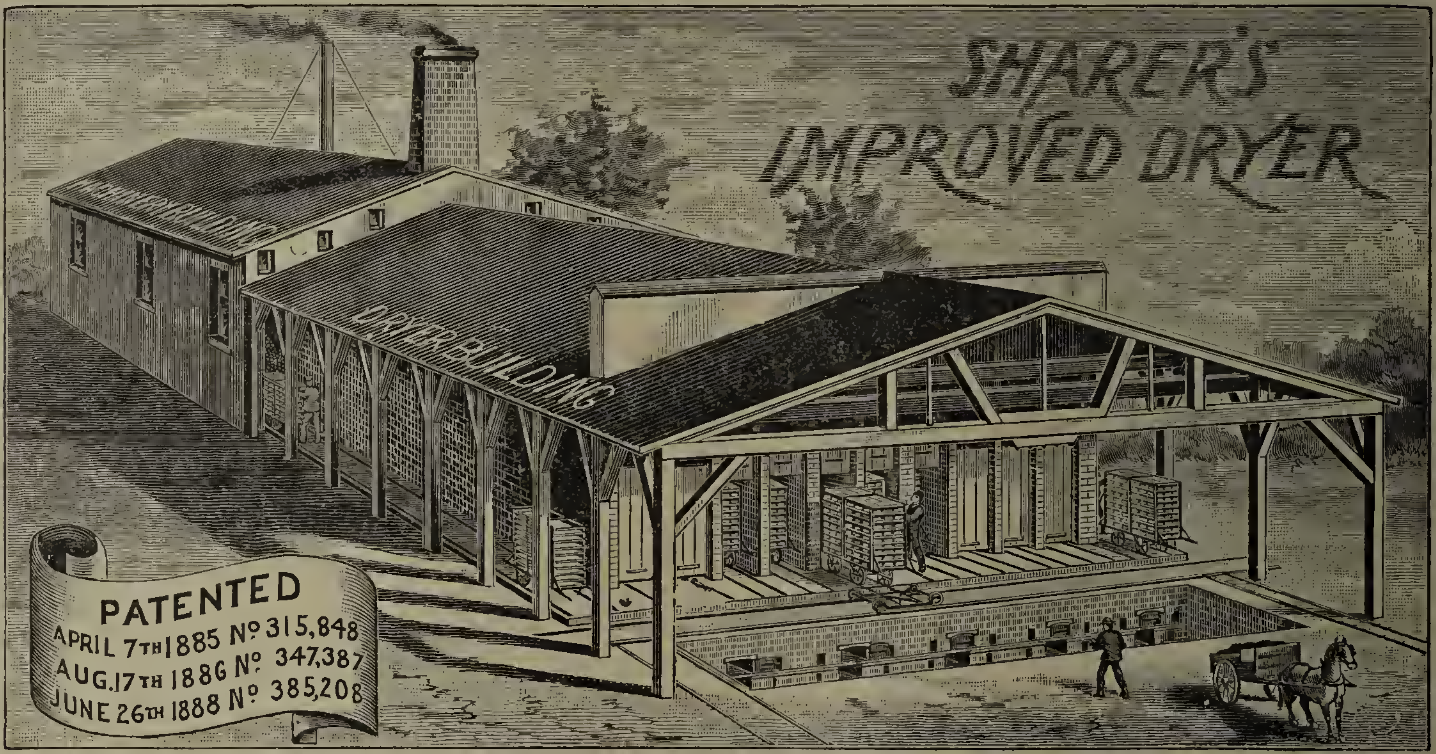
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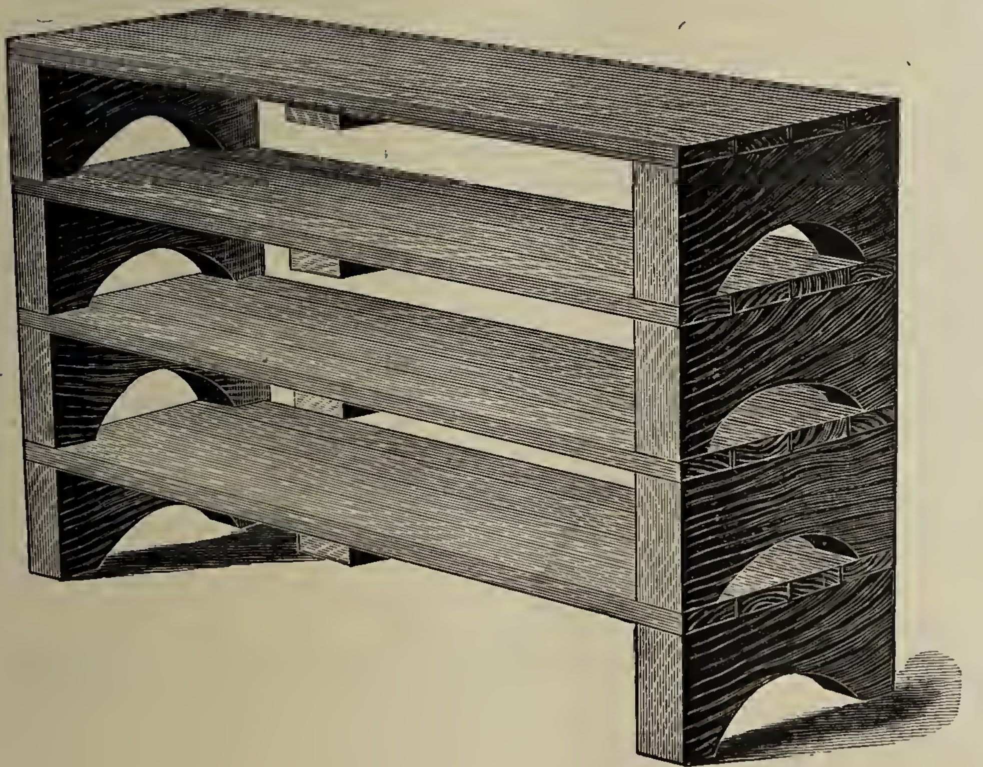

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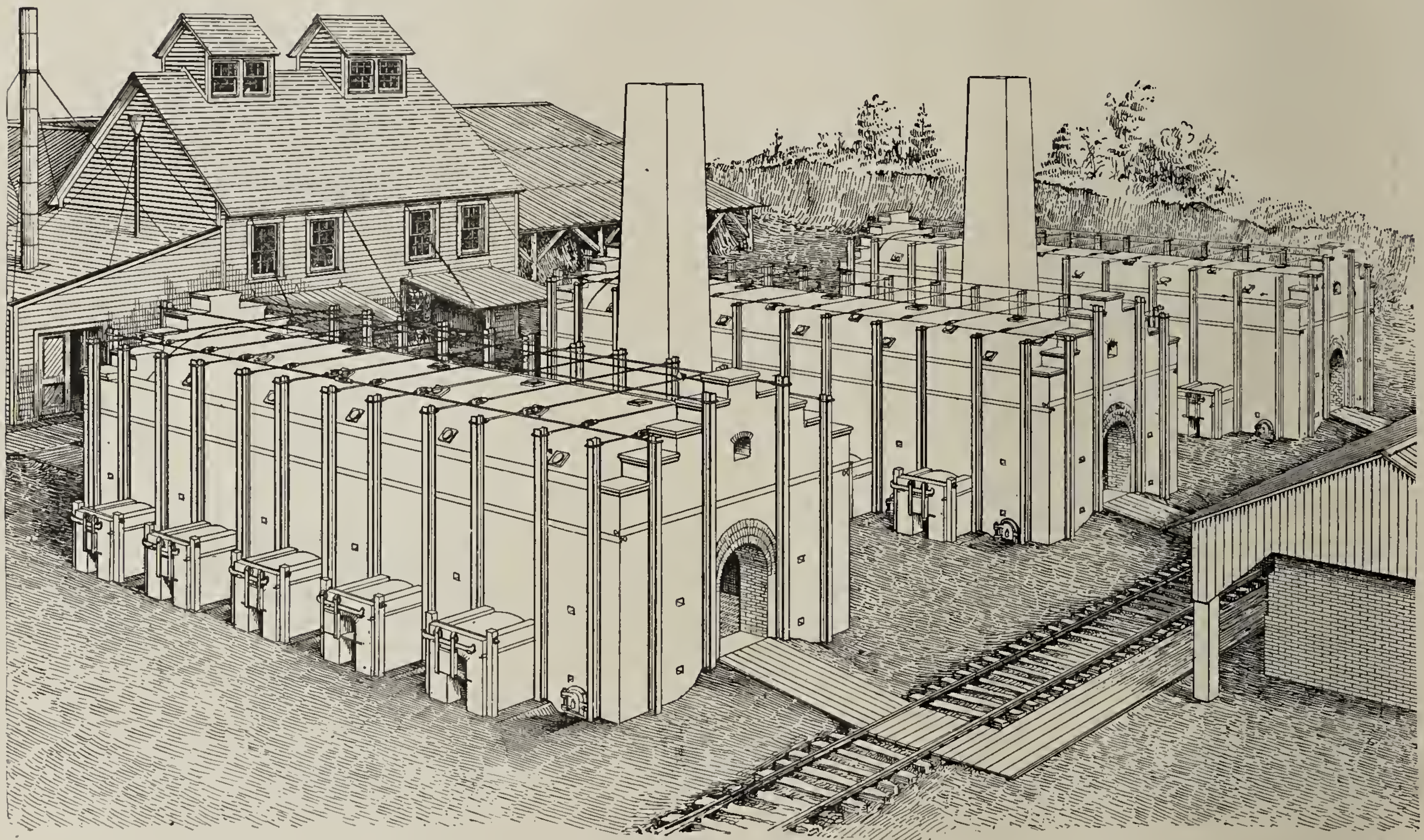

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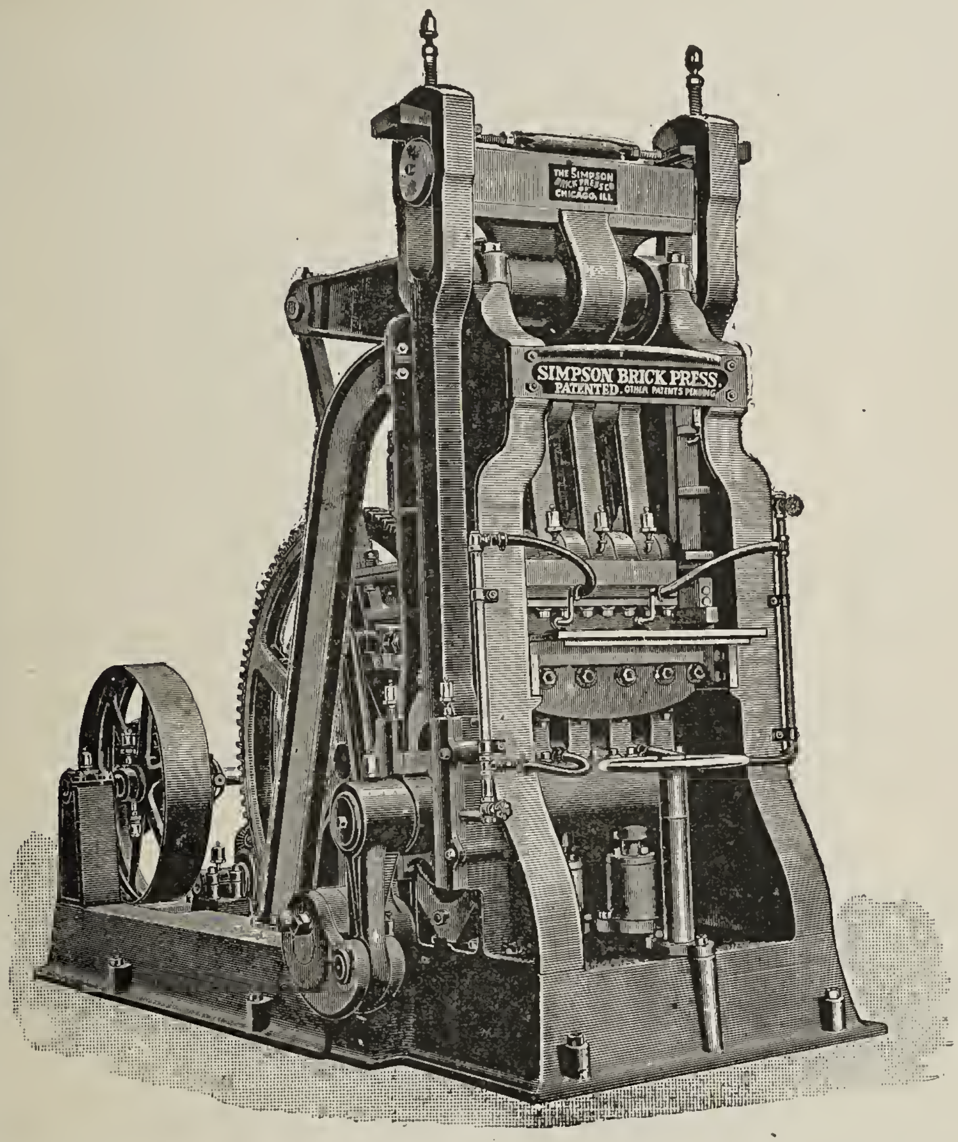
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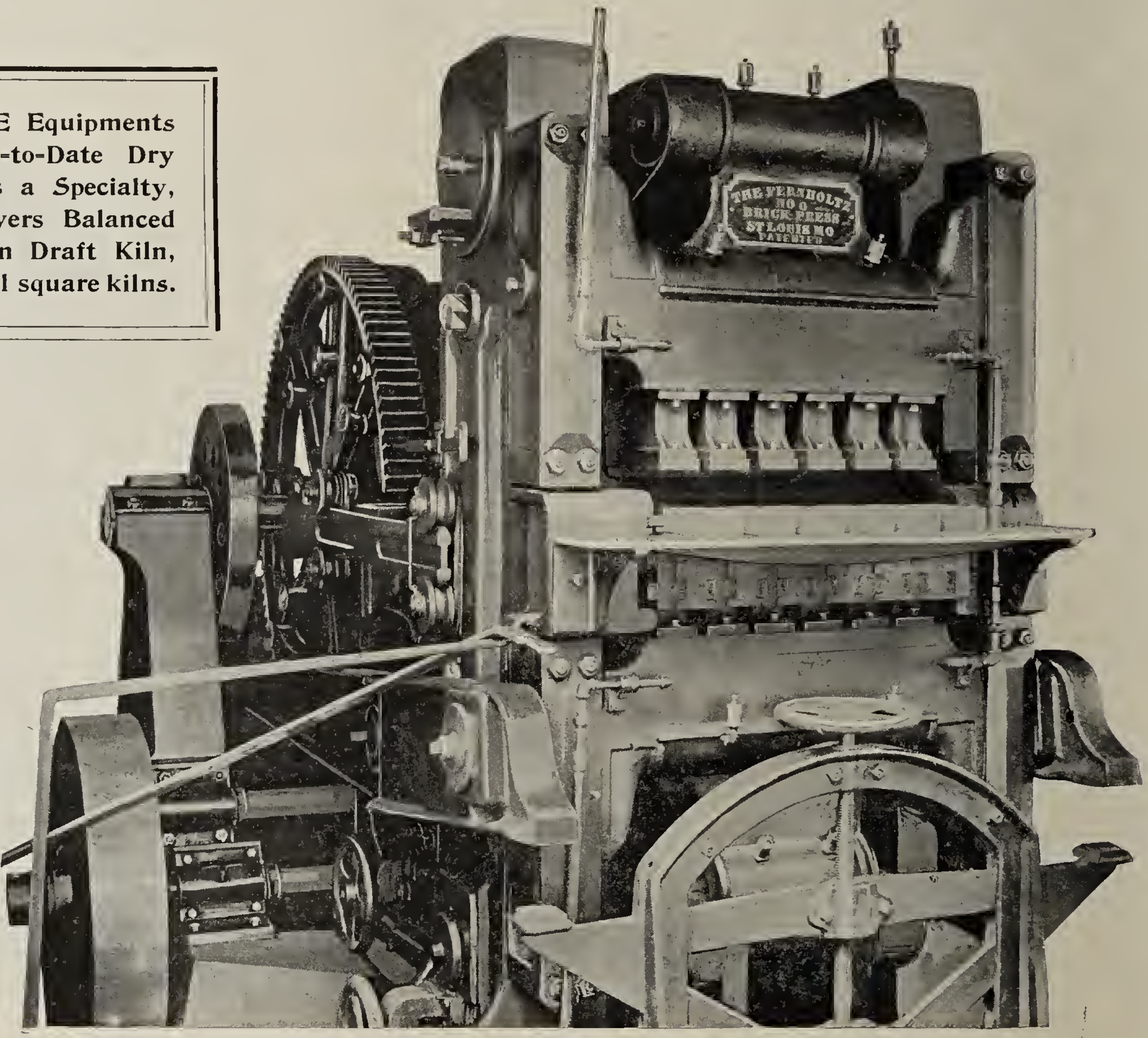

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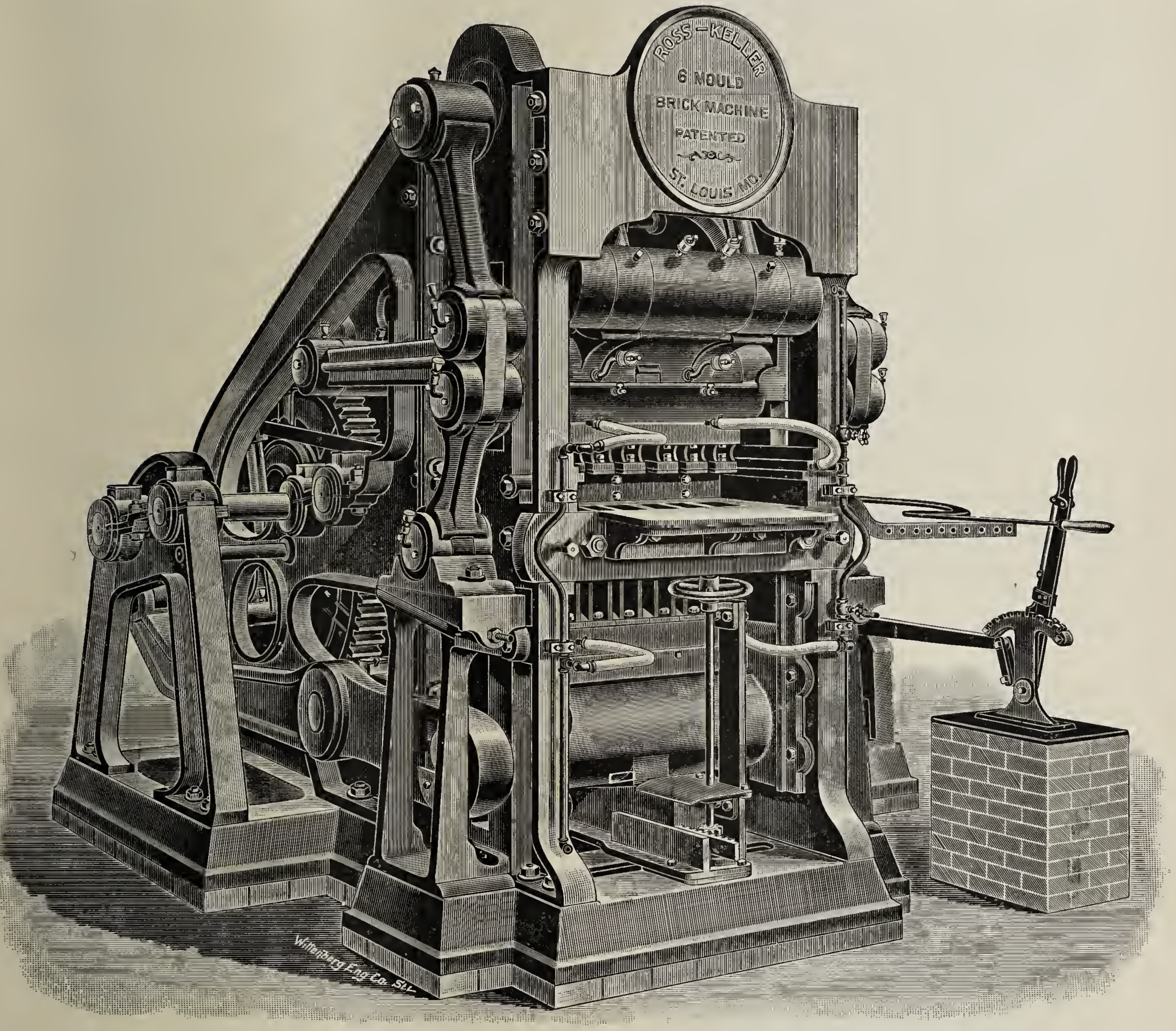

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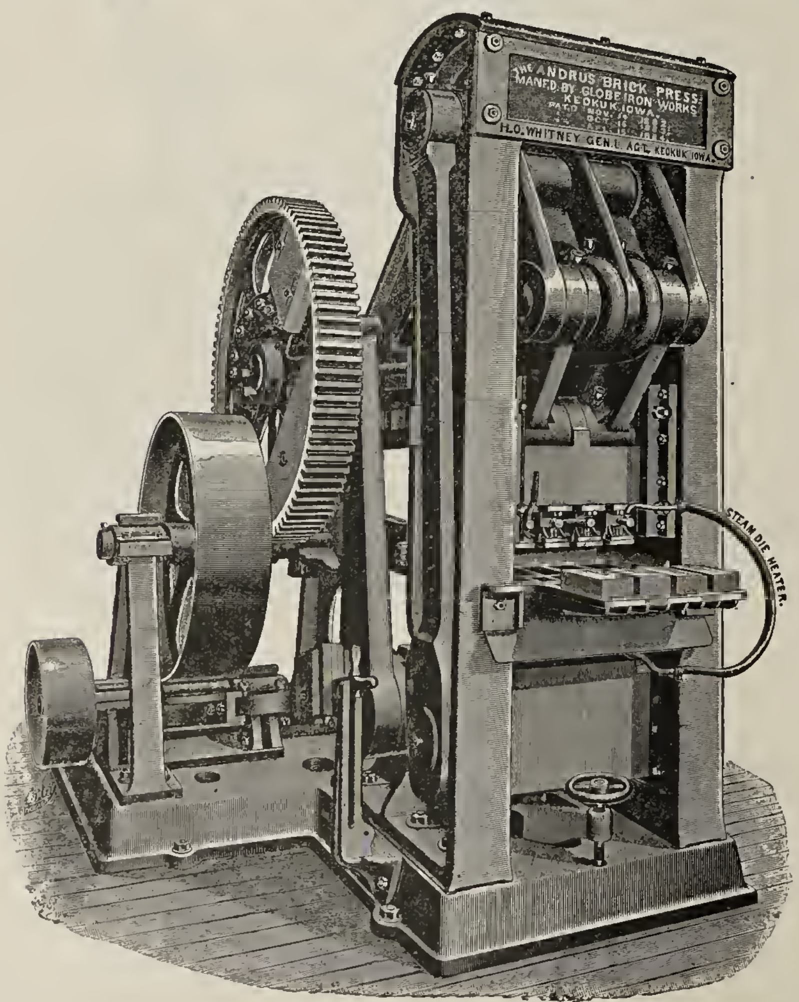
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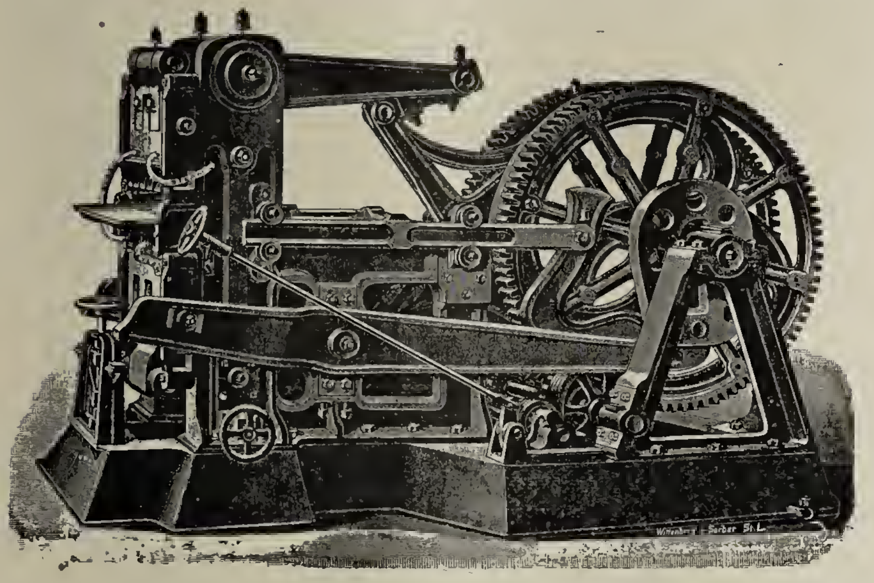

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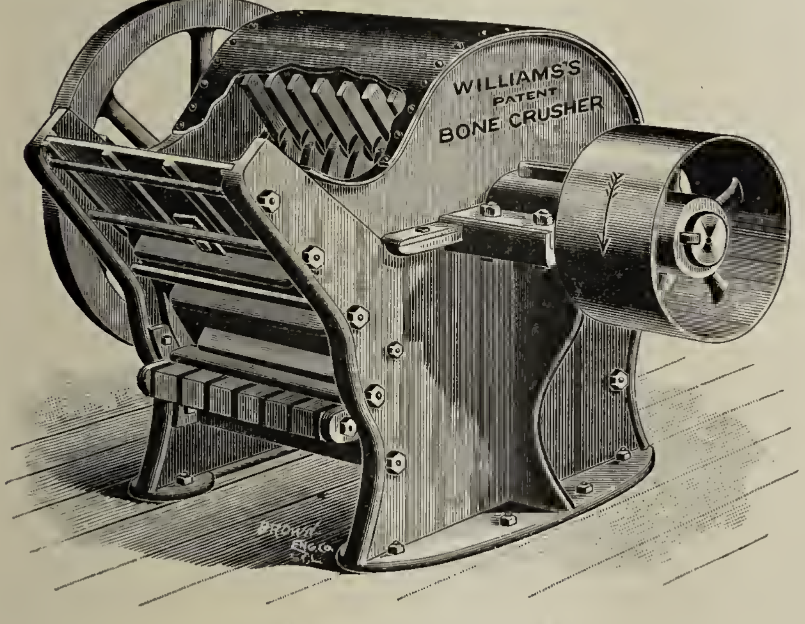

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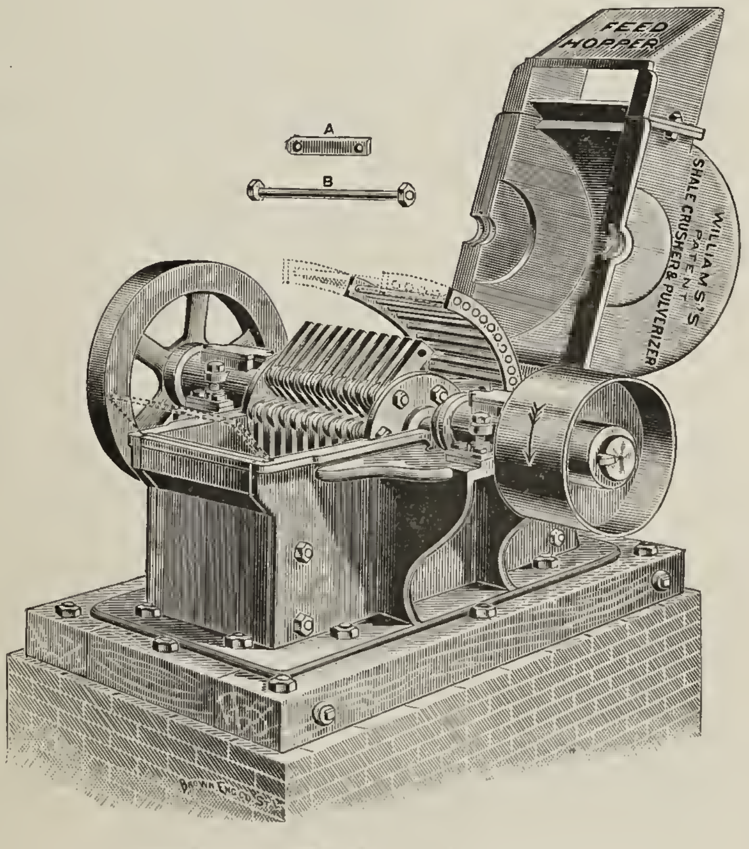
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The NATIONAL BRICK AND TERRA-COTTA CO.,

PASSAIC, N. J., November 14th, 1896.

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DEAR SIRS:—After running your Drier for some time would say it is a complete success and is drying our brick **free** from **checks** or **cracks**. We are making and drying 40 M soft mud brick every day that are acknowledged by all expert brickmakers as being the strongest and most perfect brick in this market. Your Mr. Wirsching has put up the Drier in a first-class and workman-like manner, and after regulating it to suit our clay, we had no trouble whatever, and would cheerfully recommend the **"Standard"** as being the best Drier in the market. You can refer to us at any time. Wishing you success, we remain,

Yours very truly,

G. D. BOGART, President.

Its adaptability to different clays and the varied clay products has made **The Standard Drier** successful where others have failed. If you have this subject under consideration our Catalogue will surely interest you. May we send you a copy?

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The Standard Dry Kiln Co., 186 South Meridian St., INDIANAPOLIS, IND.

THE CLAY-WORKER

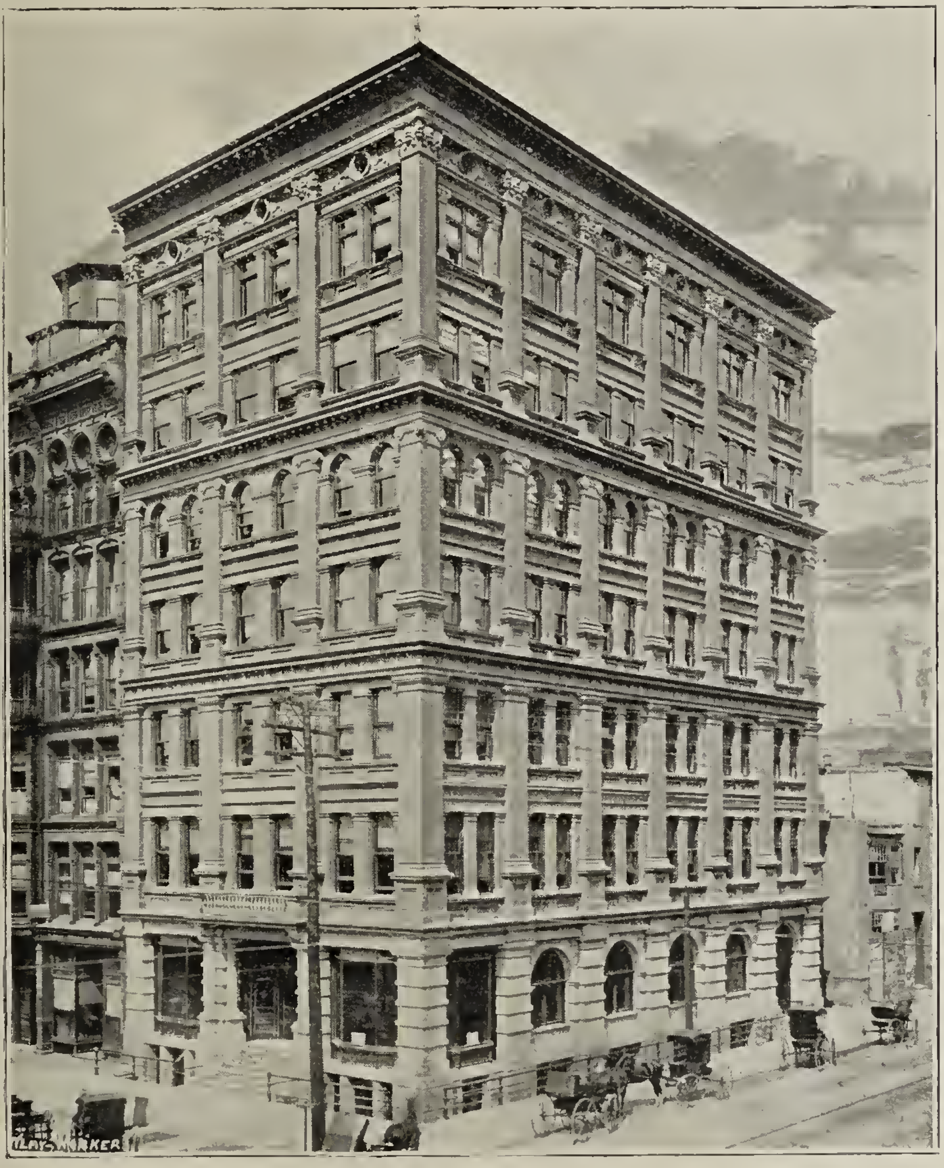
THE OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

VOL. XXVI. INDIANAPOLIS, IND., DECEMBER, 1896. No. 6.

Written for the CLAY-WORKER.

THE BUFFALO BUILDERS' EXCHANGE.

THIS BUILDING was erected for and is owned by the builders and material men of Buffalo. It is the property of the Builders' Exchange of that city. It contains the offices and clubrooms of that organization, a sample room, in which various building supplies are exhibited, and general office rooms, many of which are occupied by builders and furnishers of building materials. It is a handsome building, well and substantially constructed, as should be the home of a builders' organization. The exterior of the building shows the preference of its designers for classic forms. The basement of the building takes for its model the Tuscan forms, though for the most part it is made up of rustications. The Tuscan is followed by the Doric; next above it is the Ionic, and, finally, the Corinthian. Thus we find the superposition of these various orders such as has been followed under the domination of the classic spirit. The first order, being heavy, is followed by one less heavy—the Doric. The next being lighter yet, the Ionic is selected, and at the top is the still lighter Corinthian. The material of this building is bright red brick and terra cotta, excepting the base, which is of stone. Certainly it is fitting that every builders' organization should own its building, and that it should express the high character of the builder's art. A shabby building for a Builders' Exchange, or one without architectural character, would certainly reflect discredit upon the builders of any community. Nothing better can be done by any builders' organization than to possess a substantial, dignified structure, such as will reflect the character of those who own and occupy it.



BUILDERS' EXCHANGE, BUFFALO.

It lends more dignity and force to a Builders' Exchange to have its own property. Owners of realty are always held in higher esteem than those without possessions. A Builders' Exchange is a very useful organization in any community. It affords a great saving of time. Here it is that the general contractor can meet sub-contractors, or vice versa. Here it is that all may be brought in contact with those who would buy or sell materials. The builder may, if he wish, have an office in such a building. If he be a general contractor he can, at specified hours, see a contractor of cut stone, a plasterer, a brickmaker, a plumber or others. He may meet all within a few minutes. Without the service of a Builders' Exchange this would be out of the question. Furthermore, within an organization of this kind there may be subsidiary organizations. There may be a general contractors' association; the lumbermen or millmen may have a distinct organization; the brickmakers may have their body. In truth, there is opportunity for many general sub-organizations, all having in view one main object—self-protection. However, there is and should be the general body, composed of the individuals who belong to the lesser organizations. The larger body, the general organization, lends strength and character to the smaller body. Again, it is well to bear in mind that the interests of all parties in a builders' organization are not inimical. For instance, in one city the general contractors and material men generally have been operating against one another in a spirit of friendly business rivalry for some years. There are questions which come up where the interest of one may not be the interest of the other; but the general interest of all may be served in the general association, and the particular interest may be served by the organization of the various classes. Organization of this kind always commands respect. We respect capacity, force and organization. In one instance which is in mind the general contractors were favorable to the repeal of the lien law. The material men were favorable to the law. Thus there would have been no opportunity, had the organizations been distinct and separate, for open disagreement. Again, suppose the brickmakers wished to form a combination. The general contractors and bricklayers might not be favorable to it, but with the idea of distinct organization the plans of the different bodies could be carried out as self-interest would dictate. The Builders' Exchange is a convenience for architects and owners as well. If either wish to meet the builder it is not necessary for him to chase over large territory to find him. He can telephone the proper officer to notify the member when he comes in. Thus it is that a number of the members of the various branches of the trade can be reached within a short time, and with very little effort. Is not the builders' association an institution adapted solely to the larger cities? Not necessarily. Wherever there are four or five good builders in a town or city there should be an organization. There should be the opportunity for the various members of the trade to come in constant contact with one another. It is interesting to note the temper of various members of the same business calling in two communities, one with and one without an organization. Where there is organization business rivals are business friends. They touch shoulder, come together in a friendly spirit and respect one another. We will not be half as mean to a man whom we meet every day as to one whom we may not expect to see excepting at long intervals. Organization makes more honorable competition. It develops better prices; it brings out the best there is in men, and altogether serves a very practical purpose. In a community where there are, say, two or three brickmakers, the common understanding, one with the other, would make a good deal of difference in the profits of the business of either. Time proves the wisdom of organization. We seek protection from our kind. Every year proves its benefits. It has come to be a necessity. There will be the opportunity at the coming Convention in Buffalo to study this organization of the builders and material men of that city. All large cities recognize the benefits of the Builders' Exchange. The benefits in the smaller cities are relatively as great.

We trust that our friends will study this monument to the spirit of organization among the builders of the Convention city, and, through its inspiration, carry with them to their homes a conviction as to the self-help which local organization may develop.

One of the most important attributes of business is veracity. Misrepresentation may make a sale, but it will never secure a customer. Let truthfulness be the watchword.—Shoe and Leather Facts.

THE BUILDERS' EXCHANGE. Hall in which the 11th Annual Convention of the N. B. M. A. will meet Tuesday, February 2, 1897.

BRICKMAKING IN ARCTIC REGIONS.

PROBABLY the most northernly spot on the face of the globe where brickmaking is now being carried on as a permanent industry is in the valley of the Tromsodal, on the mainland of Norway, opposite the town of Tromso. The brick earth is dug from a raised beach or terrace, which is about a quarter of a mile wide at the mouth of the valley. A section of this terrace, about twenty feet in height, shows from the base to summit a homogeneous mass of blue clay, with bowlders and stones interspersed throughout. There are no traces of bedding in the clay, which was, no doubt, formed by glacial action. We have not seen a sample of the brick made, but understand that it is smaller than the average British make, and is commonly a light red. The prevalence of the coarse detritus in the clay renders its working somewhat difficult, and the larger bowlders and even small hard stones have to be removed before the earth is ready for the final molding. Speaking of this bowlder clay reminds us that it is somewhat similar to the "till" of the Southern Uplands of Scotland. It is not so chalky as the corresponding bowlder clays of the eastern counties. In the arctic regions such clays are met with as raised beaches, not only in the northern part of Norway, but in Novaya Zemlya, Kolguev, Spitzbergen and the minor groups of islands in that part of the Arctic regions. The absence of fuel is a drawback to the establishment of works of a permanent character in high latitudes, but wood is generally obtainable except in the far north.—British Clay-Worker.

Written for the CLAY-WORKER.

IN DEUTSCHLAND. No. 10.

Brick Works on the Rhine.

WORMS, the oldest city along the Rhine, a town full of historical interest, sheltered the Clay-Worker scribe within its hospitable walls for a period of two days. For an example of a city having the true mediaeval aspect, take Worms. Its streets, flanked by venerable houses, representing the rugged architecture of the middle ages, are as crooked and narrow as they could possibly be, and we doubt whether the older portions of the city have changed materially since Luther walked through its lanes. On the day of our arrival everything and everybody was in festive commotion, owing to a patriotic celebration, it having been the anniversary of some battle during the Franco-Prussian war. But ours was not the duty of studying antiquity nor of participating in patriotic festivals, but that of exploring brick plants. Hence one fine afternoon found us promenading along the banks of the Rhine, which, by the way, are not beautiful here, by any means, towards a brickyard situated about four miles from Worms, the Rheinischen Ziegel-werks. The country in this vicinity being very flat, it is subject to floods, and the traces of the flood water can be seen everywhere.

The clay worked here is a true alluvial deposit, is very plastic, burns a fine red, and beds of sand are evenly distributed throughout it. The mining is done by picking and spading, although a steam shovel could be used to great advantage here, and would effect a great saving, even considering the low wages paid the hands. It is remarkable that steam shovels do not find application in German brick plants. For taking the clay to the factory dump cars are employed, drawn by a small steam locomotive. The factory itself is built upon an elevation, and is a brick structure. No expense seems to have been spared to make the interior outfitting of the most substantial kind. The machines are very heavy, and the shaftings are put up in a manner indicating that they are expected to run smoothly for decades, quite in contrast to some of our brickyard shafting, which is, only too often, hooked up in any shape. The German brickyard men seem to cling to the old cast-iron pulleys, for only few wood-split pulleys were noticed. A large compound engine furnishes the power. The engine room is a model of tidiness.

THE RHEINISCHE ZIEGELWERKE, WORMS ON THE RHINE.

The preparation of the clay is, of course, accomplished by means of the ever-present roller crushers. For grinding the grog required for the roofing tiles a dry pan is employed.

The capacity of the works is 60,000 brick and 16,000 roofing tiles per day, in the making of which four auger machines are used and four revolving tile presses. The drying rooms are distributed over six floors, to which the green ware is taken on platform elevators and from which it is removed in the same manner. Engobes—that is, clay slips—are made use of for giving to the roofing tiles a uniform dark red color.

Owing to the peculiar interior arrangement the lower stories are poorly lighted, and hence electric light has to be kept in use all day. The burning is done in two continuous kilns, which, however, cannot take care of the daily production. As a natural result, the operations are hurried, and the setting and emptying has to be done at a temperature too warm for comfort; in fact, we do not believe that American workingmen could be induced to work under such circumstances. The roofing tiles are set on top of the brick, so that there are eight courses of brick, a flat course, and seven courses of tiles.

Notwithstanding the hurried burning, the ware was of a very uniform hardness. Owing to the lack of kiln space, a large stock of brick was piled up on the yard, to be again wheeled into the works and burned. An outdoor drier was

KILN HOUSE, Worms Brick Works.

also arranged just outside of the building, the hacks being protected by straw thatches.

An American brickmaker could not afford to handle the brick so often, and at the same time hope for a profit. It seemed a pity that this concern, in spite of the large investment it obviously required, could not produce 60,000 brick and 16,000 tiles without swelling the expense account unnecessarily. In fact, wonderful are the ways of some German brick works, and it is often a puzzle how reasonable profits can be produced on the basis of the large capitals employed. But then these are only the reflections of an unsophisticated American clayworker.

END VIEW, Worms Brick Works.

At this concern the brick are shipped and the coal is received by boats, the factory having a narrow-gauge track running to a dock on the Rhine.

—German Ball Mills.—

Grog being such an important factor in the manufacture of German roofing tiles, a good deal of attention has been given to the building of machines adapted for the grinding of the burned clay in the shape of brickbats or spoiled tiles. But two machines especially are to be considered in this respect—the dry pan and the ball mill. The latter has found an extensive application for this purpose. The ball mill consists, as far as external appearance is concerned, of a sheet-iron drum, terminating on top in a pipe, through which the floating dust may be drawn off by means of a ventilating fan, and at the bottom in a mouthpiece for discharging the ground material. The grinding itself is accomplished in a cast-steel cylinder within the drum by means of steel balls. Similar to the bottom of a dry pan, this cylinder, which turns on a horizontal shaft, has its walls perforated in grate fashion. In order to prevent clogging up of the holes, they are made to widen towards the outside. The material to be ground is introduced into the revolving cylinder through a trough at the side of the drum. If the ball mill is required to do the work of an ordinary dry pan—for instance, to grind up shale to the fineness usually obtained with dry pans—its capacity is very large, always provided that the material be not fed in too large pieces. The grinding process is very simple. The substance, on being introduced into the cylinder, is caught by the heavy balls, crushed and forced through the grate, from which the ground particles drop into the discharge opening. It is needless to say that the material to be pulverized must be dry. In case the charge is required to be ground finer than the openings of the grate will permit, a sheet metal screen is constructed around the grinding cylinder, so that the particles going through the grate are screened. The coarse material is returned to the grinding cylinder. If a still finer powder is wanted, another screen or a sieve may be put in, and the screenings of this sieve also are returned to the interior of the grinding cylinder. The arrangement for conveying the coarser particles to the cylinder being quick acting, the screens are not encumbered with the screenings for any length of time, so that their capacity is very large.

The wall of the grinding cylinder is composed of plates, which can be easily and quickly replaced; the same is the case with the screen plates. If it is desired to empty the mill it is only necessary to remove a bar at the side and the machine will discharge its load by making a few revolutions.

One advantage of this machine not to be underrated is that it requires very little attention. The main point to be considered in its operation is that the material must be fed into it as regularly as possible. By crowding it at one time and running it empty at another its capacity is lessened to a great extent. The rate of feeding should always approach the rate of grinding. But this holds true, also, of the dry pan. The advantage lies with the ball mill, because, on account of its construction, it is much less liable to break-downs. This machine is not overparticular in its choice of material; in fact, it will grind any dry substance, and is extensively used for pulverizing cement, brickbats, plaster, lime, slag, ore, bones, etc. In regard to capacity, the mills vary, of course, with the size, with the nature of the material to be ground, with the velocity and with the fineness of the screens. A ball mill 4 feet 6 inches in diameter and 2 feet 6 inches in width, requiring four-horse-power, is able to grind about 1,200 pounds of ordinary burnt brickbats per hour of the fineness corresponding to a No. 5 sieve. One 7 feet in diameter and 3 feet 9 inches in width, requiring some twelve-horse-power, grinds about 5,200 pounds of the common brickbats per hour. In comparing the respective merits of the dry pan and ball mill, we find that the ball mill is less liable to breakage, makes no dust in the working room and furnishes a screened product, while, on the other hand, it cannot use very coarse material. Brickbats, for instance, must be broken up before being fed into the machine. The dry pan does not possess the first-named advantages, but, if properly constructed, it will grind material like brickbats without further breaking up. For the cuts of ball mill we are indebted to Th. Groke, of Merseburg, a manufacturer of such machines. We regret to say that we never saw a place where both machines are worked together under like conditions; it would be very interesting to note the capacity of each machine, using as a basis of comparison the power consumed by each.

For the grinding of glazes and colors ball mills are almost exclusively used now in Germany. These mills are, of course, much smaller than the ones considered above, and are very simple in their construction. Such a mill is an iron cylinder, with a porcelain lining, and containing hard porcelain balls. The grinding may be done either wet or dry; if wet, the charge is ground till fine enough; then the mill is stopped and the slip run out through a spigot with a brass sieve; if

PILE OF GREEN BRICK. Worm Brick Works.

dry, the powder is removed through a grate. Both kinds of mills have one of their ends removable so that the mill can be cleaned that way. These simple machines give universal satisfaction

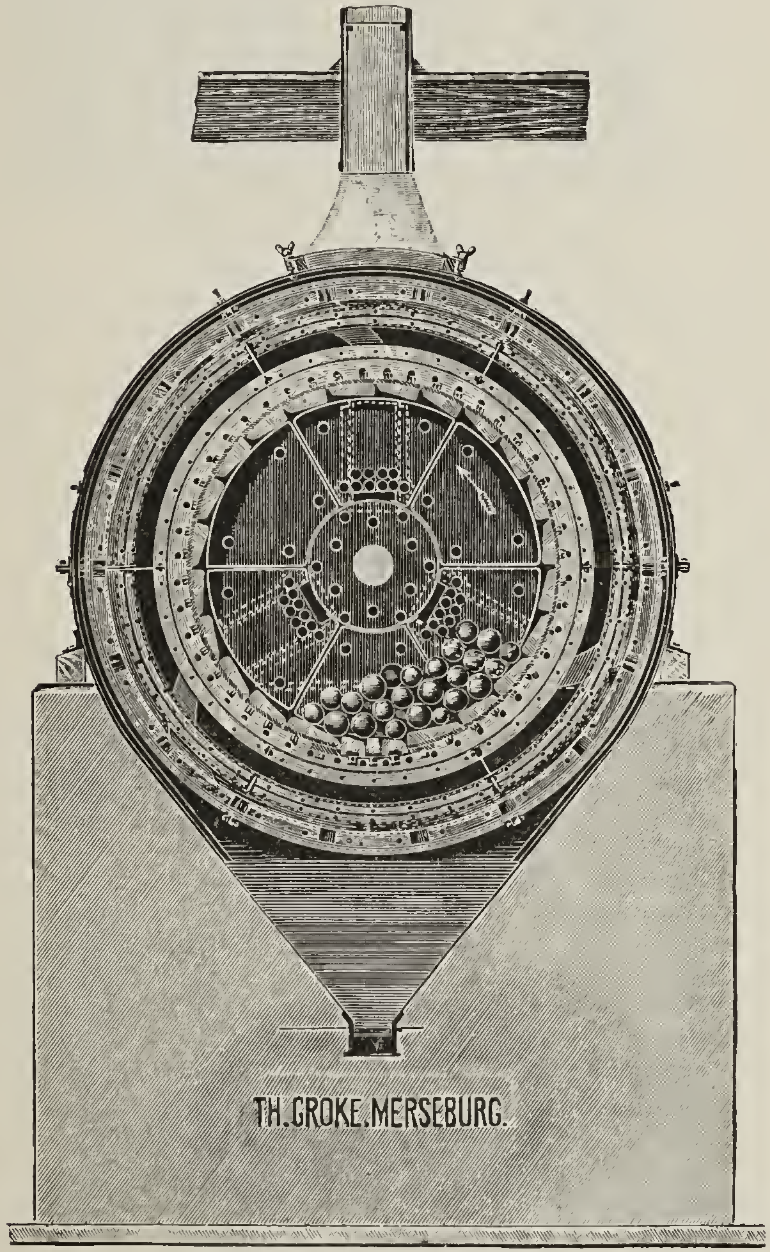
—Useful Instruments for Clayworkers.—

Hacking Brick. Worms Brick Works.

It has been proven by actual experience in German brick plants that there are instruments which are a help to the brickmaker in controlling his operations, chiefly those of drying and burning. Of these apparatus we will mention two of the most common ones, not considering the thermometer, which should be used everywhere, as a matter of course. The first little instrument is used for determining the rate of evaporation, and is made and sold by a brickyard engineer, Mr. Hotop, of Berlin. Although by no means a perfect indicator, it is useful enough to assist the clayworker in tracing the work of his driers. The evaporation gauge is a glass cylinder, nine inches high, open at one end, and is filled with water. The opening is closed with a cover of thick paper. The cylinder is calibrated into centimeters and fractions, so that the sinking of the water level, which corresponds to the rate of evaporation, can be measured. When used for testing the conditions of a drier, it is best to have several gauges and to hang them up in different parts.

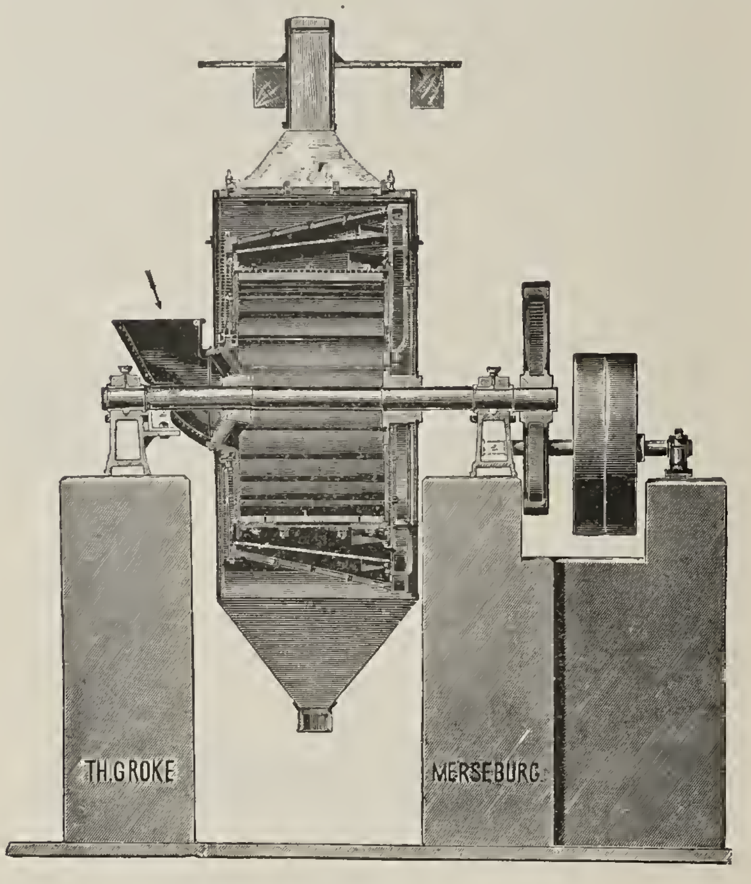
The other instrument is a draft gauge, used for determining, as the name implies, the intensity of the draft, in an indirect way, for really not the velocity of the draft is measured, but the rarefaction of the air in a flue or chimney. It is hardly necessary to point to the advantages of a draft gauge, for every one knows that the draft of a kiln is a factor of the greatest importance, and to know the intensity of the draft means the proper regulation of the damper. The simplest form of a draft meter, and which, at the same time, plainly illustrates the underlying principle of atmospheric pressure, is the one made as follows: A U-shaped glass tube, whose one leg is connected with a chimney or a flue by means of a rubber tube and gas pipe, is filled with a liquid to a certain height. Between the two parts of the tube a graduated rule is fastened, say an architect's rule, with beveled edges, which must be as close to the tubes as possible, so that fluctuations of the level can be readily observed. In the start the liquid must always be at a certain level, which might be called zero. It is also advisable to have the gauge as near to the flue or stack as possible, and to keep the temperature of the liquid about uniform. Now, if an air-tight connection between the tube and the flue is established, and supposing the air in the latter to have a draft, that is, to be rarefied, the atmospheric air will force the liquid towards the flue in order to keep up the equilibrium. Thus, of course, the level in the one leg will be lowered and that of the other, connected with the flue, will be raised. The more rarefied the air in the stack is the higher will the level be raised, and consequently the draft can be expressed in inches or fractions. Water is not a very satisfactory liquid to be used, because, on evaporating, it leaves a residue, which clings to the sides of the tube. Petroleum is better, and a solution of rosolic acid in caustic soda is said to have given excellent satisfaction. It is, of course, essential that the loss by evaporation be constantly corrected. The liquid may be colored to facilitate the reading of the gauge. There are a number of draft gauges on the market, all of them being serviceable instruments, but giving no more accurate results than the device described above, which has the advantage of being extremely simple, and which can be made by anybody. Our cut represents a draft meter sold by E. Hotop, Berlin. The instrument proper is represented by "a," and is suspended from a hook, "b," which is part of an iron frame, "d," with a heavy base, "e." In this construction the instrument, having only a slight point of support at "b," always hangs vertically, and always returns to this position when disturbed. The scale has an inclination from the horizontal of 1.10, so that the fluctuations of the level are magnified ten times, and even the weakest draft can be detected. As represented, the gauge is specially adapted for a continuous kiln, the base forming the cover for a fire hole and "d" being the connecting pipe. In this case the instrument is connected with the chamber nearest to the outlet of the combustion gases.

—Barium Compounds as a Preventive for Whitewashing.—



German Ball-Mill. Side Elevation.

Almost every pressed-brick maker, at some time or other, has had trouble with whitewashed brick. Most of the efflorescences are caused by soluble salts, usually sulphates of lime, which appear on the surface of the brick after drying or after the burning. Many ways have been suggested for remedying this defect, but only a few have proved successful, while the most of them are flat failures. We are justified in saying that only two methods have met with success. The one consists of covering the surface of the brick to be exposed with a layer of some impervious organic substance, like tar; the other one mixes barium, either as a chloride or a carbonate, with the clay. The first one is only successful with some clays; the latter has proved to be so with nearly every clay. In Germany, where so much attention is paid to the color of pressed brick, the barium method is used quite extensively, and we had several opportunities for observing the results obtained by it, which, in every case, were satisfactory. The obnoxious agent, the prime cause of the trouble, is the sulphur compound, which forms soluble compounds with bases like lime and the alkalies. As long as this sulphate is present in a soluble form it will cause efflorescence, and it can only be rendered harmless by tying it down to an insoluble compound. The base with which the sulphuric acid combines to make an insoluble substance is barium, and hence it must be the material used for this purpose. Of the two barium compounds, the carbonate witherite and the chloride, the former is usually used in the solid form, the latter in solution. The carbonate is the cheaper, costing about 2 cents per pound in smaller quantities less than that in bulk; we cannot quote the price for the chloride. The quantity of barium to be added to a clay depends on the quantity of sulphate present, and hence it is essential to know how much sulphuric acid a clay contains. Of course, a chemical analysis gives the most accurate information concerning this point, but as brick manufacturers, as a rule, do not care to have their clay regularly analyzed, empirical tests are made use of to determine how much barium must be used. It must, however, be considered that the amount of sulphate in a clay varies with the different strata of the bank and the kinds of coal used, and also with the methods of drying and burning. A German firm—Katz & Co., Mannheim—proposes the following method for determining the amount of barium necessary:



German Ball Mill. End Elevation.

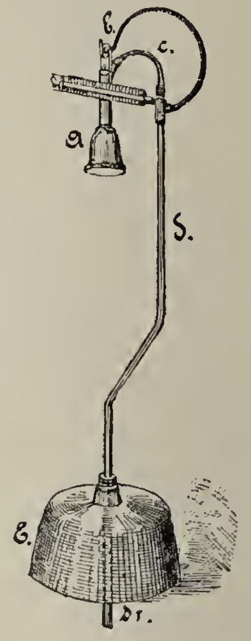
A quantity of the brick clay sufficient for making fifteen brick is divided into five batches, each being sufficient to make three brick. To each part barium chloride is added in solution in the following proportions:

First Part—8.75 ounces to 220 pounds of clay.
Second Part—17.5 ounces to 220 pounds of clay.
Third Part—26.25 ounces to 220 pounds of clay.
Fourth Part—35 ounces to 220 pounds of clay.
Fifth Part—43.75 ounces to 220 pounds of clay.

The clay is thoroughly mixed and made into brick, which are marked and burned. The appearance of the brick after the burning and after being moistened repeatedly will indicate whether enough barium chloride has been added. It is very important to mix the clay very thoroughly, for the better this is done the less of the barium is needed. Another essential point to be considered is that barium chloride in excess is liable to cause efflorescence in itself, and hence it has been advised to use only three-quarters of the barium required as chloride and the balance as carbonate. Where the witherite is used alone there is no danger in that respect. For dry pressed brick the latter would naturally be used exclusively. A chemical analysis of the burned ware should be made at the start in order to determine the amount of sulphate present, and thus give a theoretical guide as to the quantity of barium required. Where lime sulphate is present as a natural ingredient of clay, the ideal way of removing it would, of course, be a thorough washing. We shall, perhaps, return to this subject in a subsequent paper.

We have the pleasure of bringing before the readers of the Clay-Worker the likeness of a man prominent in German ceramic circles, Mr. K. Duemmler, editor of the German Brick and Pottery Gazette, and author of "The Clay Industry of the United States." Personally, we are indebted to him for the kind assistance which he rendered us during our German trip. Mr. Duemmler was born in 1849, at Loeban, Saxony, the son of a bookseller. During his boyhood he visited the citizens' school of his native city, entering the High School in 1863, from which he graduated. Having left the High School, he studied architecture at the Dresden and Berlin technological institutes, and later was active in constructive work, both in the practical and office departments. In 1880 Mr. Duemmler took charge of the Ullersdorf Clay Works, in Silesia, and two years later he entered Mr. Hoffmann's office. After doing considerable work and undertaking several journeys of investigation for the Gazette, he was appointed responsible editor of that journal in 1895.

Evaporation Gauge.



Draft Gauge.

Written for the CLAY-WORKER.

THE MODERN BRICK PLANT.

Suggestions for Its Construction and Operation.

COMMON BRICK—Too many think bats are good enough for kiln building. In this they are entirely mistaken. While a great many bats can be used, especially in the foundations, it is not safe to put too many of them in the walls proper. As it is not safe to use much cement or lime mortar on account of the heat, we must depend more upon the brickwork for strength; therefore, use enough good, strong, hard brick to bind the walls well together. If the walls are reasonably thick more bats can be used without risk.

When common brick are used to line any part of a kiln next the fire they should be hard and strong. If the shrinkage is all taken out of the brick before they are laid, the walls will stand the fire much better, and are not likely to warp or sway from side to side in burning.

Dry-press brick made from common clays will usually stand more fire than soft or stiff-mud brick made from the same clay. I have found many makes of dry-press brick which answer well for building crowns, though I do not advise their use where fire brick can be had at a reasonable price.

Fire Brick—Too much care cannot be taken to have the proper kind of fire brick, and to have the fire-brick work done just right.

I have often heard it said that a certain clay was easy to burn, and therefore a poor grade of fire brick would answer, and it is not an uncommon thing to hear the statement that because the clay from which the common brick are to be made will stand a great deal of fire, therefore fire brick are not necessary. These are very great mistakes.

The furnaces, arches over the fire holes, bags and kiln lining inside of the bags of a down-draft kiln need to be lined with a No. 1 grade of fire brick and clay, and the same is correspondingly true of an up-draft kiln. No common brick will answer for these purposes, unless made from fire clay.

The fire brick for kiln building should be of a uniform size, and should be made to fit accurately the places or parts of the work for which they are intended. Most of the troubles arising with the furnaces, arches and crown of the kiln come from the fact that the fire brick were not cut to fit accurately and were not laid with a close mortar joint.

It is not necessary to use the best grades of fire brick in every part of the kiln. The floor and crown are just as strong and durable, if not more so, when constructed with fire brick made from a poorer quality of clay, as the one must endure the rains and frosts of winter, while the other must stand the wear and tear necessary to the filling and emptying of the kilns.

Ironwork—Too much cannot be said in urging the importance of having the proper kind of iron and workmanship used in constructing kilns—irons of all kinds, including furnace doors, grate bars, and especially the bands or bracing for the kilns.

—Foundations.—

No kiln should be built on a bad foundation. The foundation should be dry. A great deal of fuel is wasted in drying out wet foundations, to say nothing of the soft, shelly or otherwise damaged and worthless brick as the result of damp kiln bottoms or improper surface drainage.

If the foundations of the main walls and bottom of the kilns are not good, make them so before you commence to build the kiln proper. Kilns do not require such deep or strong foundations as heavy buildings, but the foundation should be uniform, so that if the kiln settles it will remain level from side to side and from end to end. Especially is this true in building down-draft kilns. The foundations, both of the kiln and furnaces, should be deep enough to be safe from the severest frosts, which depth is determined, to a great extent, by the climate or location where the plant is built.

The materials should always be suited to the kind of kiln and place in the kiln where they are to be used.

I am often asked about using stone in the foundations. A stone foundation is all right, provided it does not come in contact with severe heat. I do not advise stone foundations except entirely below the flue work and fire holes.

If the land is soft, so that it becomes necessary to go very deep for a foundation, stone can be used if found to be more convenient and less expensive than brick, but to my mind the ordinary depth for kiln foundations should be put in with good, hard, rough brick. A short footing to the foundation, while not always necessary, is advisable.

—Walls.—

The walls should be uniformly strong and substantial throughout. Moderately thick walls are much better than thin ones for the reason that they keep their shape and retain the heat much better. While a thick wall may show, with the heat, a few larger cracks, it will not crack so much or let in anything like the amount of cold air that a thin wall will.

Kiln walls should be built smooth, straight and plumb, inside and out. Especially is this the case with down-draft kilns. If the walls are not even and straight on the outside, the braces or bands will not have an equal bearing on the entire length of the wall from top to bottom, and consequently, when the kiln is heated, the walls will expand unevenly and soon become racked, weakened and out of shape. The walls should have, uniformly, the same strength throughout. A weak point in a kiln is like a weak link in a chain.

K. DUEMMLER, Editor Brick and Pottery Gazette.

—Crown.—

The top of the walls should be made perfectly level with good brick. Too many level up, before starting the crown, with mortar. This is very bad construction, and will, doubtless, give a bad crown. The skew back for the crown should be cut from good brick to fit accurately, with the proper pitch. Any unevenness in the starting of the arch will, in time, affect, and, more than likely, destroy, the entire crown.

In narrow kilns or kilns with small diameter it is very important, if not absolutely necessary, to have the crown brick cut or made to fit the proper radius. This is not so necessary in building wide kilns or kilns with large diameters, but it is always best to use several courses of end-wedge or radius brick in the building of any crown.

In setting the crown brick, always be careful to have the center line of the brick on a perfect line with the radius of the crown circle; or, in other words, avoid "lipping" the brick on the under side.

I do not believe a mortar trowel should ever be used in building a kiln crown. In fact, in some of the best crowns I have ever had built the brick were set dry to the form, the mortar being made thin and poured in from the top afterwards. Of course, this cannot be done in building crowns on round kilns, for the reason that round crowns are usually built without the use of centers or form boards.

A great deal has been said about the proper circle for kiln crowns. Some advocate a full half circle, while others advocate irregular shapes, such as the "Gothic" to one extreme, and the "flattened arch" to the other.

For my part, I never build a crown on a half circle or on an irregular shape of any kind, but, to the contrary, I always build crowns on an arc of a perfect circle, the diameter of which is greater than the width or diameter of the kiln. The size of the arc or the proportional part of the circle used always depends upon the width or diameter of the kiln. But in no instance should the diameter of the kiln be the same as the diameter of the circle from which the arc is taken.

There should always be left an open space between the ends of the crown and the end walls of a square kiln to allow for expansion. These openings can be covered with a flat course of brick.

—Kiln Bottoms.—

Too much pains cannot be taken in building down-draft kiln bottoms. If the bottom is not correctly and well built the kiln is liable to be more or less a failure.

The flues under the floor should be built with good, hard, straight, well-burned brick, which should be uniform in size. No lime mortar should be used, and but a very little mud or fire clay mortar. In fact, the less the mortar the better the job.

In open floors too much care cannot be taken to have the floor brick of uniform size and with uniform openings. The openings in the floor have much to do in procuring proper and uniform draft. In addition to this, the floor should always be perfectly level. The height of the floor level must depend upon the location and arrangement of the kilns with reference to the other parts of the plants. Where tunnel driers are used the top of the floor of the kiln should never be higher than the car tracks in the drier tunnels. If the kilns are any considerable distance from the drier, which is necessarily so with many large plants, the kiln floors should be some lower than the tracks in the tunnels.

We often have trouble in building new kilns on old plants for the reason that the driers were set too low for the kiln ground.

—Bracing.—

The best way to brace a kiln is to brace it. A few light strips of sheet iron poorly fastened together will not do. Round kilns should have good, strong, wide bands; when the bands are made of more than one piece of iron they should be thoroughly riveted together.

WORKS OF THE NATIONAL BRICK AND TERRA COTTA CO., Passaic, N. J.

If the bands are made from light iron a good plan is to bend back each of the ends to be joined, and hammer them down well. Let the turned ends be on the outside. This will afford thickness of iron sufficient to cause the rivets to hold well.

Do not neglect the band fasteners. These should be securely fastened to the band about six inches from the ends. When bands give way it is usually at the fasteners.

Square down-draft kilns should be braced with iron trusses. Wooden braces should never be used, and iron braces should always have good, strong truss rods. Of course, eye beams, if very large, will hold a kiln, but they must be very large, and consequently are too expensive. Old railroad rails or small eye beams, well trussed, are much better and cheaper.

The braces should always be securely fastened to the bottom of the kiln foundation or wall with strong bolts and washers. These bolts should never be exposed to the heat in the bottom of the kiln. The braces should also have an equal bearing from top to bottom against the wall, and should be tied across the top of the kiln with good, strong rods of iron. The tie rods should have the threads cut back far enough to allow plenty of space for tightening.

Starting a New Potts Machine.

The best bracing I have yet found is a truss formed with two rails cut of exactly equal length, with a cast-iron head block at top and bottom, through which the foot bolt or bolt at the bottom and the tie rod at the top pass. This form of head block serves the double purpose of holding the rails together at each end and as washers for the bolts and rods.

The braces should only be just high enough above the top of the wall to allow the tie rods to pass a few inches over the top of the crown.

The truss rods should have a long thread cut on the upper ends where they pass through the upper head block, so as to give ample room for tightening should occasion require.

—Furnace Irons.—

There is a large variety of furnace doors and grate bars, some of which are very good, while many others range from medium to very poor. Grate bars should always be adapted to the kind of fuel to be used. Therefore there can be no set rule given.

The size of the mesh of the bar depends upon the kind of coal. Some coals require a great deal wider mesh than others. The same may also be said of the strength or weight of the bar. One thing, however, should always be insisted upon, namely, the bar should be made from good iron. Old burned-out stoves and other like scrap iron will not make a good, strong, lasting bar. Many grate bars are spoiled because of shallow ash pits and because the pits are allowed to fill up with ash and cinder. There should be a free circulation of air under the bars; therefore, build a deep ash pit and keep it as clean as possible.

Kiln doors should not be hung to frames fastened to the brick forming the furnace mouths, for the reason that the constant opening and closing of doors fastened to the furnace fronts will soon rack and destroy the brickwork. Sliding doors or doors hung on rollers are much better than doors hung on hinges. I think it advisable to use a light cast-iron door housing, lined with fire clay or with a fire clay slab or brick

Hope to take up the subject of fuel, firing and emptying the kilns, together with railroad switches, storage sheds, selecting and loading at another time.

W. A. EUDALY.

Written for the CLAY-WORKER.

A NEW JERSEY BRICK PLANT.

ONE OF THE MOST complete and best equipped brick plants that I have ever had the pleasure of visiting was one that I saw in Passaic, N. J., erected by the National Brick and Terra Cotta Company, a corporation, the stockholders of which are among the wealthiest business men of Passaic. Gilbert Bogart is President and Richard Morrell, Vice-President. The company owns 250 acres of the best clay land in the State, which they had tested by the different processes by which brick are made before making a contract for the machinery now in use, the dry press and stiff clay brick proving very satisfactory, but after giving the matter some thought they decided upon the soft clay process, because their market demanded this class of brick, and they did not feel that they would be justified in trying to introduce something new.

This plant, which was planned and erected by C. and A. Potts & Co., of Indianapolis, Ind., is located on the New York, Susquehanna & Western Railroad, giving them excellent shipping facilities to various points in the State. From all appearances of this plant, I should judge that there had been no money spared to make it the best possible, and none but skilled mechanics had been employed in its erection. The plant now consists of engine house and drier, which are built of brick, and one machine house, which is a three-story frame.

CLAY-WORKER.

Good Bricks—Bone Dry.

The machinery now consists of two 100-horse-power boilers, and one 100-horse-power engine. This power plant was purchased with the view of operating three brick machines. At the present time one boiler furnishes the steam for drier, the other for operating the machinery. The drier was erected by the Standard Dry Kiln Company, of Indianapolis, and has ten tracks, each 116 feet long. It was guaranteed to have a capacity of 45,000 brick per day, and is doing the work easily, with not a cracked brick in sight, and all dried thoroughly. There were two features about this drier that attracted my particular attention—one was the peculiar construction of the Steel Rack Car that is used for transporting the green brick from the machine through the drier and out to the kiln. This car is certainly the most rigid, the easiest running and at the same time affords the safest means for handling soft mud brick I ever saw. The other feature was the novel means (in the shape of a trap) employed to return the condensed water from drier to the boiler. It works entirely automatic; needs no looking after at all, and puts the hot water back into the boiler without its ever seeing daylight, and without the aid of a pump or other mechanism. In fact, this drying plant, taken as a whole, appears to be a model of completeness and convenience, and the perfect manner in which it dries these brick must certainly be a source of satisfaction to the Brick Company and the manufacturer as well.

The clay is brought from the bank by a winding drum and cars, the cars being of the class known as a bottom dump. At the head of the incline the clay is dropped directly from the car into the granulator, which mixes the clay and feeds it regularly into the disintegrator, which is placed at the rear of the brick machine, the clay passing through the disintegrator directly into the brick machine, which is one of the largest all-iron machines made by C. and A. Potts & Co. The pug mill belonging to this machine is about thirteen feet long, and open the entire length on top, enabling the man who does the tempering to keep the clay evenly tempered. From the brick machine the brick are placed upon steel rack cars alluded to above and run into the drier.

On the day of my visit to this yard the brick machine was running and making 4,500 brick per hour. The brick were as near perfect as any I ever saw made. They were perfectly straight and square, and having unusually clean, sharp corners. I have visited a great many new brick plants, but it has never been my pleasure to see one more complete than this. It is modern in every respect, and every appliance that could be used to save labor or cheapen it has been used. The clay is not touched by shovel or hand from the time it is loaded into the car at the bank till made into brick. At the time the inclosed photographs were made the kilns were not completed, it being the intention to make and burn two kilns of about 250,000 brick each, then to close the plant for the balance of this season, and build permanent walls, using coal for fuel, getting the plant completed and ready for business early in the coming season. They claim to have a market for from six to eight million brick per year, brick selling at $6.50 and $7 per thousand.

Mr. Bogart, the President of this company, is a prominent business man, being connected with numerous enterprises in Passaic and the near-by towns, as well as quite a prominent politician, having been elected Mayor of Passaic several times, and is also very much interested in the drug business.

With this class of men engaged in the brick business, we are sure to have better plants and to hear less complaints of low prices of brick. I believe the day of the old open yards and light, trappy machines is past. ONYX.

WORKS OF THE NATIONAL BRICK AND TERRA COTTA CO., Passaic, N. J.

SIMPLY THIS AND NOTHING MORE.

Much of our happiness depends upon little things. Ofttimes it is the little things that make or mar in business affairs. One of the little things that advertisers always want to know is the name of the paper in which the inquirer for catalogues, prices, etc., find their addresses. Hence the oft-repeated request to "mention this paper." Our readers will confer a favor on us, as well as our advertisers, if, when writing to the latter, they will write on the lower left-hand corner of their letter—or anywhere else—The Clay-Worker.

Written for the CLAY-WORKER.

WEDGWOOD.

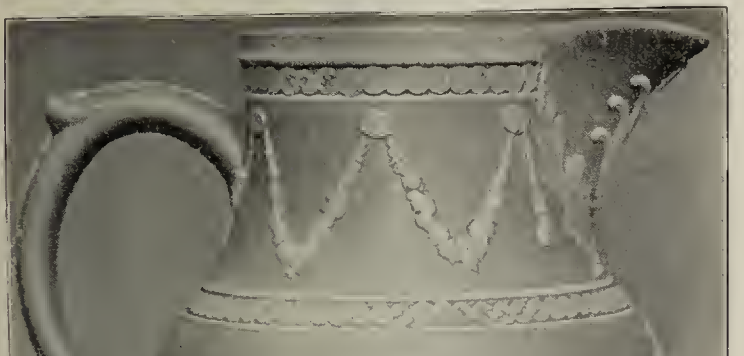
Productions of the Famous English Potter — Collections of Wedgwood in the United States—Imitations of Wedgwood's Art Wares—The Portland Vase.

BY EDWIN ATLEE BARBER.

IT WAS JOSIAH WEDGWOOD who brought the ceramic art to the highest state of perfection in England, and his admirers are, perhaps, justified in calling him the world's greatest potter. He lived from 1730 to 1795.

Wedgwood himself divided his productions into two classes—"Wedgwood" proper and "Wedgwood Ware." The first included everything of an ornamental nature; the second such things as were intended for daily use. In this way he separated the strictly artistic from the useful, and, in fact, kept the manufacture of the two classes entirely distinct.

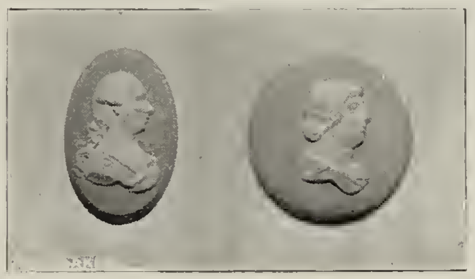
Many of Wedgwood's finest designs were reproductions of the engraved gems of ancient Greece and Rome. His "Jasper" ware, in particular, was noted for its extreme fineness and the artistic treatment in relief ornamentation of classical subjects, usually in white on a dark or light blue, pale green or cane-colored ground. Some idea of the great number of his productions may be gained when it is known that in his catalogue, published in 1787, he enumerated 637 different subjects in small cameos from the antique, 391 ceramic seals and intaglios, 275 large medallions, bas-reliefs, etc., 113 busts, statuettes and animal sculptures, 881 medallion portraits of celebrities of ancient and recent times (not later than 1795), besides hundreds of miscellaneous designs, such as vases, lamps, chess sets, opera glasses, inkstands, tobacco pipes and many other articles.



JASPER PITCHER BY WEDGWOOD. Classic Figures in white on blue ground.

Examples of old Wedgwood are not particularly scarce in this country. One hundred years and more ago much of it was imported by American dealers and sold to wealthy patrons. Then, later, American travelers in England brought home with them bits of Wedgwood which could still be picked up in antique shops in London. The best display of old Wedgwood on this side of the ocean is, perhaps, that in the Bloomfield Moore collection in the Pennsylvania Museum, Philadelphia, which includes numerous fine vases, tea sets, plaques and cameo jewelry.

Mr. Fred Rathbone, of South Kensington, England, the best living authority on old Wedgwood, has in his possession a pair of mantel facings for chimney places, made for Longton Hall in 1777. These are, perhaps, the most extensive pieces of jasper cameo work produced by Wedgwood. The designs were executed by the celebrated sculptor, Flaxman. The central tablet on one of the mantel pieces represents the Apotheosis of Virgil. In each upper corner is a head of Medusa, while the side panels are decorated with handsome scroll designs. On the other is a central plaque with a head of Ceres, and side panels, with wreaths and vines and Bacchanalian symbols, in white relief, on a grayish blue ground. These superb examples of the potter's and sculptor's skill are valued at $16,000, and if laid out in a straight line the decorated panels would measure twenty-seven feet in length. Mr. Rathbone devotes most of his time to the collection and study of old Wedgwood, and there is scarcely a collection of this ware in England which he has not catalogued at some time. He has sent many fine specimens to this country to prominent collectors, and it may be said that there is no known example of Wedgwood's work in existence, of any importance, which he has not seen or handled. His investigations in this field cover a period of more than twenty years. Among the portrait medallions in his own collection are several relief busts of Washington, Franklin and other noted Americans.



WEDGWOOD JEWELRY CAMEOS. Blue and White Jasper.

Among private collections in the United States are numerous isolated specimens of jasper and other celebrated bodies, one of which is here shown—a jasper pitcher in dark blue, with relief ornamentation in white, the property of a lady residing at West Chester, Pa. This beautiful example belongs to the period preceding Josiah Wedgwood's death. Two small medallions belonging to a collector in the same place are also reproduced here. One is a finely modeled head of Charles Stuart, the Pretender, in white, on a dark blue ground, intended for mounting in a seal ring. This is literally a ceramic cameo, showing three layers, the base being a white body of the finest texture, over which is laid a layer of blue of equal depth, and on this is the raised white bust, carved in the most exquisitely delicate manner conceivable. The finest lines are sharp and distinct, and the drapery is gauze-like and transparent against the blue coloring beneath. The second of these small medallions shows a Roman head in white paste, on a pale blue ground. This example is known to have belonged to Josiah Wedgwood's own private collection, and was obtained from one of his descendants.

After the success of Wedgwood's fine art wares had become established many imitators sprang up in England, and among these was one William Baddeley, whose works were at Eastwood, Hanley. This potter imitated very cleverly some of Wedgwood's art wares, both in body and modeling, and it is said that he used as a mark the word "Eastwood," which he stamped in the ware in such manner that the "East" was always blurred and indistinct, while the "wood" was clear and sharp, so that at first glance it might be mistaken for the Wedgwood stamp. Whether this effect was really intentional and meant to deceive or not, it is certain that the mark often appeared, as shown in an old black basalt teapot belonging to a Philadelphia man, which is so close a copy of the famous basaltes, or Egyptian black ware, of Wedgwood that nine out of ten collectors would pronounce it genuine. The form of the vessel is graceful and the relief ornamentation, all in the same rich, dull hue, is excellently modeled. To still further carry out the resemblance to old Wedgwood, one side is embellished with a raised medallion, almost an exact copy of a noted design representing Hope addressing Peace, Art and Labor, which was modeled by Webber and made at Etruria, Wedgwood's works, in 1789; in basalt body, of clay sent to Wedgwood from Sydney Cove, Australia, by Captain Cook and Sir Joseph Banks. The figures in the Eastwood piece (reproduced here) are almost identical, varying only slightly in detail. The anchor, in the Sydney Cove medallion, on which Hope stands, is replaced by a staff surmounted by a Liberty cap, in the Eastwood piece, so that the latter design may be called Liberty addressing Peace, Art and Labor. By this slight modification Mr. Baddeley might escape the charge of appropriating Wedgwood's design, yet the intention to deceive is plainly apparent.

BLACK TEA POT. Imitation Wedgwood, by Baddeley.

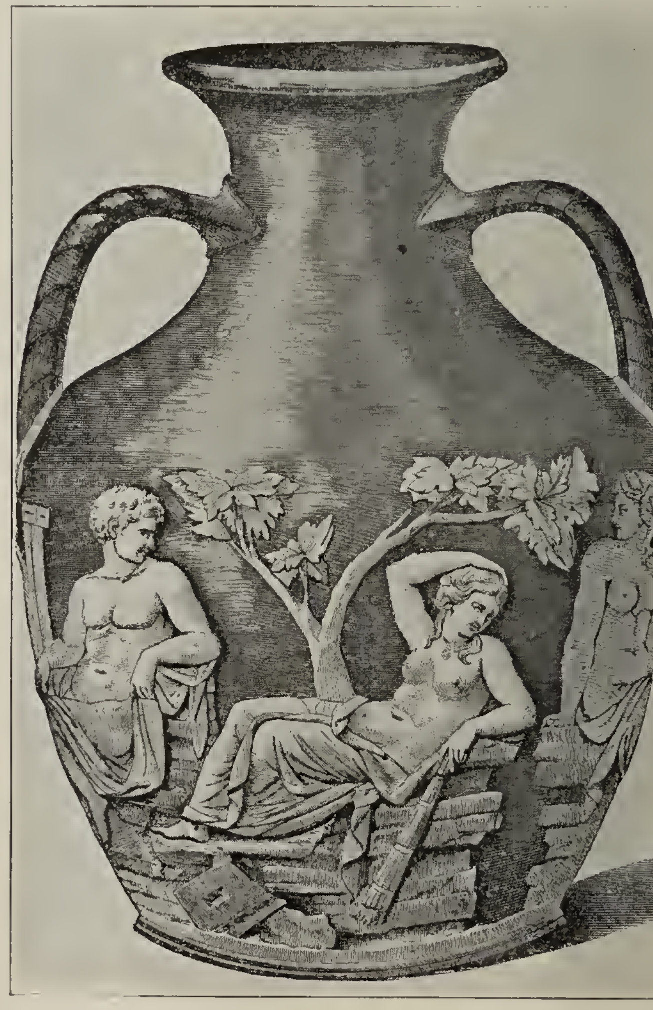
The old designs of Josiah Wedgwood, at least many of them, are still being reproduced by his successors, but these may readily be distinguished from those which appeared during his lifetime, previous to 1795, by the general inferiority of the body and the lack of sharpness in the finer details of the sculptures.

—History of One of the Masterpieces of Ancient Art.—

Among the most celebrated works of ancient art is the Barberini or Portland vase. Its origin is enshrouded in mystery, but it was undoubtedly executed by one of the greatest artists of the East, and is believed by some to have been brought out of Asia by Alexander the Great; by others it is thought to be of Graeco-Roman origin. It was discovered in the year 1644 in a sarcophagus near Rome, which contained an inscription to the memory of Alexander Severus, who was killed in the year 235 A. D., but the vase itself is believed to have been made several centuries earlier. This chef d'oeuvre of ancient art received its name from the noted Barberini family of Rome, into whose possession it came, from whom it passed to Sir William Hamilton, who, in 1784, carried it to England and disposed of it to the Duchess of Portland. Since then it has been known as the Portland vase, and has been considered worthy of special description and illustration in the standard dictionaries and encyclopedias down to the present time.

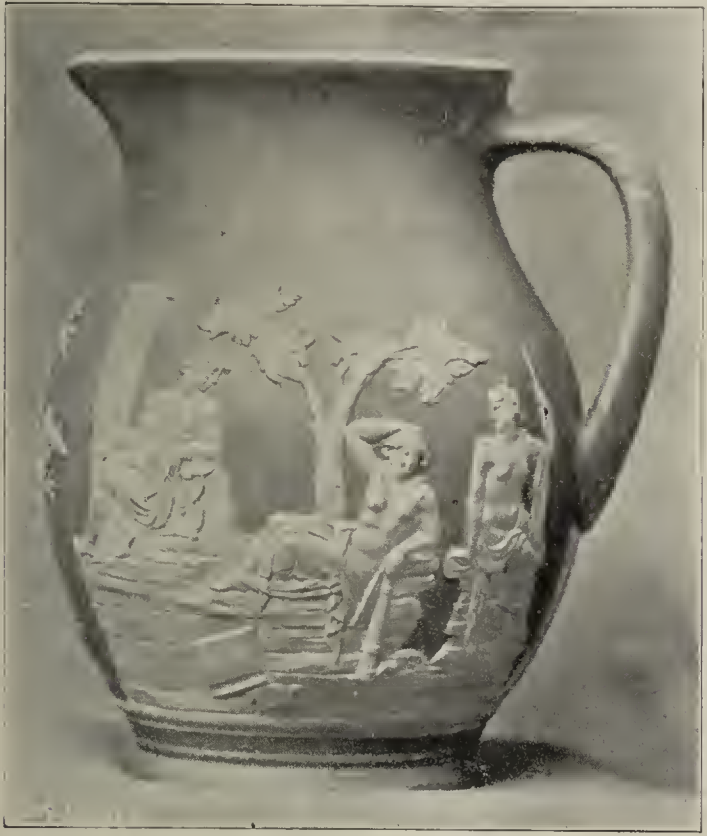
After the death of the Duchess her valuable collection of antiquities was sold by auction in April, 1786. The famous potter, Josiah Wedgwood, had heard of the vase and determined to possess it for the purpose of making it a study, and of reproducing it, if possible. When it was offered at the sale he found that his principal competitor was the Duke of Portland, son of the former owner, but this did not deter him, and the bidding was continued until upward of a thousand pounds had been reached. Then his wealthy opponent approached Wedgwood and asked his object in wishing to obtain it. Upon being informed, the Duke offered to allow Wedgwood the use of the vase until it should have served his purpose if Wedgwood would permit him to purchase it. Thus the prize was secured by the Duke for £1,029 and was immediately turned over to the great potter, who kept it in his possession for about a year. Wedgwood soon ascertained that the material was glass and not onyx, as had previously been supposed. The ground was a very dark blue, almost black, on which had been placed a layer of white, which had been cut away to show the dark ground beneath. The term "Portland blue," now used by potters, is derived from the peculiar shade of coloring which characterizes the original.

While much has been written on the subject of the white reliefs, their significance has never been satisfactorily explained. The side of the vase here shown is that which is usually figured, and is therefore the more familiar to those who have never seen the original or one of its copies. On the opposite side is a somewhat similar group of three figures, varied in attitude, with a Cupid hovering above. Some antiquaries believed these to be intended for Leda, with the swan and Jupiter and an unknown on either side, while others, with



THE BARBERINI OR PORTLAND VASE.

equal confidence, claim that the figures represent the marriage of Peleus and Thetis, and for the swan they substitute a serpent, which she holds in her left hand, while Jupiter gives place to Neptune. Again, there are those who recognize in the representation the story of the Garden of Eden. There is the serpent whispering the temptation into the ear of Eve, who, with outstretched arm, is drawing Adam toward the forbidden tree, over which a winged boy, with bow and flaming torch, hovers, with gaze intently fixed on Adam's hesitating countenance, while to the right stands the angel, watchful and waiting. While it is true that the design might admit of such interpretation, those who advance it do not attempt to explain how the supposed pagan artist came to select as his subject a story from the Hebrew Scriptures. Wedgwood himself, who devoted many months to the critical study of the vase, and published his observations and conclusions in a learned dissertation on the subject, seems to have been uncertain as to what the groups of figures were designed to represent, though he hazarded some explanations, which, however, have not been generally accepted. Could they not, instead of possessing a mythological purport, have symbolized some simple allegory of human life? Or did they, indeed, possess any particular significance?



Portland Vase Pitcher. By Josiah Jones, Trenton, N. J.

In addition to the embellishment on the sides of the urn, a relief head of a man, wearing a Phrygian bonnet or pilleus, occurs beneath the base, which by some is supposed to represent Paris and by others Ganymede. In the original vase this piece is loose, and is thought to have been cut from another vase, since the scale of the figure is much larger. Does this relief bear any relation to the main decorations? Could it have any connection with the ancient artist or lapidary who designed or executed this wonderful work of art?

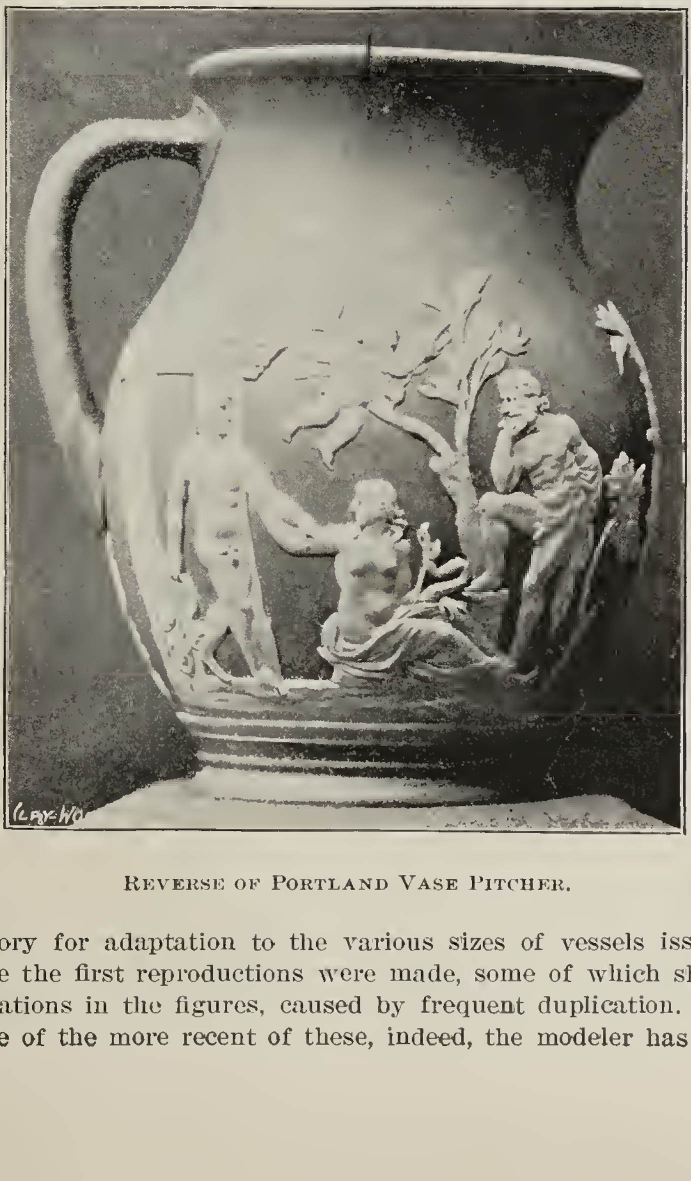
In due time Wedgwood completed his copy of the vase in his finest jasper body, which has been considered the most perfect ceramic work of any age or country. Fifty examples were to have been made from the molds, at fifty guineas each, but it is believed that not more than thirty of the original issue were ever completed. The cost of preparing the necessary molds, experimenting for suitable bodies, undercutting and polishing the reliefs was greatly in excess of the amount realized on the pieces sold.

In 1845 the original vase, which had been deposited in the British Museum, was broken by an alleged insane visitor named William Lloyd, but it has since been perfectly restored, and is again on exhibition, together with one of Wedgwood's celebrated copies.

Many reproductions since the first issue have been made, not only at Etruria, but also at many other potteries in England and elsewhere. Perhaps no work of art has been so extensively copied, both in pottery and in glass, and, indeed, in the precious metals, as the Portland vase. The best copy of recent times was that produced at the Wedgwood works in 1882 from the original molds, which are still in existence, and these were sold by subscription at $200 each. Even at the present time the Wedgwood works are producing copies in various sizes and colors, some of which may be purchased at a moderate cost. One of the marks now used on Wedgwood ware is a print of the Portland vase in miniature.

It is not generally known that this work has been reproduced on this side of the Atlantic. Josiah Jones, who came to this country from England in 1847, was an experienced mold maker and modeler, and prepared the designs for the Greenpoint, N. Y., china works of Charles Cartlidge & Co., between 1848 and 1856. In his eightieth year, six years previous to his death, which occurred at Trenton a few years ago, he finished three pitchers, each eleven inches in height, in imitation of the Portland vase, from molds which he had brought to this country with him. By leaving off one of the handles and spreading the neck into a lip, he produced a pitcher of graceful shape. The material is white ware, with white Parian figures in relief on a blue ground. Of the three examples made by him, two are still owned by his sons, Herbert Jones, of New Haven, and Josiah Jones, of Trenton. As will be seen by comparison, there are differences in detail between the cameo work of the original and the reproduction of Mr. Jones. Just how Mr. Jones procured his molds is not known, but as they differed in many respects from other copies of the famous vase, the work was doubtless his own, modeled in all probability from engravings.

Several sets of molds have been prepared at the Wedgwood factory for adaptation to the various sizes of vessels issued since the first reproductions were made, some of which show variations in the figures, caused by frequent duplication. In some of the more recent of these, indeed, the modeler has de-



Reverse of Portland Vase Pitcher.

parted somewhat from the simple conception of the ancient engraver by adding draperies to the figures. The workmanship in the Jones reproductions is exceedingly fine, and the white designs are in higher relief than those found on the modern Wedgwood. It is to be regretted that the molds made by Mr. Jones were lost some years ago, when the pottery in Trenton, where they were deposited, was destroyed by fire.

Base of Portland Vase Pitcher.

Written for the CLAY-WORKER.

CHEMISTRY FOR CLAYWORKERS. No. 50.

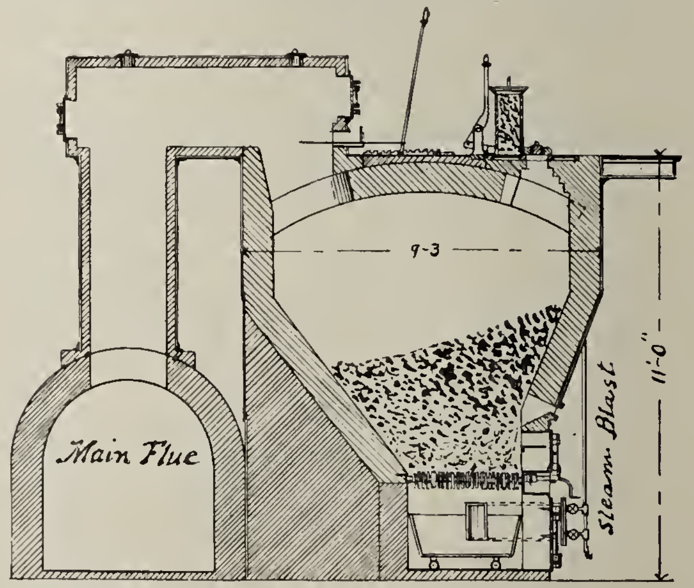
IN MY LAST I TOOK exceptions to the doctrine of sending all the air supply to a furnace through the grate, for the simple reason that both theory and practice are against it. A little patient investigation will, I think, serve to set us right on this point. We will, for example, examine the changes taking place on a grate burning soft coal. Now, it will be conceded that to obtain all the heat from the fuel its carbon must be converted into carbonic acid and its hydrogen into steam, and this must be accomplished without an excess of air, just so much and no more. The nearer we approach these conditions the nearer we approach the maximum results of fuel with reference to heat and its utilization. The grate under consideration is, of course, one arranged for the air supply to enter the grate only. The air, then, entering this grate, attacks the fuel on it and oxidizes or changes it into carbonic acid; this carbonic acid, passing through the hot fuel above it, is carbonized or changed into carbonic oxide, and, if it comes in contact with no free oxygen, it passes on to the chimney as carbonic oxide, and has only left us one-third of the heat it contained. Now, let us see what becomes of the hydro-carbons. These are distilled from the fresh coal just put on top of the redhot coke supported by the grate, and they immediately start on their course towards the chimney. If they come in contact with free oxygen they burn; if not, they do not burn, no matter how hot the chamber is through which they pass. If the fire on the grate is too thick, it is simply a gas producer; on the other hand, if the fire is too thin, an excess of air is admitted. In either case there is a waste of fuel. I may be charged with selecting extremes, a too thick and a too thin fire. Granted; but I am at a loss to find a mean, or any condition of fire that will be adequately met by air entering at the grate only; for, supposing it possible to burn with a fire just thick enough to produce carbonic acid with the fuel on the grate, an atmosphere of carbonic acid in the combustion chamber will not burn the hydro-carbons liberated from the coal on top of the hot cokes; as stated above, these hydro-carbons will be wasted unless they meet and combine with free oxygen. If these gases are not burnt there is a waste of 40 to 50 per cent. of the heat of such fuel. The ordinary method of coking coal furnishes us with ocular demonstration of the heat value of the hydro-carbons. Further, an atmosphere of air and carbonic acid, mixed, will not properly support combustion. The air must be largely in excess for combustion to take place at all. Mr. C. W. Williams demonstrated practically the value and absolute necessity of an air supply on top of the fuel, as well as that supplied to the grate, in firing steam boilers. I indorse Mr. Williams's views on the subject, and go a little further in saying that the same law applies to all furnaces burning bituminous coal. But the best indorsement Mr. Williams can have is that he is supported by the chemical theory of combustion.

While I am on the subject of firing boiler furnaces I may just say a few words on heaping up a fire on the "dead plate" in front of the grate so that the bulk of the gases may be distilled from the coal at that point, then the hot coals be distributed over the grate. Setting all other objections aside, this system of firing keeps the furnace door open too long, thus counterbalancing all the good claimed for the system. This system appears to me to demand an air supply on top of the fuel more than any other I have yet seen; in fact, practical experience has taught me so.

The good automatic stoker is a great advance on hand firing and considerably reduces the difficulty of proper air supply, but gas firing reduces the difficulty much more and is a much nearer approach to perfect stoking. A nearly uniform supply of gas is easily supplied with a nearly uniform supply of air, the proper amount being easily gauged by observing its effect on the gas flame, and both easily regulated by an automatic damper, and this brings me back to my subject of gas producers, furnaces and regenerators, continued from the last number of this journal.

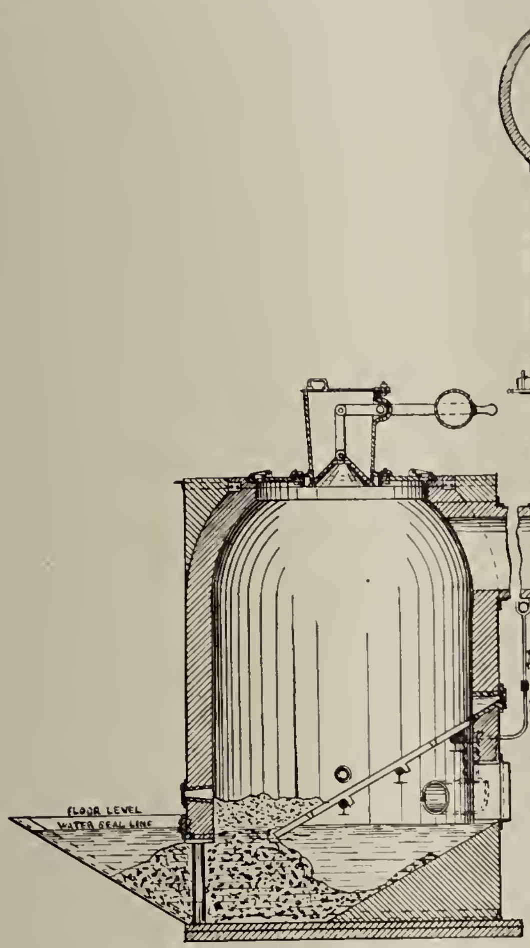
The Siemens producer illustrated in the last issue is of the non-steam-jet type, and is worked by natural draft. He never approved forcing the producer, but, even had he been so inclined, the steam jet is one of the last sources of blowing he would have resorted to. His education and training precluded all such chimerical notions as producing heat by decomposing water and combining those elements again; in other words, he could never see the advantage of giving water one hundred units of heat so that he might recover ninety units. It always appeared to him like a 10 per cent. loss, and so it appears to me up to this writing. Still, we cannot overlook the fact that nearly all the producers of the present day are supplied with one or more steam blowers, and I therefore lay before clayworkers sketches of a few of the popular ones.

The producer with a steam jet or blower originated, if I remember rightly, with George or Alexander Wilson, members of the firm of Chas. Cammell & Co., Cyclops Steel and Iron Works, Sheffield, England, which of the two brothers I do not know. The producer was known there as the Wilson producer. Since the advent of the Wilson producer I have seen the steam jet blower applied to ordinary heating furnaces in rolling mills and to steam boiler furnaces, but have never seen them outlive their novelty, except in producers.



Produces of Swindell Bros., Pittsburg, Pa., from Cassiers Magazine.

The first of the steam blower producers shown is a Swindell. The Swindell Bros., of Pittsburg, Pa., have striven earnestly, though not always intelligently, to improve the Siemens producer. They have, I think, succeeded in some minor details, but upon the whole the Swindell may be looked upon as a Siemens, with a steam blower attached. One of their novelties was building the regenerators over the furnace to save excavations and to meet such emergencies as water in the foundations. They also introduced the triangular brick for regenerators, and they gave us a slightly modified Ponsard regenerator some fourteen or fifteen years ago. The description of the Siemens producer in the last number of the Clay-Worker will enable the reader to readily understand this of Swindell's with very little explanation. There are two dimensions given, and from these any other dimensions may be scaled near enough to give a tolerable idea. It will be observed that it has a rocking grate, and very short; a very sloping back wall and sloping front wall, too. These are to prevent burning through holes as much as possible, for either blast or draft finds its easiest way up the side of a vertical wall. A short syphon tube conducts the gas from the producer to the main flue, and from thence it is distributed to the furnaces.



Producer of S. R. Smythe Co., Pittsburg, Pa. From Cassiers Magazine.

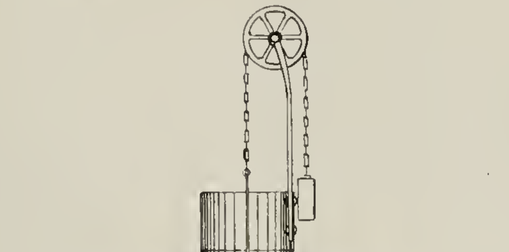
The next producer to be noticed is one built by the S. R. Smythe Company, Pittsburg, Pa. This is a modification of the Wilson furnace, is circular, and inclosed in a sheet-iron casing. The grate is set at a considerable angle, thus giving more grate area. Another novel feature, but of questionable benefit, is the water-sealed ash pit. As shown in the drawing, the largest portion of the grate is shown as being bare; in practice, however, this is not so. Very little reflection will convince the reader that it could not be so. The cup and cone method of feeding is very popular, and has the advantage of spreading the fuel better than the Siemens drop valve or the Swindell sliding hopper, but even in this there must be some allowance made for the form of producer.

The next and last is the Taylor producer. This contains more original features than any of the later producers I have yet seen. Like the Wilson, it is circular and cased with sheet iron. It has no grate. The bottom consists of a large cast-iron disk, toothed on the underside to fit into bevel gearing on a shaft extending to the outside of the casing, where there is more toothed gearing and a handle, by which the said cast-iron disk, or bottom of producer, may be made to revolve and grind out the ashes and clinkers. I cannot do better than quote the description given by the inventor, Mr. W. J. Taylor:

"The accompanying cut illustrates the producer in operation on anthracite coal, showing the revolving bottom supporting the bed of ashes (put in before firing), on which rests the incandescent fuel. It will be noticed that the revolving bottom is of greater diameter than the bottom of the combustion chamber, and placed at such a distance therefrom that when it is revolved the ash, which forms its own dome or slope at an angle of about 55 degrees, is discharged uniformly by its own gravitation over the periphery and into the sealed ash pit below (which is under back pressure), all without stopping the producer or much interference with making gas. The grinding is done as fast as the ash rises too far above the central air and steam discharge, say every six to twenty-four hours, according to the rate of working. The door of the ash pit is opened once a day for taking out the ash and clinker. This requires but a few moments and interferes but little with the continuous working of the producer. The injected air and steam is introduced through a central pipe and is discharged radially therefrom, in order to prevent too much travel of the gas next the walls, which is the line of least resistance, and is placed at a point sufficiently high to carry the required bed of ash, which should never be brought below the air discharge. Sight or test holes are placed in the walls so that the dividing line between the ash and incandescent fuel can be ascertained at any time. Four sets of agitating bars or scrapers are provided, any of which may be pulled out in case the ash grinds down too fast on one side; this retards the discharge on that side and levels up the ash bed. Gates are also arranged around the bottom of the ash bed to cut off the discharge of ash entirely on the low side when necessary.

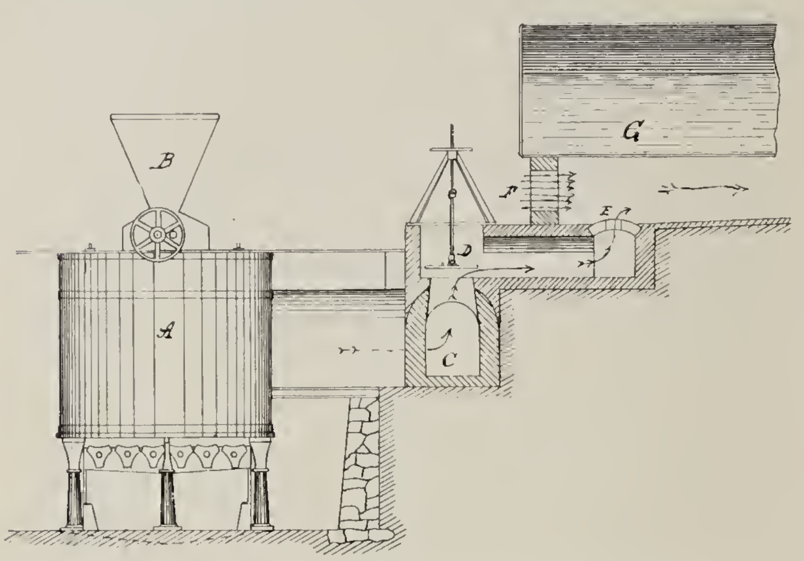
"The lower part of the ash chamber is a cast-iron hopper, perforated for the admission of punching bars, inserted through the doors in outer casing, for the breaking up of clinker that is too large to pass down and out without trouble. Access to the cut-off gates is through these doors, and the grinding of the ash can also be observed through them—a very important feature."

There are yet scores of other producers, with more or less novelty attached to them, but a description of them would be a wearisome waste of time and space in this journal. I am often amused at the claims for improvements made by proprietors and managers who have just had a gas plant installed in their works. Long before they have mastered the first principles of fuel-gas making they are filled with visionary schemes to improve their new plant, and, utterly ignoring every law of physics and mechanics, they energetically set about putting their guesswork ideas into form, and straightway another producer is born. Some seven or eight years ago I was in the Otis Steel Works, Cleveland, O., and saw a row of Siemens gas producers, which I at once recognized, but was promptly informed they were not Siemens's producers, but Wellman's. I was then shown the great improvements Mr. Wellman had made. He had closed the ash pit with ordinary folding doors, made of sheet iron. He had made a hole some three and a half or four inches square



Producer of W. J. Taylor, Philadelphia, Pa. From Pamphlet.

through the side walls into the ash pit. In the mouth of this hole he put a steam pipe, provided with a valve. The pipe was about three-quarters diameter, and through it rushed a deafening jet of steam into the ash pit through the hole just mentioned, and this clumsy attempt at a steam jet changed the Siemens to a Wellman.



Producer attached to Steam Boiler. From original Drawings.

In conclusion, I will, with the accompanying cut, endeavor to make clear the application of gas firing under steam boilers, where A is the gas producer, B a coal hopper, fitted with automatic feeding arrangement, C main gas flue, D regulating gas valve, E a line of gas burners all across combustion chamber, F perforated air plate in front wall, G the boiler.

WM. WAPLINGTON.

Written for the CLAY-WORKER.

THE COST OF GOOD BRICK WORK AND THE FIRE TAX.

THERE is a definite relation between brick work and the rate of insurance. It is expected that in most buildings there will be fires from time to time. The character of construction has a great deal to do with the matter of their destruction by fire. If a building be well and substantially constructed of incombustible or slow burning material there is opportunity to put out the fire before it becomes seriously destructive; or, if not that, the salvage is greatly increased.

A building, to get the best rates, should be what is known to the underwriters as a standard building. That is, the roof should be of metal, slate or tile. The cornice should be of brick, stone or terra cotta. The walls should be of the following thickness: For a two-story building, the basement twenty inches, the first story sixteen inches, the second story twelve inches; for a three-story building, the basement should be twenty-four inches, the first story twenty inches, the second story sixteen inches and the third story twelve inches; for a four-story building the basement should be twenty-eight inches, the first story twenty-four inches, and the other stories graduated down to twelve inches. Nine-inch walls are never allowable under any circumstances in a building which is entitled to the best insurance rates. Side walls shall be without openings, and shall not rise less than eighteen inches above roof, and shall have copings of incombustible material. It is required that party walls have ledges; that is, they shall be so constructed that the joist do not run into the walls. The brick are corbelled out from the walls and the joist rest on them. This is usually done by coming out from the wall with a slight projection seven courses below the underside of joist. The next five courses come out gradually, so that the sixth course may stand out four inches beyond the wall. Then the seventh or last course is a header course and ties the whole into the wall. On this the joist is placed.

So far as brick work can go this gives what is known as a standard building, and entitles it to the best rate of insurance that may be allowed in the town in which it is built.

In a first-class town—that is, one having a first-class water works, full-paid fire department, well-equipped fire alarm telegraph, police regulations and paved streets—the rate on such a structure would be 50 cents. For deficiencies in construction in a town of any class there are certain additions to the regular rates. For brick veneer buildings 25 cents is added to the regular rate. For walls not standard thickness, each story, 5 cents; for side walls not coming eighteen inches above roof, 10 cents; for party walls not ledged, each story, 5 cents; for shingle roof, 20 cents; for chimneys built from upper joist, each, 25 cents; for frame extensions to brick buildings, add 5 to 10 cents. These are some of the grosser considerations which influence the rate of insurance in connection with brick buildings. There are many other items which should be considered, and which, as the insurance companies look further into these matters, will receive further consideration. For instance, the matter of flues. It is proper that all flues should have flue lining; also, a premium should be allowed for walls nine inches in thickness surrounding flues.

Insurance rates do not gradually become less, and why? Because the general character of buildings does not improve in the average community. It is experience which makes the rate of insurance. Unfortunate experience makes the rate high. The fortunate experience would make it low. The rate of insurance does not apply to the building alone, but to the stock which it contains. Thus, in building well, one secures not only a good rate on the building itself, but upon the stock which may be placed in the building, and the saving will apply during all time throughout the history of that structure.

Very few people who build have even a remote idea as to the exact difference which it will make in the rate of insurance as to whether they build well or otherwise. It is well to know, therefore, that the difference in the rate of insurance may, within a few years, pay for the cost which may be necessary to bring the building to the condition of a standard structure. In the matter of the character of the brick work the difference between building well and building carelessly may mean the doubling of the rate. In a first-class building one may have to pay 50 cents, while in a poor one he may have to pay a dollar, and all on account of the difference in the character of the brick work. Of course, it costs more to erect a building according to the standard idea, but it is worth more because it pays to do it, and, as said before, it pays not alone with respect to the building, but with all the stock which it contains for all time.

In some of the larger cities of the country there are building regulations which enforce a certain standard of building. But even that is not always as high as it should be, nor is the inspection as rigid as it might be. In all these cities buildings were put up previous to the inauguration of building regulations and inspection. All such buildings which stand to-day are menaces to other surrounding property, and affect the rate of insurance for all contiguous structures. If there are three or four bad buildings in the square, if the party walls are thin and otherwise improperly constructed, the insurance companies take these into consideration. They know that they affect the hazard on other property. But this is much worse in the smaller cities and towns of the country, where there is no pretense to high-class building and never has been. Here it is that they must pay for their whistle. Other features might be mentioned in connection with the insurance value of buildings, but this is sufficient for a suggestion.

The specific information given in this matter with respect to the rating on different kinds of construction is from the mercantile schedule of the Board of Underwriters for the State of Indiana, and shows the tendency of insurance organization to look yet more carefully into matters of constructive importance.

A SMALL BOY'S IDEA.

An eight-year-old boy was asked to write out what he considered a good bill of fare for a Thanksgiving dinner, and here it is:

Furst Corse.
Mince Pie.
Sekond Corse.
Punkin Pie and Terkey.
Third Corse.
Lemon Pie, Terkey, Cranberries.
Fourth Corse.
Custard Pie, Apple Pie, Mince Pie,
Chocolate Cake, Ice Cream and
Plum Pudding.
Desert.
Pie.

—Rochester Post Express.

NEBRASKA BRICKMAKERS.

Convention to be Held at Lincoln, January 19 to 21, 1897.

A YEAR AGO a little band of enthusiastic brickmakers gathered at Lincoln and formed a State Association for the purpose of advancing the brick industry of that part of the country. As chronicled in the Clay-Worker at the time, their meeting was successful, though the attendance was light. An efficient corps of officers were elected, as the reader may judge from the pleasant yet earnest faces that are pictured on this page.

The second yearly meeting will be held at the Capitol Hotel, Lincoln, beginning Tuesday, Jan. 19, 1897, and continuing Wednesday and Thursday. Secretary Bushell has arranged an interesting programme, which includes the following papers:

President's Address, by G. F. Cotton; "Setting and Burning Brick," by C. F. Kaul; "Mixing and Drying Clay," by W. H. Bushell; "Manufacture of Hollow Ware," by J. E. Stockwell; "General Remarks on Brickmaking and Legislation," by John Edelmeier; "Profits of Brickmaking," by B H. Jungbluth Various other features of the business will be discussed. Every one interested in clay work is invited to attend the meetings, which will be both instructive and pleasing. Secretary W. H. Bushell, of David City, Neb., will be pleased to correspond with any one desiring to join the Association.

CLAY-WORKER.

J. E. STOCKWELL, 1st Vice-Pres.

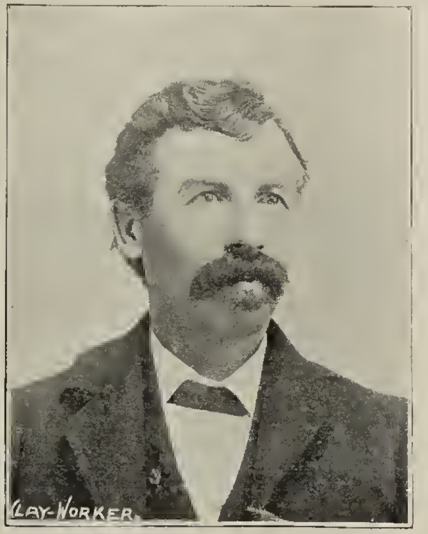
CLAY-WORKER.

B. H. JUNGBLUTH, 2nd Vice-Pres.

GEO. F. COTTON, President.

CLAY-WORKER.

C. F. KAUL, Treasurer.


CLAY-WORKER.

W. H. BUSHELL, Secretary.

BRICKS OF SAND.

The Experiment to be Made on the Pacific Coast.

A GREAT BRICK PLANT is to be established in proximity to San Francisco, which will add materially to this city's manufacturing interests and through new methods may lead to a revolution in that important industry. An organization has been incorporated under the name of the California Stone Brick Co., which proposes to expend $40,000 in the purchase of a site and the erection of buildings for the manufacture of brick from sand, no other ingredients entering into their composition than those contained in sand or earth. Plans for the kiln have been drawn and a search is now being made for a proper site. The process to be employed is that of Prof. E. C. Brice, of Washington, a relative of Senator Brice. He is a prominent chemist and has been working on his discovery for many years at Chicago and the National capital. In addition to the manufacture of stone brick the process includes that of fire brick, tiles, glass pots, crucibles and gas retorts. That portion of the patent covering glass and retorts has already been sold to large glass works at Pittsburg, while the fire brick has been tested at Chicago and Cincinnati, with the result as claimed that it has been found to be almost indestructible by heat. The stone brick which it is proposed to make here is manufactured from powdered stone or the elements contained in stone, such as sand, clay, etc These substances are mixed with a prepared flux, which acts as a bond, holding in union the particles of sand or other material used as a filler, the whole being thoroughly annealed by heating. The process of baking differs from that usually employed, in that the brick first passes into a tunnel on cars, being left for four hours exposed to the heat therein. They are then passed on the cars into a second tunnel or annealing furnace, where they remain for three hours. From the time that the sand is taken from the bank until the brick are turned out is only ten hours, and there is only one handling—that when the brick are "hacked" on the cars. With the vast amount of sand near San Francisco, this process obviates the necessity of going to remote points in seach of material required for the ordinary bricks, thereby saving the expense of transportation. The stone bricks are made in red, yellow, blue and pure white. Among the advantages claimed for the Brice brick is the saving of time, only ten hours being needed for their manufacture, instead of eight to thirty days; a much less consumption of fuel, scarcely any loss from burning, a crushing strength of from 10,000 to 45,000 pounds to the square inch, instead of from 400 to 4,000 pounds, and reduction of cost to three-fifths of that of old-style bricks.

FIRE BRICK FOR RUSSIA.

The Harbison & Walker Company, of Pittsburg, Pa., leading manufacturers of strictly high grade fire brick and silica brick in this country, have received a contract to furnish all the high grade material to be used in the construction of the new open-hearth furnace plant of the Nicopol-Mariopol Mining and Metallurgical Company, of Russia, amounting to about seventy-five carloads. Up to a few years ago all the silica brick used in the United States were imported from Wales.

This Department is devoted exclusively to Invention and Patents relating to the Clay Industry, and is edited by Mr. Edward C. Weaver, attorney and counselor, in patent law, McGill Building, Washington, D. C. Copies of any patent with drawings will be sent at cost, namely: ten cents for each copy. Any information and advice in regard to patents will be gladly given. Address all communications to the editor.

REPEAL OF PATENTS.

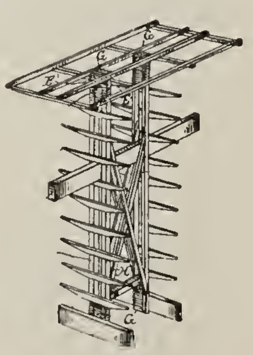
PATENTS AND REISSUES may sometimes be obtained by fraud or sometimes may be granted by mistake. Sometimes these facts may avail as a defense in a suit for infringement, but, as a rule, in the few fraudulent patents in existence such ingenuity was displayed by the attorneys that such defense could not be made. The only other way for an individual to secure benefit in the matter of such fraud is, after a successful interference suit, to take steps in equity for the annulment of the fraudulent patent. A further equity is believed to lie, where patents have been obtained by fraud or mistake, with the United States, in the nature of a bill stating the facts and praying that the letters patent may be annulled. An illustration of this equity is the celebrated Berliner patent now before the Supreme Court, and in which case the equity jurisdiction will be firmly established.

The bill to repeal a patent must be filed before the United States by a United States District Attorney, in the Circuit Court for his district, and must be filed before the expiration of the term of the patent. No citizen can compel the filing of such a bill, nor can he control its prosecution. In other words, the right to the individual only arises after a successful interference suit, when, being a patentee, he stands upon the same plane as the patentee by fraud or mistake, and is thus in position to ask equitable interference. Unless an individual can secure this advantageous position, an attack upon the fraudulent or erroneous patent can only be made in the name of the people.

567,542. BRICK ROUGHER AND SANDER. John G. Kerst, Springfield, Ill. Filed April 11, 1896. Serial No. 587,206. (No model.)

Claim—1. The combination, in a brick-sanding machine, with the sanding devices and the brick-carrying belt and with a pusher having pins, of pivoted plates forming with plates on the sides of the machine a path to be traversed by the pins on the pusher, and a crank disk and connections embodying a slotted arm, the slot of which receives the crank pin of said disk, and an oscillating shaft, from which said arm depends, between the same and the pusher, for actuating the latter, and hinged doors for edging the bricks as they are delivered from the belt, said doors being connected with and operated from the main shaft, substantially as specified.

2. The combination with the pusher, the push bars connected therewith, the pivoted switch plates and the levers, of a shaft carrying the levers, an arm secured to said shaft and having an elongated slot, and a disk provided with a crank pin working in said slot, and hinged doors connected with and operated from the main shaft for edging the brick after they are delivered from the belt, substantially as and for the purpose specified.



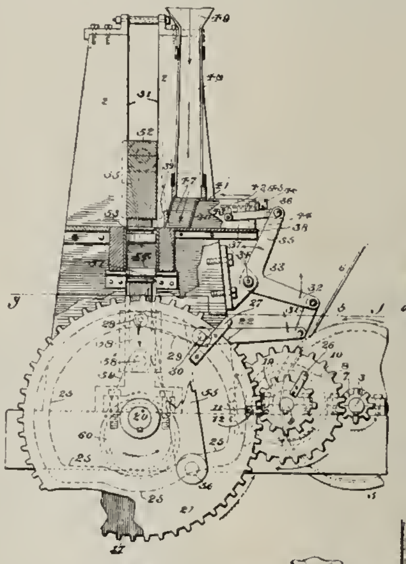
568,034.

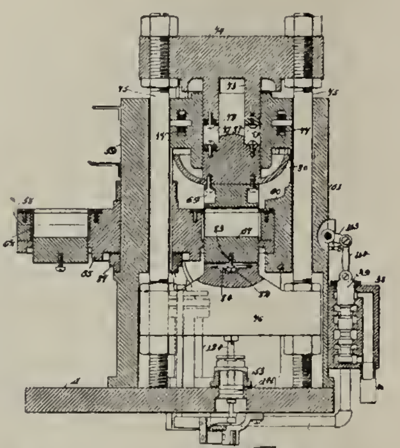
568,034. BRICK-DRYING RACK. James F. Mock, Muncie, Ind. Filed Sept. 12, 1895. Serial No. 562,297. (No model.)

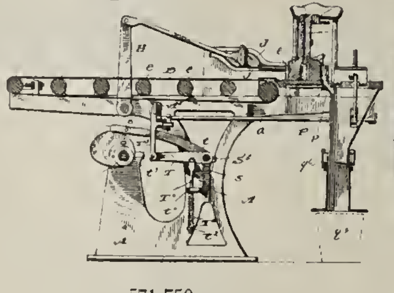
Claim—An apparatus for handling and drying brick, consisting of a rack formed of parallel upright posts formed in two pieces, spacing blocks between the pieces and located at the top and bottom of the posts, brackets secured to the posts, a cover for the rack detachably secured to the upper ends of the posts, crossbars connecting the posts, the upper crossbar extending on opposite sides of the posts and above their vertical center, transverse braces connecting the posts and horizontal bases secured to the lower ends of the post, and upon which the rack is adapted to be supported, substantially as described.

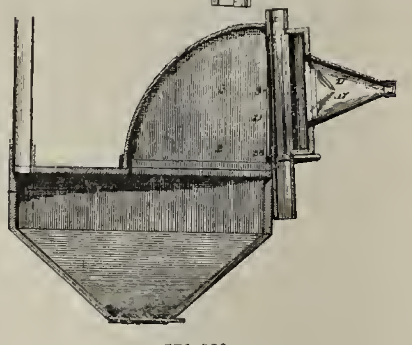
571,629. BRICK MACHINE. Henry B. Whitehead, Memphis, Tenn., assignor of one-half to John J. Bishop, same place. Filed Feb. 12, 1896. Serial No. 578,968. (No model.)

Claim—1. A brick machine, comprising a mold, dies operating therein and having air outlets, a cylinder receiving pressure by which said dies are operated, an extractor cylinder, and means for forcing a high pressure only into both the pressure cylinder and extractor cylinder, and causing an intermittent action of the dies, and thus allowing air to escape, substantially as specified.









571,750.
567,542.

571,629.
572,311.

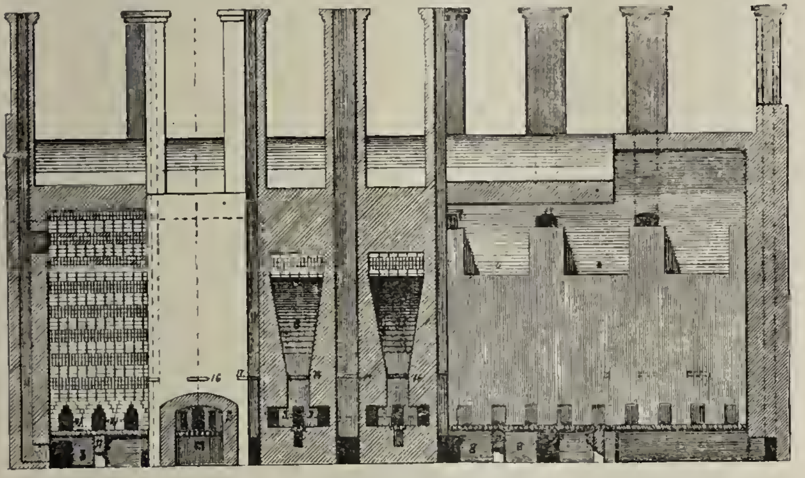
2. In a brick-forming machine operated by hydraulic pressure, a pressure controller, comprising a valve casing, having a series of receiving and exhaust chambers, one above another, formed by perforated partitions in the casing, a piston valve movable through said perforations, having one end enlarged so as to be self-moving by hydraulic pressure in one direction to instantly release the pressing devices and reverse their movement, high and low pressure chambers in said casing and communicating with certain of said first-named chambers, and a valve-controlled opening between the said two chambers, the valve controlling said opening being independent of the piston valve, substantially as set forth.

571,750. BRICK MACHINE. John Crabtree, Philadelphia, Pa. Filed Oct. 1, 1895. Serial No. 564,309. (No model.)

Claim—In a brick machine, a frame, a stationary mold on said frame, a driving shaft with a pinion thereon, a feeding device movable on a table above said mold, upper and lower vertically operating dies, a mutilated gear wheel meshing with said pinion and mounted in said frame mechanism connected with said upper dies and feeding device, respectively, and said mutilated gear wheel for operating the said upper dies and feeding device, a dog secured to said gear wheel near the mutilated portion thereof, and a dog secured to said pinion and adapted to contact with the first mentioned dog, and mechanism connected with the lower die and the shaft of said gear wheel for operating the former.

572,311. CLAY SEPARATOR. Phil S. Place, Alfred, N. Y. Filed Nov. 21, 1895. Serial No. 569,643. (No model.)

Claim—In a clay separator, the combination with the bin having a hood communicating therewith, of a pendent screen frame covering the open end of said hood and hinged thereto, said screen frame having a feed opening extending longitudinally through the same and also comprising a screen proper at one side of the feed opening and a plurality of deflecting slats on the opposite side, and a funnel carried by the hinged screen frame and adapted to direct the air blast against the deflecting slats, substantially as described.



572,474.

572,474. BRICK KILN. John T. Cullens, Edwardsville, Ill., assignor of two-thirds to John J. Coldiron and James Walter Wooten, same place. Filed May 28, 1894. Serial No. 512,587. (No model.)

Claim—The combination in a brick kiln of the plurality of direct leads from the furnace to the interior of the kiln, the openings being approximately equidistant apart, dampers in the said direct leads, the fire bags 6 expanded at their tops and provided with dampers, a plurality of chimneys opening from the upper part of the kiln and provided with dampers, and a plurality of chimneys provided with dampers leading from flues under the perforated floor of the kiln, substantially as described.

NIAGARA FALLS POWER.

The long-talked-of plans for setting Niagara Falls to work have finally been completed. Power was turned on at Buffalo, twenty-two miles distant, and its street-car system, heretofore run by electricity furnished by steam power, was, to the extent of 1,000-horse power, supplied by the Falls. The four dynamos in position are each of 5,000-horse power, so that there is a good deal of power left unused. But as it can be furnished much cheaper than electricity which is the product of steam from coal combustion, the present experiment at Niagara uses only a very small proportion of the power which for uncounted thousands of years has gone to waste. Ultimately several hundred thousand horse power will be taken from Niagara, and that without appreciably lessening the beauty and grandeur of the Falls, which, ever since they met human gaze, have astonished the world. Those who attend the coming N. B. M. A. Convention at Buffalo, Feb. 2-5, will have an opportunity of viewing these wonders of nature and mechanics.

A NEW EXPERIMENT AT GALESBURG.

Contractor J. B. McAuley threw open to the public yesterday the new strip of pavement on West South street. This pavement is one-half mile long, is thirty feet wide and has stone curbing. It differs from all the other pavements in the city in that it consists of but a single course of brick. This is an experiment, the other pavements consisting of two courses. Of course, it is still too early to say whether the one course of brick placed edgewise will stand the strain of travel and of road upheavals in the spring. Thus far the heavy traffic has not affected it. Contractor McAuley is of the belief that it will stand.—Galesburg Register.

THE BRICK AND TILE MANUFACTURERS OF ILLINOIS TO MEET AT GALESBURG, TUESDAY AND WEDNESDAY, JAN. 19 AND 20.

The Nineteenth Annual Convention of the clayworkers of Illinois, which will be held Jan. 19 and 20, at Galesburg, promises to be one of the most successful meetings in the history of that old-time association. The paving brick interests at Galesburg are very extensive, and the local manufacturers, headed by the Puringtons and Andy Harrington, are going to do their utmost to make the visitors happy while there.

Secretary Stoll predicts a large crowd. He has arranged the following excellent programme:

—Tuesday, Jan. 19, 10 A. M.—

Call to order.
Enrollment of members.
Reports of members.
Report of the Secretary.

—Afternoon Session, 1:30.—

Address of welcome, by Hon. J. J. Tunnicliff, Mayor of Galesburg.

Annual address, by President F. Plumb, Streator, Ill.

"The Preparation of Clay," by E. L. Hathaway, Macomb, Ill. Discussion.

"Clay Cisterns," by H. F. Townsend, Avon, Ill. Discussion.

"A Convenient Factory," by J. A. Wilson, Pawpaw, Ill. Discussion.

"Terra Cotta," by Albert Warren, Galesburg, Ill. Discussion.

"The Use and Advantage of Hollow Brick," by J. M. Mamer, Campus, Ill. Discussion.

—The Social Feature.—

A banquet will be given by the brothers of the craft at 7 o'clock, Jan. 19. D. V. Purington, Chicago, Toastmaster. Music by H. F. Townsend, Avon, Ill.

—Wednesday, Jan. 20,—

From 8 a. m. to 1 p. m., will be devoted to a visit to the clay industries of Galesburg, through invitation of the Reception Committee.

—Afternoon Session.—

"Coal vs. Oil," by W. S. Purington, Galesburg. Discussion.

"Clay vs. Cement for Sidewalks," by B. F. Townsley, Aledo. Discussion.

"Thorough Tile Drainage," by F. A. Martin, Mazon. Discussion.

"Paving Brick for Country Roads," by Prof. McClanahan, Monmouth. Discussion.

Report of the Treasurer, Wm. Stare, Mendota.

Report of Committee on Resolutions.

Election of officers.

Questions read and discussed.

Headquarters for the Association will be at the Union Hotel, where special rates have been secured.

F. PLUMB, President, Streator, Ill.
G. C. STOLL, Secretary, Grant Park, Ill.

Written for the CLAY-WORKER.

PRIMITIVE CLAYWORKERS.

Their Crude Products—A Coat of Clay as a Burial Casket.

BUT SOME few centuries since, to believe in the antipodes was deemed heresy, and later on, within the lifetime of most readers of the Clay-Worker, popular pulpits fixed the work of creation at six days, each occupying twenty-four hours. The Christianized Mexican Indians, who in November of 1895 took pagan Indians—men, women and children—from their beds at night, first putting them in jail before burning them to ashes to convince them of error in belief, finishing the performance with grotesque native dances round the embers, are but a picture of those who insist on America's discovery by Christopher Columbus. That thinking men should be found to believe in the path of a prehistoric northern race via, say, Iceland to this continent, then through Ohio to Mexico, is, in the eyes of some people, a vision of fairyland.

The origin of the Aztecs and Toltecs is unknown, but legendary. Of their coming in force from the north we are assured by tradition, even as always the northern hordes have overrun the plains of India from the hills. The well-known descriptions of the curious temples of the Natchez and Taesas need not be quoted as proof, or the perpetual fires kept therein. The custom of offering as a sacrifice the first fruits of the returning spring, or heat in nature, so well known to have existed in the temple at Cholula, on whose slopes the native believers in the Heart of Heaven made their best stand against the invader, and on whose summit in the Catholic Church the writer once saw poor Indians bringing in the first fruits of their little gardens, till it looked inside the altar rail like a well-filled vegetable cellar; the almost arbitrary despotism of the Grand Chief, or Sun, accounting for their giant earthworks, etc., and last, but not least noticeable, their hereditary aristocracy transmitted through the female side of the family—a remaining myth, perhaps, among prehistoric Americans of the Wise Women of the Mighty North.

Some of the early descriptions of Louisiana and the Red River country at the time of the four French brothers, Le Moyne, Sherville Bienville, Serigny and Chateauguay, contain matter too long for insertion here, but to the point. Nor must we forget, in connection with this, the wonderful prehistoric mining in the copper country of Lake Superior, and also the knowledge on the part of the prehistoric Danes of smelting copper and alloying it with a certain fixed percentage of tin to form bronze, as shown in the magnificent collection of bronze implements in the Museum at Copenhagen.

The first instance of prehistoric weaving in Europe is from the lacustrine constructions on the Swiss lakes, while weaving has been found on the mummy cloths of Utah and the West, and among the Mound Builders generally on this continent.

The gravel beds of Colorado and Wyoming, on this continent, however, like the valleys of the Somme and the "finds" of the European Cave Dwellers, give conclusive proof of the existence of man on both continents contemporary with the great pachyderms.

But with all other objects of the past, except that of its clayworkers, may we truly be compared to children playing on the seashore, picking up here and there a smoother or prettier shell, while beyond stretches out an expanse over which hang clouds, and, yet beyond, the impenetrable horizon of conjecture.

Col. Whittlesey, one of the keenest writers on prehistoric America, classifies all these old works into three great divisions, and assigns their construction to three distinct nations: First, those of the Ohio valley, which he assigns to what he believes to have been an agricultural nation; second, those of the fortification builders on the lakes, as those of the military nation; third, those between the Mississippi and Lake Michigan, as those of the effigy nation.

Now, when the future Australian on this continent, after our existing civilization shall have disappeared, disposed to divide the past, he would find, perhaps, remains of fortifications on the two coasts, on the Atlantic and Pacific, either in stone or earthworks of a later date, which he would not find in the interior of the country.

Now, if we follow the idea of a prehistoric settlement via Greenland and Iceland via the lakes, naturally the remains would be at first those of a people on the defensive and the warrior class, whereas as they went south and became a trading or agricultural nation, increasing in numbers and adding the wealth and family acquired, perhaps, from the tribes they overcame, the remains, as they are, can all be accounted for as the southern march of one people changed by their surroundings.

This view seems the more probable inasmuch as the ancient works in New Mexico and Arizona seem to be unlike the rest, and more likely to be of that race who came from the Pacific and drove out the Mound Builders from the Mississippi and Ohio valleys down to Mexico, many of these last being of solid masonry.

But a few evenings since, by the favor of Mr. Reau Campbell, of Chicago, I was shown some to-date-unpublished photographs taken by him lately of some ruins in old Mexico near some of the railroad lines which Americans have built into that country, connecting its old capital with Chicago, and over which tourists are now conveyed in palace cars by obliging guides. One view especially caught my eye, "The Arrival of the Tourists at the Ruins"—the up-to-date crowd from Chicago and the without-date massive Mexican stone ruins, while philosophically regarding both were descendants of that Indian race who, while friendly to all white people and others, still insist on living exclusively by themselves, neither adopting the habits of others nor intermarrying with them, anticipating in some way, with the new order of things, a return to them of the prosperity which their traditions commemorate as belonging to the Montezuma era, and which they believe will again come to them with the recoming of the blonde race and white-bearded men from the north. Among the views, also, was a wall with a "Moorish" pattern projecting from its regular surface, no mortar, apparently, being used in its construction.

ZUNI INDIAN WATER VESSEL.

There is one other peculiarity—that while the Atlantic coast possesses hardly any remains of the Mound Builder race, they penetrated into North Carolina from the West after mica, following the Tennessee river. Many of the tombs or burial places in Tennessee have been formed by covering the body with a thick coat of clay or plaster, then building a fire above it, the cast of one beautiful female arm having come down to us intact in this way.

When I say the Atlantic coast has no remains of the Mound Builders, I do not forget the mound in the Kennebec valley, Maine, which is rather proof for than against the theory where these people came from.

The Dolmens of southern Utah may be the limit in that direction of their Western migration before they met the oncoming hordes from the Pacific, who finally overwhelmed them. Traces of the existence of these last people were found near Olympia, and examined by engineers of the Northern Pacific railway, but I am unable yet to send photographs of the pottery found there, though I have been promised them for an article for your publication. Up the Yellowstone and two hundred and fifty miles up the Big Horn river are the ruins of mound cities yet properly unexplored, but with well-known peculiarities, like those still existing in Wisconsin.

Two things certainly the race had an eye for: where to look for pay dirt, and successful cultivation of the country they overran or occupied. The copper mines of Lake Superior, the lead mines of southern Wisconsin, mica in Carolina or salt in Louisiana, all were known to them. When the writer first saw the Northwest an apple was rarer than it is to-day, and peaches were like the girls—among the things we left behind us. Yet since then the peach-orchard section of Michigan has been created where the garden beds of the Mound Builders were before the Scotch gardeners, while in lower Wisconsin and the interior lake section of this State, "the old garden country" of these people, at one time held useless for fruit or peach culture, has now become useful for this purpose by simply piling snow or ice round the roots of the trees in spring, preventing the too rapid budding and loss by late frosts. Whether the race understood salt-glazing pottery is a somewhat doubtful fact, the specimens said to have been found in the shell heaps in the "Tuckpaw" country in Louisiana having been lost in the Chicago fire, years ago.

There is one thing peculiar in the chain from the lakes and the St. Lawrence to Palenque and Copan, namely, the absence, in a great measure, of warlike implements in the graves of the race, and in most of them, as was the case at Aztalan, Wis., the dead are found in a sitting posture "according to the fashion of the Greeks," as described in Herodotus, cremation, as well as tumuli-building, being practiced by the Celtic and Scandinavian races as well as by the classic Greeks and Romans. Unlike these much-lauded peoples, among the pottery of the Mound Builders, while the human figure is not unfrequently used as a decoration, both modeled and incised, seldom, if ever, is found the obscene and beastly thoughts of classic and continental Europe. So, judging them by their works, they were clean thinkers.

In connection with the theory that the Mound Builders came by water to Lake Superior, note that it was as likely as that he should go through the unbroken forests (now Wisconsin) south to Ohio as that they should come from Ohio, after office or copper mines, to Lake Superior, as some Eastern writers think was the case.

The climate, too, was more likely to tempt a race from Iceland south than for a southern race to come north. For, admitting that, as is sometimes claimed, they were simply summer tourists in our mining and lake country, returning every fall to tell fish stories, they must have been quick workers in the short season, for there is hardly a vein on the lake that they did not know of, as is amply proven by the remains they have left for the miners of our day on Isle Royale or the mainland.

The Indians of New Mexico to-day claim that Montezuma was born in their country, founding pueblas as he moved south; the Aztecs, it is estimated, moving into the valley of the Anashuac but three hundred years before the Spanish Invasion, not yet at that date having had time to consolidate the empire, its disruption being only through the alliance with the Tlascalans and the services of the Ewige Weibliche Malinche.

The knowledge of the solar system, the causes of eclipses and the learning and arts of the City of Mexico at the time of the Invasion are more likely to have originated with the conquered Toltecs, a people identical with the Mound Builders of the lakes and Mississippi, than with their Aztec conquerors. The race who built in Mexico the terraced pyramid of Cholula, 172 feet in height, with a base of 1,335 feet (nearly double the measurement of the greatest pyramid of Egypt), and covering 45 acres, or the mound of Cahokia, in the Mississippi valley, possessing neither horses nor knowledge of the use of iron, must have been in condition of civilized slavery in some form under a general government, and have long passed a mere tribal free wandering existence; the date of Egypt, the rice of India, being supplied by corn on this continent; seed time and harvest being the Mound Builders' means of existence rather than that of the more precarious chances of hunting and fishing. The builders of Palenque, Copan, Uxmal and Mitla, superb in their forgotten forests, were long beyond the Isaac Walton state of civilization.

The serpent symbol, whose presence so inflamed the American filiale of the Inquisition, appears to have been common property of the Mound Builders alike in the serpent mounds of the Northwest or the stone carvings of Mexico, the Natchez appearing to be the connecting link on this score between the Mound Builders and Nalmas. Approaching Mexico via Texas, the truncated pyramid of the Mississippi valley becomes more and more in resemblance the Teocalli of Mexico, especially as you approach the Rio Grande, the works being more recent in Texas and Louisiana as compared with those of the lake region, and while the copper tools found there may have been taken there with the builders, it is still doubtful if summer travel to and from Lake Superior existed then as now.

Head Vase, Arkansas.

But if this sacred meeting place did exist then, it was in the Wisconsin of to-day! The savage, who has to have an actual visible god, dressed in church millinery, would naturally erect the animal mounds where the holy places of the pilgrimage existed. Whether it is a Babel, St. Peter's, St. Paul's, an Egyptian or a great American pyramid, the priestly principle is the same then as now, namely, erecting an edifice higher than that of the dwellings of the worshipers.

As the animal mound gave way to architectural beauty and utility in the lower Mississippi country, dried brick take the place of mere earthworks. In some instances stone is introduced on the border of Mexico's superior civilization, and the architectural chain of the people's wanderings and intellectual improvement is complete.

RICHARD G. FRACKELTON.

The above illustrations are from Edwin AtLee Barbers' "The Pottery and Porcelain of the United States."

TUESDAY TO FRIDAY, FEB. 2-5, 1897.

It's now generally known that "all work and no play"
Doesn't suit the up-to-date worker in clay,
Who knows for a fact nothing better will pay
Than a few days spent with the N. B. M. A.;
So mark well the date, pack your grip, and away
To Buffalo for a brief holiday.

—T. F. S.

OFFICIAL ANNOUNCEMENT.

Eleventh Annual Convention of the National Brick Manufacturers' Association to be Held in Buffalo, N. Y., February 2, 3, 4 and 5, 1897.

To Members of the N. B. M. A.:

AS PREVIOUSLY ANNOUNCED, our next yearly meeting will be held at Buffalo, N. Y., the first week in February, beginning Tuesday, the 2d. Buffalo's central location and unexcelled railroad facilities and excellent hotels make it pre-eminent among great convention cities. This, coupled with the fact that it is but an hour's ride from Buffalo to Niagara Falls, the greatest of America's natural wonders, which presents a more beautiful and impressive appearauce in midwinter than at any other season, will make the Electric City, as newly christened, a most desirable place of meeting for our entire membership.

The meetings will be held in the main hall of the Builders' Exchange, which is but a square from the new Tifft House. The latter will be headquarters, where delegates and those accompanying them will be accommodated at the following special rates, on the American plan only: $2.50 and $3 a day for rooms without bath, and, with bath, $3.50 to $4 per person, according to location of room, two or more to a room.

—Reduced Railroad Rates—

Have been secured on the certificate plan; that is, delegates and those accompanying them, if they pay full fare going and take a certificate for same from the ticket agent, will be entitled to return tickets at one-third regular rate, making two-thirds rate for round trip. Those starting from small towns should make inquiry of local ticket agent a few days in advance, to insure the receipt of proper certificate. Where same cannot be obtained, be sure to take a receipt for full fare paid, bearing stamp of agent, who should state that the receipt was given in lieu of certificate, he being out of blanks.

The programme, which has not yet been completed, will include the following addresses and essays, each to be followed by general discussion of the subject under consideration:

—The Programme.—

"The Old, Old Story"	O. J. Swegles, Buffalo, N. Y.
"Clay in Architecture"	Henry R. Griffen, Phoenixville, Pa.
"Brickyard Ethics"	T. P. Plumridge, St. Louis, Mo.
"Some of the Essentials to Success in Making and Marketing Paving Brick"	Geo. F. Cotton, Table Rock, Neb.
"After the Brick Are Made—What?"	F. H. S. Morrison, Richmond, Va.
"Burning Brick"	H. L. Boas, Reading, Pa.
"Brickmaking—Old and New"	Brian J. Dunn, Bangor, Me.
"Brickyard Management"	Frank Alsip, Chicago, Ill.
"The Clay Resources of New York"	Prof. Heinrich Reis, New York City.
"Difficult Problems in Brickmaking"	Geo. C. Hicks, Boston, Mass.
"Using Heat from Cooling Kilns for Drying Purposes"	Robert Lyle, Perth Amboy, N. J.
"Success of Business as Affected by Geographical Conditions and Lack of Mutual Understanding	H. H. Fernald, Boston, Mass.

—Debatable Questions.—

"Are Brick Dwellings Cheaper in the Long Run than Frame Houses? How Can We Demonstrate the Fact to Home Builders Most Effectively?"

"Is It Most Profitable to Dry Brick Before or After They Are Set in the Kiln?"

"Should a Brick Plant Be Constructed so as to Utilize Natural Heat for Drying During Summer Season?"

"What Must Brickmakers Do to Be Saved from Bankruptcy?"

"Does It Pay to Use Fire Clay Mortar in Kiln Building?"

"Is a Vitrified Brick Suitable for Building Purposes?"

"Is It Advisable to Combine the Manufacture of Roofing Tile and Brick? Can It Be Done Without Much Extra Expense?"

"What Is the Proper Way to Take a Fair Sample of Clay for Analysis or for Test?"

"Does It Pay to Soak Clay Which Has Been Ground and Screened Before Pugging It, Where the Product Is Stiff Mud Brick?"

"Can Whitewash Be Prevented from Coming on the Surface of a Green Brick by Varying Its Treatment in a Drying Tunnel?"

"What Is the Cause of Black Cores in a Red Brick Which Is of a Normal Color Outside?"

"Where Can Paving Brick Be Sorted to the Best Advantage—in the Kiln or on the Yard?"

"Is Efflorescence on a Brick Wall Ever Due to the Kind of Mortar Used?"

"Which Principle Is Better for Burning Common Brick, Up-Draft or Down-Draft?"

"Which Process Is the Better for Drying High Grade Building Brick, Direct Heat or Radiated Heat?"

"What Is the Best Construction of Walls for Down-Draft Kilns?"

"What Is the Best Arc of Circle for the Crown of an Oblong, Square, Down-Draft Kiln?"

"Under What Conditions Is the Tight Floor of a Down-Draft Kiln Better than the Perforated Floor, and Vice Versa?"

"What Will Be the Effect Upon the Dry Press Process of the Increasing Demand for Face Brick Made by the Mud Process?"

"When, if Ever, Is the 'No Admittance' to Brick Works Advisable?"

"Capital Sunk in New Brick Plants—Can It Be Prevented?"

Brickmakers of the United States and Canada are all cordially invited to attend the Convention and participate in the good work. Those desiring information relative to requisite of membership, etc., are requested to address the Secretary at Indianapolis.

THE EXECUTIVE COMMITTEE.
T. A. RANDALL, Sec'y. R. B. MORRISON, Pres.

LAYING BRICK IN WINTER.

In a German contemporary there is given the particulars of experiments carried out at Riga with a view to testing the durability of brick work constructed in frosty weather. It was found that brick work erected during the cold season, using ordinary mortar prepared with warm water, proved very unsatisfactory in point of resisting power; nor was any improvement effected by dissolving in the water one-half per cent. of calcium chloride, but excellent results were obtained when the warm water contained 1¾ per cent. of common salt. The addition of freshly slaked lime to ordinary mortar gave satisfactory results, but better results were obtained by the exclusive use of freshly slaked lime, especially when used in conjunction with calcium chloride. It was found, too, that an admixture of Portland cement with common mortar increased its resisting power to frost. The best results were obtained with a mixture of Portland cement and five parts sand.

RUBBER ROADWAYS.

India rubber, in spite of its growing scarcity and expensiveness is meeting with favor as a paving for streets. It was first tried on a bridge in Hanover a little more than a year ago, and has proved so satisfactory that experiments with it for ordinary roadways are being made in Berlin and Hamburg. It is said to be perfectly noiseless, unaffected by heat or cold and less slippery and more durable than asphalt.

Written for the CLAY-WORKER.

DEVELOPMENT OF THE AMERICAN BRICK.

—Among the Quakers.—

WHERE IS THE man engaged in brickmaking who has not heard of Philadelphia pressed brick, which for years past have been considered the standard of excellence?

In the first numbers of this series the author gave a brief account of the early attempts at brickmaking in Philadelphia, and will therefore omit the matter already given from this article.

Fifty years ago there was a brickyard doing a good business at the corner of Twenty-first and Market streets, extending to Chestnut street, where common, ordinary red brick were made, where the pug mill had never been thought of, but the clay was tempered by being well trodden by bare human feet. But what a change! To-day there are hundreds of modern equipped yards situated at or near Philadelphia, turning out annually hundreds of millions of brick. Just a brief mention will suffice to show how brickmaking is being developed in this section.

Head and shoulders above the others comes Murrell Dobbins, who is worth between two and three million dollars, and owns four yards, turning out annually fifty million bricks per year, and best of it all is he sells them. To say that Mr. Dobbins is up to date is presumptuous, and as an advertiser he is unique as well as successful. One Christmas Mr. Dobbins sent out a beautiful mottled brick, in a nice box, to every one of his customers. Later in the day he sent around a bottle of Mumm's "to wash down the brick."

Then there is the Siner Bros., Charles and Joseph, who own two yards, one on Kensington avenue, also one on Harrowgate lane, and make fifteen million brick yearly. This firm, which was started by the present owner's father, has been making brick for over twenty-five years, but they still have seventeen acres of clay untouched. Siner Bros. are the fourth generation of the family who have been brickmakers, and they are proud of it, as well they should be. They use the latest Martin machinery.

The Flood Bros., on old Front street, are practical, up-to-date brickmakers. They have a nice, clean yard, where they turn out fourteen million brick annually.

H. C. Carrol & Co., Sixtieth street and Haverford avenue, enjoy the reputation of paying good wages to their help, even the boys in their employ getting $1.50 per day. Their daily capacity is about 130,000 brick.

Then there are the McCays and a hundred others whom I might mention, who are keeping abreast of the times, and are constantly on the lookout for new methods or machinery which will tend to bring to a higher degree of perfection the art of brickmaking.

So much for Philadelphia. We will now turn our attention to other sections of the State. At Wilkesbarre brick were made as early as 1804 by Mr. Harris Hamlin, near the corner of what is now Canal and Union streets. Two houses are still standing which were built with bricks from this yard in 1806. If these brick, made ninety years ago, will stand so well the ravages of the elements, how long will the modern brick endure?

The brick industry in Wilkesbarre grew from that humble beginning, step by step, until 1871. Mr. William Dickover, who had started a yard the previous year, decided to give up the antique process of hand molding, and accordingly put in a horse-power brick machine. In 1883 Mr. Dickover took his son George into partnership under the firm name of Wm. Dickover & Son. They bought a large bed of clay and put in a Martin machine, introducing steam power, and built permanent kilns for burning with coal. These were the first kilns built in the coal regions to burn anthracite coal. The next season they put in a disintegrator and abandoned the soak pit. The next year a hot-air drier was introduced and iron cars and pallets. The bank of clay which was bought in 1883 has become nearly exhausted, and the lot will soon be filled up and used as residence cites. When this change occurs Mr. William Dickover will retire from business, having reached the advanced age of seventy-seven. His son will continue to carry on the business, however, and has already started another yard, where he will turn out annually about eight million brick. In this plant he uses a soft-mud machine, disintegrator and hot-air tunnel drier, while the clay is hauled up an incline in cars by a winding drum. Mr. Dickover has a large portion of his clay bank under an immense pile of culm (coal screenings), which is quite fortunate, as he uses culm for fuel.

Owing to lack of space the progress of brickmaking in Pennsylvania will be continued in the next number.

While our forefathers were preparing for the war of the revolution, in the early seventies of the eighteenth century, Jacob Egge and John Nonnemacher, of Allentown, were busily engaged in brickmaking, and although their business came to a standstill during the trying days that the war continued, they still stuck to their brickyard, and eventually reaped a liberal reward for their persistence.

From the first yard, which was situated at what is now Sixth and Linden streets, the brick industry of Allentown has been developed to its present state by different men, all seeking to raise to a higher standard the art of brickmaking.

Works of the National Brick Co., Bradford, Pa.

Eight years ago two bright young men of Allentown, Jacob W. and Albert P. Grim, established a brickyard. These gentlemen had the business sagacity to realize what a favorable opportunity was afforded for the investment of capital and business energy in the manufacture of common brick. They selected as the site for their enterprise a locality in South Allentown, admirably adapted for the manufacture of common brick, where they purchased a tract of land containing thirty acres of fine clay. This deposit is of great depth, and is practically inexhaustible. In the equipment of this plant no expense was spared to make it modern in every respect. Two boilers of 120-horse-power furnish steam to the two Corliss engines which drive the machinery. They have three large up-draft kilns and ten drying tunnels, which, by the way, contain twenty-four thousand feet of inch pipe, through which the heat is conveyed. A siding from the Lehigh Valley Railroad runs direct to the works, and affords every facility required for the convenient shipment of their product.

From thirty to forty hands are employed. The trade extends through Pennsylvania and the East, and the extent and importance which it has already reached show conclusively the sound business judgment of the enterprising firm.

—An Enterprising Concern.—

The Williamsport Brick Company, at Williamsport, has been in existence only seven years, but by their enterprising spirit and rare business ability they have competed successfully with the oldest yards in the country, and their bricks may be seen in buildings in New York, New Haven, Conn., Boston, Philadelphia, Baltimore and Chicago. At the World's Fair they received a gold medal for their fine exhibit.

They make only fancy shades of brick, such as buff, granite, coral, Pompeiian, grays and white mottled, in standard and Roman sizes. This concern is not satisfied to run only seven or eight months of the year, but keep their fires going the year round, and turn out twenty thousand fancy brick per day.

—Bradford Brick.—

This well-known brick is made by the National Brick Company from pure shales, without coloring matter of any kind. The works are situated at Lewis Run and Bradford, on the lines of the Erie and B., R. & P. Railways.

These brick are claimed to be free from lime, magnesia, saltpeter and various other ingredients which produce discoloration after being laid in the wall. They are burned in combination up and down-draft kilns with natural gas, consequently there are no fire marks or discolored surfaces when exposed to the heat and flame, producing a brick with ends and faces equally good, which is appreciated by builders as an advantage on account of having two chances to use a brick, where, with only one face, a damaged brick renders it useless for fine work.

In a test by Maj. J. W. Reilly, U. S. A., the following results were obtained: The compressed surfaces were faced with plaster of paris to secure even bearings in the testing machine. Using the No. 1 red, hard-burned brick, the first crack was produced at 670,000 pounds, while the ultimate strength shown was 800,000 pounds, giving a strength per square inch of 24,875 pounds. Absorption of water, after being immersed one week, 5.6 per cent.

The annual production of this plant is about four million brick, and all find a ready market.

—Other Well-Known Plants.—

The clays of the Ridgway field were first located and worked by Mr. W. S. Ravenscroft, who built the Shawmut plant in 1891 and the Ridgway plant in 1893. In an interview, Mr. Ravenscroft, who is the General Manager of the company, said: "Both plants are doing all they can. Ridgway is turning away orders all the time. I am about to build another buff brick plant here. This is a most inviting territory."

These brick were used in the new Park Building at Pittsburg, a fifteen-story structure.

The capacity of the two yards is six million, and the plants are equipped with dry press and stiff mud machines. The natural color of the brick is that of yellow pine, and, using this as a base, any color desired may be produced.

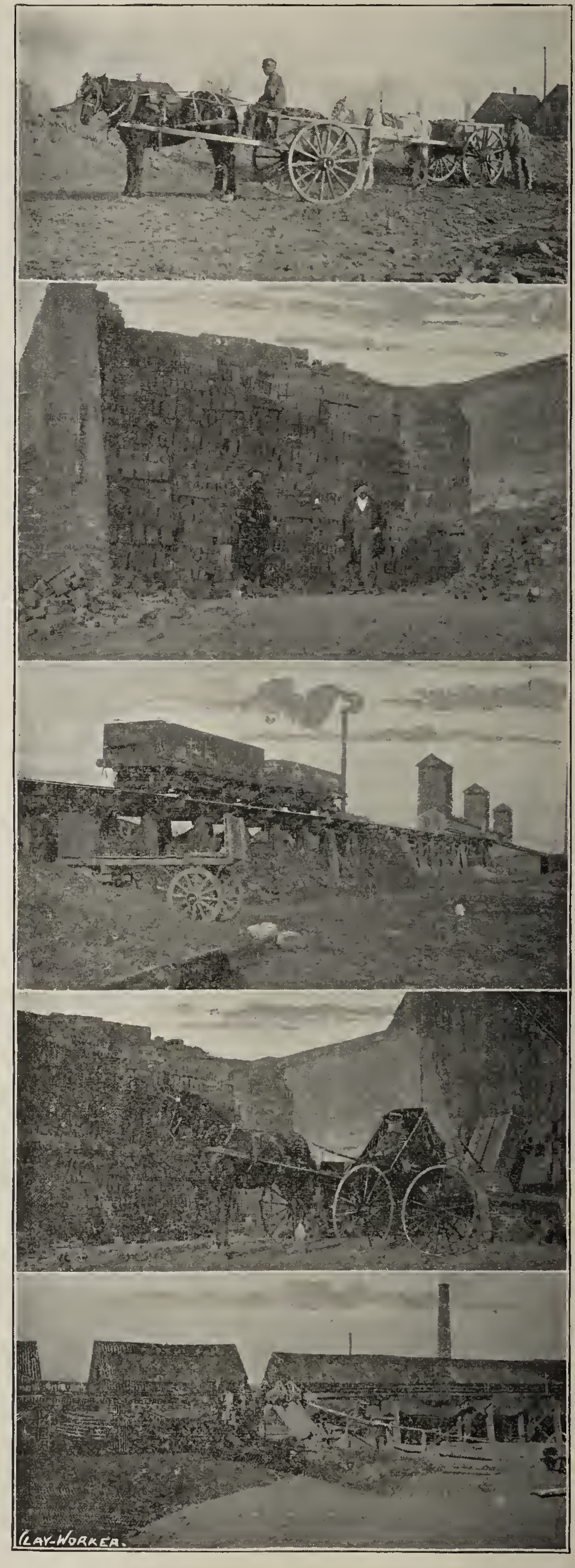
At New Castle is the yard of M. S. Marquis, who makes forty thousand brick per day, using a dry press and stiff mud machine.

There are also extensive works at Harrisburg and Pittsburg and hundreds of small yards in the country towns, all of which are constantly advancing by introducing new machinery or experimenting with new ideas, and becoming each year more proficient in the science of brickmaking.

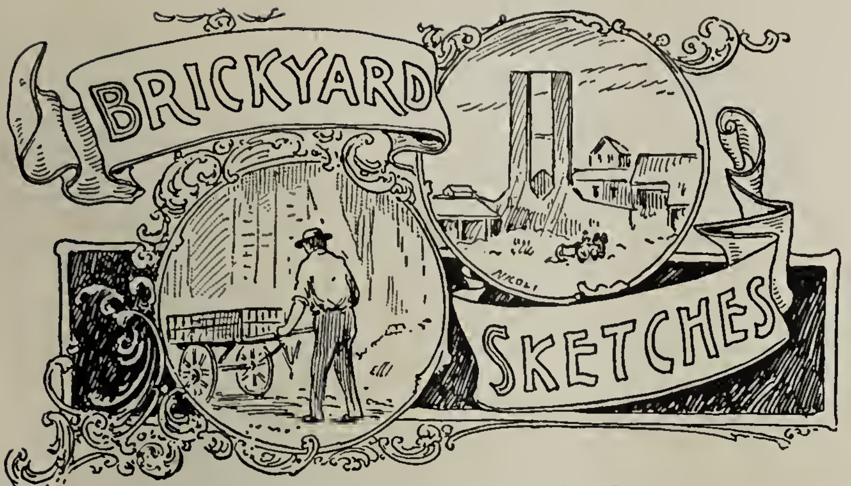
R. N. BUELL.

WHY TILE DRAINAGE PAYS.

There is one method by which underdrainage changes the temperature and condition of the soil. The soil, having been rendered more friable and porous by carrying off the surface water, it is also in condition to allow the rainfall to pass easily and quickly through from the surface to the drain below. In this passage of the rain through soil and subsoil the heat or warmth in rain is carried downward and absorbed by the soil or subsoil. As this absorbent force is always more effective in the ratio of the porousness of the soil, it follows that all the warmth of a summer's rain, instead of being wasted by radiation and evaporation, may, by a judicious system of tile drainage, be stored away in the soil below, and reappear in the increased quantities and improved qualities of the grains, grasses and fruits to reward and bless the husbandman for his toil. —Ex.



At Brush Bros. Plant—Gathering the Clay—An Outside Kiln—Bringing in the Coal—Grandpa Brush and His Favorite Sorrel—A section of the Summer Plant.



IN AND ABOUT BUFFALO.

"MILLIONS OF BRICK FOR SALE" is the rather unusual announcement that meets the eye of those who visit the down-town office of Brush Brothers in the Builders' Exchange. It is an uncommon phrase even among brickmakers, and so attracts attention. Few persons pass the door upon which the announcement appears in bold letters without observing it, and as all the busy builders of Buffalo are frequenters of the Exchange, which is just across the hall, it is really a good ad., and the Brushes believe in advertising. Several years ago they adopted this expression as a sort of trade mark. Upon every wagon and car which hauls their brick is tacked a diamond-shaped card bearing these words and the firm name, so that the builders of Buffalo and vicinity are not permitted to forget that Brush Bros. have "Millions of Brick for Sale."

This is one of "The Keys to Success in the Brick Business," a theme upon which Wm. H. Brush discoursed ably at an N B. M. A. convention several years ago. That he holds the whole bunch is apparent to all who come under the spell of his jovial presence. A young brickmaker said to the writer recently: "That is a good card for the Convention in the November Clay-Worker; I mean Brush's letter and picture. If all the brickmakers of Buffalo are as jolly as he looks, I wouldn't miss the Convention for anything." We assured him that the rest of the brickmakers of Buffalo are all right, and that he who misses the Convention will miss a good time.

The firm of Brush Bros. is an old one, all of the boys (there are three of them) having grown up in the business, which was begun back in the fifties by their father, Wm. C. Brush, who, though nearly eighty years of age, still takes an active interest in the management of the work, going to the yard almost every working day in the year. He and his splendid sorrel, which he has driven for several years, and which, like himself, seems not to grow old, are familiar figures to all identified with the city's building interests.

Mr. Brush, Sr., began working on an old-time hand yard when a boy, and in a few years started a small yard of his own in what is now the heart of the city. Of a generous and enterprising disposition, he has usually been the first to introduce improved machinery, etc., and his experience along this line during the past thirty years would make a large book. In 1860 he put in a Vervalen soft mud machine, the first of the kind used in that section.

The man whom the maker sent with the machine couldn't make it work satisfactorily, bothered with it for several days to little purpose and was then called home. Mr. Brush and the boys, who were then fledgelings, took it in hand, and by changing the speed slightly and releasing the pressure on the molds made it work very well. This was a valuable lesson to them, and instilled the idea that with a little patience and care failure may be turned to success. This is certainly true of the brick business. Many good machines are pronounced failures simply for the want of skill and judgment on the part of the operators, who ofttimes are supposed to be experts.

As may be readily imagined, they have at different times occupied and made brick from ground that is now covered by costly structures for both business and resident purposes. The present plant includes some seventy acres skirting the city limits, and but a few blocks from the terminal of an electric car line. It is the most extensive plant in western New York, and in the summer season has a daily capacity of more than 200,000 brick, made on two Monarch and seven Martin machines. The clay bank averages from eight to twelve feet in depth, and is hauled in carts and dumped into soak pits, which are ten feet wide, twenty-five feet long and three and a half feet deep. There are two of these pits to each machine. Each holds enough clay for a day's run (20,000), thus allowing the clay to soak twenty-four hours, by emptying and filling alternately. An elevator about fourteen inches in width extends from pit to top of machine.

The brick are dried chiefly by the rack and pallet system, this part of the yard having a capacity of a million brick. In addition to this, they have a hot floor dryhouse, 68 by 120 feet. The floor is made of quarter-inch iron plates, 4 by 10 feet, the edges and center of which rest on 2 by 4 stringers. Two-inch pipes are laid ten inches apart beneath the iron plates. Exhaust or live steam, as the temperature may require, is turned into the pipes, and heats the floor sufficiently to dry the brick rapidly but safely when they are laid on the flat. The foundation for the floor was made by leveling the ground and covering with a single course of brick on flat, flushed with cement. Desiring to increase their drying capacity, they have put pallet racks on this floor, and are now using the latter system, exhausting the moist air from the room by fans furnished by the American Blower Company, of Detroit.

The bulk of their brick are burned in common up-draft kilns, though they have four square down-draft kilns, holding 100,000 each, and a fourteen-chamber Wilford continuous kiln. The square kilns were intended for front and ornamental brick and for special rush orders. To expedite the cooling process a series of little chimneys were built over openings in the center of the crown, on the theory that they would induce better draft, and so cool the kiln quicker. This they found fallacious, so they will not repeat the experiment. The continuous kiln was built in 1895, under the direction of Mr. Wilford, the inventor. Each chamber holds 30,000 brick, and they burn one chamber each day, using slack or fine nut coal, which is fed into small holes through top of kiln.

One of Schmidt's Machine Gangs.

The brick are dried off or watersmoked by the heat from cooling or burning chambers, the latter being about three chambers behind the green brick. The heat is first introduced through the eyes at the bottom of kiln, over which is placed a sheet of thin but tough paper, which is burned away when the damper is opened connecting chamber with hot-air flue. The

Geo. Schmidt's Office, Brickworks and Family Nag.

heat radiates to top of chamber, and when brick are hot enough to ignite coal dust (red heat), dampers may be shifted and fuel fed in from top of kiln. The brick are burned hard with a remarkably small amount of fuel. For common brick the system is effective and cheap, but it won't do for face brick. An expensive feature of the continuous kiln is the great stack, or chimney, which is 115 feet high and 12 feet square at base, the flue being 4 feet square in the clear from bottom to top.

A large portion of the product of this plant is shipped by rail, and where their track joins the main line the railroad has located a general coaling station, which affords them cheap fuel.

—Geo. W. Schmidt's City Yard.—

A few blocks from Brush's plant is the yard of his "side partner," Geo. W. Schmidt, who is a good mate, being one of the kindliest men we ever had the good fortune to meet. They have attended the N. B. M. A. Conventions together for several years, and are more like brothers than competing brickmakers. Would that this Damon and Pythias spirit might develop generally among the brickmaking craft! Then the cry of poor prices would not be heard on every hand.

Mr. Schmidt was born in Buffalo in 1851, and started in the brick business for himself in 1872, making by hand. Then a gang of five men molded and put on the yard 8,000 brick a day. The brick were made on leased land, for which 15 and 20 cents a thousand brick, made and burned, was paid. Afterwards the price was advanced to 25 cents a thousand. Hence, but little capital was required, and Mr. S. is of the opinion that brick were made cheaper then than at any time since. He now makes about 8,000,000 a year on three Martin machines, dries by pallet and rack system, and burns in the "poor man's" square kilns, setting forty-five to fifty high. This kiln he thinks, all things considered, the best and cheapest for common brick. He builds them thirty-six feet wide and usually fourteen arches, giving a capacity of about 350,000. The lower part of the wall is twenty inches thick. From about seven feet above the bottom the wall is tapered gradually to eight inches at top. This part of the wall (5 feet) is laid dry, or without mortar, and daubed with clay mortar.

The furnaces are built against the wall, but are not tied into it, so they may be repaired or rebuilt without affecting the wall. He burns with coke and run of mine coal in from ten to twelve days. Mr. Schmidt has the reputation of making as good common brick as can be made by the tempered clay process.

A few minutes' walk from Mr. Schmidt's yard is the works of Henry Dietschler & Sons, which have an annual capacity of six million common brick, made on Martin machines, dried by rack and pallet system and burned in common scoved kilns. Henry Dietschler, Sr., is an old-time brickmaker, Mr. Schmidt having served an apprenticeship under him in the sixties. The two boys, John and Henry, Jr., hale, hearty fellows, are now the active forces in conducting the business, which is sure to grow under their energetic direction.

Across the street from their yard is that of Mr. Haake, which was closed at the time of our visit.

A block further cityward are two similar plants, owned by Berrick's Sons, who are formidable competitors, turning town lots into brick at the rate of several million a year, while a block or two still further in the city is the partly dismantled yard of Louis Kirkover, which he is now turning into city lots.

—A Patriarchal Brickmaker.—

Mr. Kirkover is a character, but very kindly and generous, with all his eccentricities. He was born in Baden, Germany, and came to the Land of the Free with his parents when a

Dietschler & Sons Works—A new Kiln.

mere child. The trip from New York city to Buffalo by boat took two weeks. The Empire Express now makes the trip in nine hours or less.

As was the custom in those days, he was compelled to work for a living instead of going to school, as do the boys of to-day. His was a rugged nature, and he thrived on hardship. His first recollections of brickyard work run back half a century. In 1847 he worked from daylight till dark for the munificent sum of $12 a month and keep. Of a naturally thrifty disposition, he saved what little he earned, and in a few years was able to start in a primitive way, molding brick by hand from clay tempered by an old blind horse, for which he had paid $18. Then brick sold for $3.50 in summer and $5 in winter—sometimes. The highest price common brick have sold for since then was $12 a thousand, after the great fire, which destroyed a large portion of the city.

Mr. Kirkover believes he has made more money in the brick business than has any of his neighbors, and now retires from the business with the good will of all. He has always been a lover of athletic sports, and of late years has gratified a taste for blooded horses, having invested largely in that line, and now has some beauties, which he exhibits with much pride. When he gave up brickmaking he converted his drying shed into a covered track, where his pets are exercised every day, regardless of the condition of the weather. The shed is 500 feet in length, the clay floor making an excellent speed track.

With one exception, the yards here mentioned are summer yards, and are now in a state of innocuous desuetude. These yards make about three-fourths of the building brick used in and about Buffalo, the balance coming from the out-of-town yards, of which we will have something to say in the next issue of the Clay-Worker.

The Brush Bros.' works will probably run through the winter, so that those who attend the National Convention the first week in February can, if they wish, visit the plant and see for themselves how the work is carried on in midwinter.

Written for the CLAY-WORKER.

ANSWERS TO SOME QUESTIONS ABOUT BURNING BRICK.

BY J. W. CRARY, SR.

ONE WRITER wants to know why it is that the top part of his kiln, after it has been burned after my system, is better than the bottom part. He says: "I find the arch brick weak, while the top part of the kiln is good and strong." Well, your question suggests the right answer; you did not attend to your business properly. In other words, you thought you were following my directions, when it was only your own self-conceit, neglect and ignorance that guided you. There can be no effect without a cause. If the top part of your kiln be stronger and better than the lower part, it is evident that you did not properly attend to the fires in the arches. You thought that after your kiln got hot enough to begin to "cover," as I direct, the arches did not require strict attention and a regular, uniform heat, so you let your fires burn down too much and too much cold air struck the lower part of your kiln, and the brick were, of course, "checked" and shattered by sudden contraction, and your whole kiln would have been thus damaged if you had not "dampered" or covered the top with clay. Your trouble comes from the fact that you neglected to carry out all of my directions. You should have kept your arches up to the maximum heat all the time, until the whole kiln was burned and covered. You say you "followed my directions," but you are mistaken. You must study and understand directions for setting and burning brick, and then strictly carry them out. Don't get it in your head that a part of my directions will do, mixed up with a part of your ideas. I don't take any responsibility for your neglect. You must keep it well in your mind that you are only a student, and if I am to be your teacher you must do all that I tell you to do. I have given you perfectly demonstrated facts to study, learn and practice; don't let any hypothesis of your own come in competition with demonstrated facts. Your clay is weak and friable, and to make a good building brick of it you should temper it so as to be as plastic as possible for the soft-mud process. Dry your brick thoroughly, set them open and evenly in kiln, watersmoke slowly, get fires out at top all over, then raise all the heat in arches that the "overhangers" will stand, and keep that heat up until you are done burning. Don't let any more cold air in your arches than is really necessary. Keep fires and heat as uniform as possible until the kiln is burned and covered, then close up without admitting cold air, and your brick will be hard and of uniform strength from bottom to top. Your clay is a sea silt, or calcareous mud. It fuses under a very low heat, and your kiln should not be set over thirty brick high, and set uniformly loose from bottom to top. The height of a kiln should be governed by the fusibility of the clay. A fusible heat makes the brick soft, and if a kiln be set too high it is impossible to burn it without crushing the lower part of it.

—Which Is Best for Very Fusible Clays, the Up-Draft or the Down-Draft Kiln?—

Several brickmakers have asked my opinion on this subject. I have written a good deal about the relative merits of the two kinds of kilns. In answer to the above question, I would say that if it be assumed that a kiln of brick must be set a certain height, say forty brick, and the clay is fusible under a low heat, by all means use the down-draft kiln, for the reason that in all down-draft kilns the top of the kiln becomes hotter than it is possible to get the bottom, and as the bottom would thus stand the greater pressure, of course the danger of crushing or too much "settling" would be much less. Thus, if it be necessary to set all kinds of brick to a certain height in a kiln, the down-draft kiln would produce the best results. But I deny the hypothesis that a kiln of brick must be set any certain height. I have seen kilns of brick set and burned all the way from twenty-five to fifty brick high, and with good results so far as the quality of brick was concerned. But for all clays suitable for making brick both of these heights for setting brick are extremes. The middle, or about thirty-eight, is the most consistent.

Louis Kirkover and His last Kiln.

Any clay that is suitable for brickmaking can be set in either up or down-draft kiln and burned to best advantage when set the medium height. If set too low, the proportion of arch brick is too great. If set too high, the work of setting is too expensive.

When the clay is infusible, a kiln of brick may be set forty brick high with profit. Infusible clay requires a strong updraft in burning, and a high set-kiln, after the watersmoking is done, has a better draft than a low-set kiln.

—Up-Draft Kilns Best Where the Clay Stands Fire.—

There is a popular fallacy that a down-draft kiln makes the hardest and best brick. This common error comes from the fact that the up-draft kiln is seldom rightly understood or used. The arches were set so that there could be no free draft up through the kiln, and then the principle of regulating the heat and controlling the fires by "dampering" on top with clay was not generally known or used until recently. Since it is known that heat in a kiln can be perfectly controlled and equalized by "dampering" on top with clay, no one qualified to judge in the matter has been stupid enough to contend that the course or shape of heat has anything to do with its effect upon a body or matter with which it comes in contact. If the degree of heat is the same going up as it is in going down, its effect must be precisely the same, and the only question in the case of a brick kiln is as to how the heat shall be controlled and equally distributed. If it requires, say, 4000 degrees Fahr. to make a brick hard, and that heat has reached the top of any spot in an up-draft kiln, and then that spot be covered over tight with fine damp clay, it is seen at once that the heat is equalized from top to bottom of kiln at that particular spot, just the same as if it were acting under a crowned arch. At the same time, the heat is deflected to parts of the kiln yet unburned without the aid of any flues or dampers, and without any change in the firing of the arches. As fast as parts or spots of kiln are burned and covered the fire is forced to unburned spots, and the draft to such spots is sufficiently strong to clear and heat up a "cold spot," if there be one.

CLAY-WORKER.

BRICKYARD SKETCHES—THREE OF A KIND—HENRY DIETSCHLER AND SONS.

It may be of interest to brickmakers to know of a case of "cold spot" lately on my own yard. Sometimes we are compelled to set brick that are not well dried. In such a case we set the wettest brick near the top of kiln. Then, of course, we watersmoke very slowly, and sometimes, after firing twenty-four to thirty hours, we close the furnace doors and let the kiln rest, or "sweat," twelve to fifteen hours, then open furnaces and start firing again. This "rest sweating" equalizes the moisture in the kiln, and also starts an excellent draft, so that when the furnaces are opened half-seasoned wood will burn rapidly. But, of course, great care must be taken not to "push" the fires, for if the arches are quickly heated one or more "cold spots" are sure to appear. The smoke, or carbon, from the wood will condense on all the wettest parts of the kiln, and, the soot being a powerful non-conductor of heat, of course the heat in the arches will seek the most conductive parts of the kiln for its escape to the top.

The last kiln burned on my yard was fired about thirty hours, then closed about twenty-four hours, then opened at night, and the draft was very strong. The fireman on watch was particularly instructed not to push the fires and to put in about three sticks of wood and let them "burn down" before firing again. But the fireman thought that he must keep at least three sticks of wood in the furnaces, no matter how fast they burnt out, so he kept up a lively fire all night. The wood was pine, about half seasoned; the smoke was full of pitchy soot, and a spot of wet brick in the kiln, about ten by twelve feet, was so much coated with soot that it became as cold on top as if no fire had been near it; but the heat came out strong all over the kiln, excepting the cold spot.

This was a case to puzzle the best of brick burners. I told my son, in charge of the kiln, that it was a valuable "object lesson," and that it gave him an excellent chance to fully test the efficacy of my system and theory of burning, so he just kept right on firing all the arches, as if there were no cold spot. All the arches were kept hot alike, even to a white heat. As soon as this heat appeared at top, with white blazes, showing that certain spots were well burned, these spots were covered tight with fine damp clay, and in a few hours the whole kiln was well burned, excepting the "cold spot," that was completely surrounded by strong, white blazes, and the main draft of heat from all the arches centered on the "cold spot," all around the edges of it. As fast as this fire advanced toward the center of the "cold spot" and the "platting" showed that the brick under it were well burned, it was covered tight with clay, and thus the firing and covering proceeded until a space about four feet square was uncovered, when a solid blaze broke out over the whole of the uncovered spot. Then the fires were kept up in all the arches about three hours and the kiln was closed, being a very excellent burn throughout. The kiln has been shipped, and 95 per cent. was first-class.

Now, the point in the foregoing statement to which I want to call the attention of brickmakers is that fires in a kiln can be and should be controlled by "dampering" with fine clay on top of kiln, instead of working fires in the furnaces or arches, or by the use of flues and dampers at side or bottom of kiln. All furnaces and arches should be kept hot alike, from start to finish. The pressure of heat will move to the most open place or best outlet, whether vertical or horizontal, and in a six or eight-arch kiln it will move the whole length of the kiln if the brick have been properly set. As a kiln is being covered with clay the draft is slightly diminished, and also the consumption of fuel. I trust that those who are plagued with "cold spots" in their kilns will be benefited by the case lately on my own brickyard, but my theory must be thoroughly studied and then practiced to a fraction. It won't do to write to me and ask for reasons of failure, when, at the same time, they confess that they did not exactly do all that I have told them to do. I try to give the reason and the proof of all that I say and do about brick, and I cannot afford to contend with dogmatists who dispute what I say.

THANKFUL FOR SMALL FAVORS.

Editor Clay-Worker:

Please find inclosed postoffice money order for my subscription to December, 1897.

Times have been very slow with us here the past two months, and prospects gloomy for the winter. We made three and a half million brick the past season, and have about one million on hand. Have closed down for the winter or until better prospects. No hopes for any new buildings until our cotton crop is assured. We are all quite well satisfied with the election. We lost our President, but carried the State almost solid, only losing one Congressman.

Wishing the Clay-Worker much success, I am, respectfully,

Belton, Tex. W. F. BEAMER.

CORRESPONDENCE

THESE COLUMNS ARE OPEN TO ALL. THE FULL NAME AND ADDRESS IS REQUIRED, BUT WILL NOT BE PUBLISHED EXCEPT WHEN PERMISSION IS GIVEN. THOSE DESIRING TO COMMUNICATE PRIVATELY WITH ANY CORRESPONDENT WHOSE FULL NAME IS NOT GIVEN CAN DO SO BY ADDRESSING LETTERS CARE OF CLAY-WORKER.

GATES'S $900 TIP.

Editor Clay-Worker:

In looking over the Associated Press dispatches, a few days since, I read that Mr. Gates, of Chicago, had been unfortunate, in that while stopping at a leading hotel in New York city he had left a package of money on the dining-room table containing $900, which was stolen by one of the waiters. When I saw the familiar name I wondered if that was our Gates. When I read about the nine-hundred-dollar package I knew it was our Gates, for none but a Chicago clay manufacturer would carry this amount of money in his vest pocket at this particular time. After settling the matter to my entire satisfaction that it was our Gates, I have been perplexed and worried as to the cause leading up to this break on the part of my distinguished co-worker. Those who are familiar with his anatomy can well understand that by the time he persuaded himself to leave the dining room he was "full." This fact, unsupported by corroborative evidence, would not fully explain his leaving the above mentioned package. The incident occurring just about the period of the late election might lead to the conclusion that he was prepared to stake his all on the general result. If this be true, "how has the mighty risen" since the days when second-hand "Stetsons" were placed in jeopardy on the result, and caused simple but confiding friends to suffer loss and vexation of spirit! However, I don't think the waiter should bear any blame, for, after receiving my Brother Gates's order for dinner and hearing him relate his exploits down on the gulf coast and elsewhere, and that he was a Chicago clayworker of 1896, he naturally thought it was a tip. We will give Gates an opportunity to explain at Buffalo. Who would have ever thought that that indefatigable little boy who "ignited the conflagration, fed the poultry, milked the cows, brought in the wood, carried out the ashes, tied up the dog, watered the geese, fed the calves, let out the sheep, and attended to a few other chores which used to precede his day's work, and was thus fighting ennui until breakfast should be served (I am quite sure he did not know what he was fighting at the time), and pulled the bell rope over old Jerry all day," and made a toboggan of poor old Jerry's vertebra, would ever have reached such a dizzy pinnacle!

It only illustrates what American pluck and push can accomplish, and this example should be an inspiration to all young men who are beginning their life's work.

I trust we will hear from many of our brethren in the next issue in the interests of the coming Convention. Let us have suggestions in reference to the programme. Send them to Secretary Randall and aid him in his arduous task. Should you be asked to read a paper don't decline. We want an interesting Convention, and this can only be accomplished by the help of all the members. R. B. MORRISON.

The Situation at Chicago.

Editor Clay-Worker:

The boom predicted by the Republicans before the election has not yet put in an appearance in the building trade in Chicago. Perhaps it is too soon to expect it, but one would have supposed, after listening to Purington, Gates and other leaders in the trade, that immediately upon McKinley's election orders at remunerative prices would pour in. Indeed, D. V. Purington was so sure of this that he started up his plant the Monday before election, and, after all that he has said, has not had the courage to shut down since. Seriously, Chicago is overbuilt. We put up buildings enough during 1892 and 1893 to suffice for the balance of this century. Chicago is growing, and growing rapidly, but so long as there are so many empty stores, residences, warehouses, hotels and theaters as now, just so long will the brick business be poor. Our party made no boasts of an immediate return to prosperity, and, if successful, would not have been obliged to stand the amount of chaffing the McKinleyites do. As near as I can estimate, the output in and around Chicago in 1896 has been less than 300,000,000, and about one-third of the capacity, and the prospect is that next year the amount needed will be about 50 per cent. greater than in 1896. Up to the 1st of June prices were firm at $6; since that time they have been down as low as $4, and $4.50 has been the maximum price for the past three months. The stock on hand is more than ample. There is no possibility of any high prices for some time to come. Wages are a trifle lower than last year, except on the city yards, where they are the same. Coal has been lower than last year, and I am told that those using oil have obtained a lower price. One thing is sure: the quality of brick turned out this year has been much better than in 1895, and this is largely due to the fact that in 1896 each manufacturer has dealt directly with the trade. In 1895 all the brick were sold to the Illinois Building Material Company, and they were compelled to take and pay for such brick as the maker chose to deliver them, and this was one of the chief causes of the disruption of the Material Company. This year, in an open market, quality of material has cut quite a figure, and the brickmaker with poor brick to sell has had a hard time. In fact, they all have, but those who make the best have come out with the least loss. We shall see little real prosperity until we get some legislation in regard to the currency. We need more money in every branch of business, and shall have hard times until we get it. I did not intend to introduce any politics into this letter, but a man in the brick business in Chicago may well be excused for worse breaks than this. Indeed, he will be lucky if he doesn't go broke himself. I would like to go to Buffalo, but have had too small margins to dare try it. My best wishes go with the brethren for a good time.

Yours for 1900, FREE SILVER.

Drying Brick by Waste Heat of Kiln.

Editor Clay-Worker:

In your issue of October, 1896, I was considerably amused to read an article headed, "Drying by the Waste Heat of Kiln." While I am not a "student of ceramics," I have been for years a clayworker, not with my pen, but as a mechanic and actually. In reading the article referred to I confess to having that tired feeling.

I particularly note the Royal Brick Company were surprised when they found that by blowing heat on to green brick the brick dried in the operation. This intensely interesting article furthermore states that "the improved burning system" is patented. For the benefit of my brother clayworkers I wish to go on record as saying that such a system has been in use to my knowledge for sixteen years. A similar system, if one can judge by the description in the article referred to, was arranged and constructed at the works of Messrs. Otis & Gorsline, Rochester, N. Y., in the year 1880. The designer or inventor was Mr. Henry Gorsline. As a drier it was a success, but it proved a total failure so far as the product of the kiln was concerned, the salt-glazed sewer pipe being air checked by rapid cooling. About four years ago I erected an improved system on similar lines to the one above referred to. It is now in successful operation in the Staten Island Terra Cotta Lumber Company's works, at Woodbridge, N. J. The machinery, fans, etc., also the working drawings, were supplied by J. W. Penfield & Son, Willoughby, O., under my directions. When the Staten Island Terra Cotta Lumber Company's plant was erected the system was not considered patentable, and I desire to assure all clayworkers that an underground or overhead tunnel from smokestacks or kilns, leading to a system of fans, connecting with the mixing or cooling chamber, thence to tunnels, dry racks or dry floors, is public property. This article is dictated with a desire to benefit all manufacturers of clay goods. The system erected at the Staten Island Company's works is in daily use, as stated above.

The hot air forced into the driers by fans, which are about eight feet in diameter, can be regulated by the admission of cold air into the mixing chamber, from the lowest degree of heat up to one thousand degrees, if necessary.

In order that my brother manufacturers may not be misled by this article, or the one which interested me so much, to which I have referred before, a few suggestions are necessary. This system, in my opinion, is useless for any purpose excepting the manufacture of hollow building blocks, common red brick, farmers' drain tile and similar goods. I will briefly criticise the advantages claimed by the "Student" in his explanation of the Royal Brick Company's system:

First—The waste heat only can be utilized to advantage.

Second—In my experience, the drying by heat from bottom of kilns causes the brick to burn pale. The system is without merit if much heat is drawn, except as it passes up the stack, or after the kiln is finished and the heat drawn from the crown.

Third—It is impossible to burn a kiln quicker when you are drawing heat from any point, bottom, top or sides.

Fourth—I have never discovered the consumption of coal to be less or more. The system claims to use waste heat, and that is all it can accomplish.

Fifth—Positively the kiln is not injured or benefited in the slightest degree. I would not advise any one to erect such a system, unless he has sufficient kilns cooling or burning from which waste heat can be drawn continuously.

This subject has received little or no attention in the past. Any one about to build a brick plant, and wishing to arrange a waste heat drying system, should build the kilns in rows, so that flues or ducts could be placed underground with as few curves as possible. The mixing chamber should be large enough to permit rapid cooling or lowering of temperature before the heat has passed through the fans into the driers, dry floors, etc. Unless sufficient kilns are under fire at the same time, either cooling or heating, smoke and gases are drawn through the ducts and into the driers, causing, at least, much discomfort. If, however, several kilns are tapped by the system, with dampers, properly regulated, at each point where the ducts enter kiln or stack, the heat will be drawn only from the kilns cooling, and the kilns sufficiently heated to consume smoke and gas.

With the system erected at the Staten Island Terra Cotta Lumber Company's works two hundred tons of fire-proofing are dried every twenty-four hours, without cost, except for steam to run 40-horse-power engine, which drives the fans. I am fully aware that goods manufactured from some clays cannot be dried rapidly. This system, however, in my opinion, is suitable for all kinds of clay, inasmuch as the velocity of hot air can be reduced to a minimum at the same time the temperature is lowered. ROBERT W. LYLE.

Residence: Hotel Imperial, New York City.

College for Brickmakers on the Industrial Plan.

Editor Clay-Worker:

The agitation of the question of starting a school for brickmakers solely on the industrial plan continues. The recent articles appearing in the Clay-Worker have been perused with much pleasure and interest, and noting in the discussion that Mr. Crary continually cites "Prof. Orton's school" as a standard of comparison (as well he may). As I hold a certificate from this college, and also possess some practical experience, which Mr. Crary prizes so highly, I feel that a few remarks on the recent publications will perhaps not be out of place, although the remarks made by "A Student" in a recent issue are so forcible and full of commendable points that any further remarks may be deemed almost unnecessary.

I will state that I am not addicted to adverse criticism, nor am I reeling on the pessimistic side of life, but just the reverse, and that it is my intention to uphold and further any cause which is to the best interests of the people at large, and the remarks which follow are made, not with a desire to continue argument, nor from any lack of regard for our venerable friend, Mr. Crary, but simply to state some facts which bear upon the negative side of the question.

In the November Clay-Worker he says, "Professor Orton begins right where I would stop," and just below that he says, "Professor Orton, I think, has the right thing for a beginning," and that "the students of Professor Orton's school can come to the industrial school and finish as brickmakers," and I am in a quandary, from the above remarks, to know just which school he would have a student go through first. A student having reached the necessary age, and possessing the kind of knowledge which he would acquire at Columbus, and having satisfactorily completed his course, it is highly improbable (although it might be a benefit) that he would attend Crary's school. Would a graduate of any college, after receiving his diploma, think of entering a kindergarten?

Such a school as Mr. Crary suggests, if feasible from a financial point of view (which I doubt), might be a good thing, and it would undoubtedly do a student no harm to take such a course before taking a course in ceramics; however, let me ask, couldn't one who is a close observer and anxious to learn get the same kind of practical experience on any brickyard having the various kinds of kilns and machinery, and, if failing to find enough variety on one yard, go to another? In most cases we will find that the education of the expert civil or mechanical engineer or an expert in any line of engineering is not confined to a trade school, and in the vast majority of cases he has never seen a trade school. And let me ask, Is it possible to turn out an "expert brickmaker" in four to six months' time, with only a practical knowledge, which would really be about all one could get out of such a course in the allotted time, and still have our "expert" remain in ignorance of the principles upon which his practical knowledge hinges, and which determine, to a marked degree, whether or not he is truly worthy to be called an "expert?" Any intelligent brickmaker, I think, will agree with me that a green man with only four to six months of the best possible training will fall short of even the minimum that constitutes an "expert brickmaker."

At Columbus one can obtain the proper kind of foundation needed in the clay line in the short course (two years) or in a full-fledged collegiate course (four years), which gives the student a solid basis upon which to work, and places him in readiness to launch into any of the various clay industries. If he has had practical experience before taking the prescribed course, he will grapple the theoretical points so much the easier. That is to say, the more knowledge he brings with him when he comes, the more in proportion will he carry away with him when he goes. But even if he lacks all practical knowledge of the subject, his school training is practical, and when he begins outside work he will feel that it is only in continuation of the course he has undertaken.

Two years is plenty short enough. The storage capacity of one's brain is limited, and the amount of knowledge which it is capable of retaining in a given time varies greatly, of course, with different individuals. It requires time for development.

I agree with Mr. Crary in so much as practice is a necessity in this line of work, but when he says that "practice only makes perfect," and seemingly looks down upon theory, he appears to have lost sight of the fact that theory is only the outgrowth of practice. In short, it is the essence or vital principle deduced from all past experience, by which we attempt to solve present problems. It is the soul, of which practice is only the body.

All practice and no theory is not the correct principle upon which to found an institution of this character. The clay industry is suffering most to-day from lack of trained scientific observers, not for want of practical workers. The world is full of practical men. But look at the historic names of Seger, Richter, Bischof, Hoffmann and Wedgwood, who have done most toward advancing the clay industry, and whose arduous labors in this line have gained for them a fame which is world-wide. It was to their ability as scientists that they owed their power to make their magnificent practical contributions to the clayworker's art. Considering these facts, can we conscientiously advocate the founding of a school to be run solely on the industrial plan, with a view to turning out "expert brickmakers?" The value of as thorough a knowledge as possible of chemistry and the allied sciences embraced in a course in ceramics is fully appreciated by the average clay man, even though he lacks this sort of knowledge himself, whether he be engaged in the manufacture of brick, terra cotta, sewer pipe, tile or pottery. There are questions which arise, even on a brickyard, where a knowledge of chemistry would often solve the whole difficulty, and proper steps could be intelligently taken to eradicate that which is causing the trouble, which, by the way, would be entirely beyond the reach of a "merely" practical man. Many of the readers have undoubtedly seen an application of this fact in everyday life, as they are a common occurrence, and it matters not how great are the abilities of the merely practical man, if he is without such knowledge he is not in a position to settle a chemical problem.

If those who are most prominent in advancing this idea would pause a moment and investigate the workings in detail of the ceramic course we now have in the United States, where tuition is free and the advantages unsurpassed, I think the question would at once be dropped. From what I have read I am thoroughly convinced that they have failed to take the initial step and learn for themselves the exact state of affairs pertaining to the objects and teachings of the above mentioned school.

If it is beneficial to have an industrial school, as suggested, for brick exclusively, why not broaden the scope of the idea and extend it to the practical teachings of the manufacture of sewer pipe, terra cotta, enameled brick, encaustic tile, pottery, etc., and teach modeling, plaster work, fitting, turning, fettling and all that would result in turning out skilled hands, as that is the aim of the trade schools? I assume that there are members of the N. B. M. A. who are not manufacturers of brick and who are deeply interested in the development of other lines of clay manufacture with which they are connected, and who, like myself, can see no reason, if it is a good thing to teach the practical workings in the manufacture of the crudest of clay products (brick), why we don't need it all the more in the manufacture of the finer wares.

The N. B. M. A. has already backed Professor Orton in his undertakings, and tacitly pledged its support toward the maintenance of this much-needed school, and since this is the case, and it is steadily growing in its effectiveness and practical value, would it be wise for the N. B. M. A. to divide its material or moral support in favor of Mr. Crary's somewhat immature scheme?

For myself, I can say that I entered the ceramic department at Columbus without practical experience in clayworking, and the "theoretical training" I there received has been "practical" enough to obtain for me my present position and the power to hold it, with what success I have so far achieved.

ELMER E. GORTON,
Chemist American Terra Cotta and Ceramic Company.

Brick and Tile Trade Improving in Michigan—Will Attend the National Convention.

My Dear Mr. Randall:

Trade in this section has been extremely poor the past season, several yards around us not having started at all, though they had a light stock last spring. We have fared a little better, having furnished a million brick for a State building here. With this order, however, and what other business we were able to get, the past season has been the poorest in regard to number of brick sold of any season in the past ten years. The price has averaged a little higher the past season than in 1894 and 1895, for which we are duly thankful.

Business since election has noticeably increased. Especially is this the case with our farmer trade. During the past summer, if a farmer came to the yard after a few brick or tile it was something wonderful. Now, however, they come in freely, have plenty of money, and seldom ask for credit. Whether this is due to their having sold their wheat or are experiencing a "relapse" of confidence we cannot say, but hope it is both.

We thank you very kindly for your invitation to participate in the coming Convention, but must decline. Knowing ourselves as well as we do, of course, we realize that a "dignified silence" would be more becoming on such an occasion than anything else we could wear. We know you will get over our declining in a little while; besides, you know, "there are others." Have never attended a Convention as yet, I am ashamed to admit, but intend to get to Buffalo in February, if possible.

The picture of Mr. Brush in last number of the Clay-Worker is a good drawing card, for if the rest of the Buffalo brickmakers are such "jolly good fellows" as Brush appears to be from his photo, we want to improve the opportunity and meet them.

F. H. VANDER HAYDEN.

Ionia, Mich., Nov. 23, 1896.

A Galesburg Brickmaker Visits Canton.

Editor Clay-Worker:

In reply to your query about my trip to Canton: I found only the Royal yard running, and that was about to close down. They have a very fine plant, being fire-proof throughout. They are using their system of taking the heat from kilns and using in drier very successfully—claim they have dried standard brick in five hours, bone dry.

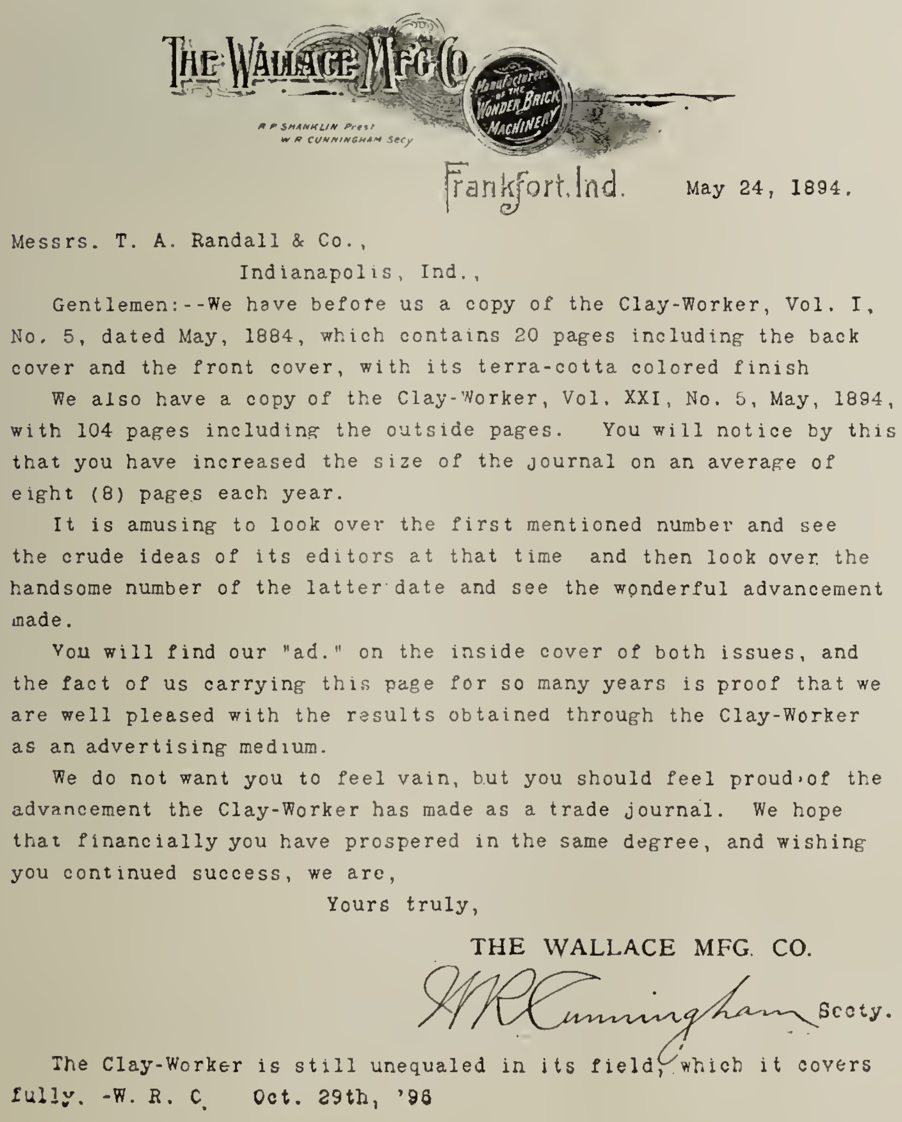
They are making a brick for the Cleveland market that is 8⅝x3⅜x5 inches in depth. It seems to me a waste of material to make them so deep, but we must all make what the market demands. They have few brick sold and very few on hand. Mr. Giessen claims to have his drying system patented, but I am in receipt of a letter from Mr. Eudaly, wanting to put in a similar system, and he also claims to have a patent on it.

Returning, I spent one day in Bucyrus, where I ordered three new Eagle represses of the American Clayworking Machinery Company. They are running about one-half of their full force. They recently booked an order for three represses for the Anderson Barr Clay Company, of Streator.

I inclose the blank forms which we use for making out our statements. You will understand by examining them that they show a pretty full statement of our business, and any one can see at a glance what we are making or losing each month. I think there is no part of our business that gives us so much satisfaction as knowing at the end of each month how we stand, and after we got it into operation we found it just as easy to keep everything separate as it was to run the season through without knowing where we stood. We are running our No. 2 plant to its full capacity, and are turning out an excellent quality of brick. Have orders for nearly eight millions for delivery next spring. W. S. P

THE VOICE OF EXPERIENCE.

"It Covers the Whole Field Effectively."



THE WALLACE MFG. CO.
Manufacturers of the Wonder Brick Machinery
R P SHANKLIN Pres't
W R CUNNINGHAM Sec'y
Frankfort, Ind. May 24, 1894.

Messrs. T. A. Randall & Co.,
Indianapolis, Ind.,

Gentlemen:--We have before us a copy of the Clay-Worker, Vol. I, No. 5, dated May, 1884, which contains 20 pages including the back cover and the front cover, with its terra-cotta colored finish

We also have a copy of the Clay-Worker, Vol. XXI, No. 5, May, 1894, with 104 pages including the outside pages. You will notice by this that you have increased the size of the journal on an average of eight (8) pages each year.

It is amusing to look over the first mentioned number and see the crude ideas of its editors at that time and then look over the handsome number of the latter date and see the wonderful advancement made.

You will find our "ad." on the inside cover of both issues, and the fact of us carrying this page for so many years is proof that we are well pleased with the results obtained through the Clay-Worker as an advertising medium.

We do not want you to feel vain, but you should feel proud of the advancement the Clay-Worker has made as a trade journal. We hope that financially you have prospered in the same degree, and wishing you continued success, we are,

Yours truly,

THE WALLACE MFG. CO.
W R Cunningham Secty.

The Clay-Worker is still unequaled in its field, which it covers fully. -W. R. C. Oct. 29th, '96

QUESTIONS FOR TILE MANUFACTURERS.

Is your stock of tile sufficient for the probable demand, if the winter and spring should be open and wet?

Is your tileyard in an orderly condition—the different sizes convenient to get at?

Is your supply of large sizes sufficient for the prospective demand, or do you depend on shipping them from some other factory that makes a specialty of large sizes? If so, is it best to wait until wagons drive into your yards for large sizes, and then order them, and let the wagons return empty or go somewhere else for extra large sizes?

Are your prices up to a profit-paying point? If not, put them up, so that you may realize a moderate per cent. for your risk, time and labor necessary to make them.

Are your outstanding accounts for tile sold in the form of notes? If they are not, make it your business to go and settle with each person who may owe you, and have a note drawing interest. If you do you will be surprised to find so many ready to pay rather than give an interest note.

Is all your tile machinery in good condition—where it will not rust and will keep bright?

Are there any leaks in the roofs of the building that need mending?

Are there any little odds and ends which need picking up to give the factory a neat and orderly appearance?

Are there any repairs which should be made or new machinery which should be put in before spring, so as to be ready to start up when the weather is favorable without delay?

Is the tile trade a little dull? Does it need talking up? If so, do the talking.

WITH PHILADELPHIA BRICKMAKERS.

A RETROSPECTIVE glance at the year now reaching the fag end of its existence shows clearly that it has not been one of unlimited prosperity, but our men have held their own, and, thanks to a few good operations left over from 1895, many of them (of course, I mean the clayworkers) have had a very good time for six months of the year, as the past reports made from visits to and inspections of the yards proved.

The Master Builders' Exchange has undergone vast alterations and improvements, now nearly complete, to give to exhibitors more space for tilings, terra cotta and bricks of all description.

Borgner & O'Brien, who own the only large fire clay retorts we have in the city, carry a large exhibit, both at the Bourse and the Exchange, as does the Eastern Hydraulic Company.

Murrell Dobbins, whose plant is down in what is called the "Neck," expressed his ability and willingness to ship a few extra loads, but was satisfied that things had been no worse during the year.

The Peerless Brick Company, whose offices are also in the Exchange Building, have had a fairly good year. Of course, their line is a broad one, and, with molded arch and fancy shapes, there is always a big call upon them from the architects and builders of this city.

Over the 'phone I learn that the Equitable Brick Company, which is owned by Bros. Wm. S. Kimball and C. H. Kimball, had been very busy during the earlier part of their season. The plant, which is located at Sixtieth and Pine streets, with a capacity of 20,000,000 annually, is considered one of the crack yards of this city. Everything is trim and up to date. "Not doing very much now," came the echo over the 'phone, "but come out and see us," and, of course, I answered I would, but not until the new year.

The much vexed question of a settlement between the Hatch Brothers (Hugh and Joseph) versus the Pennsylvania Railroad, over the clay strip of eleven acres along the Pea shore, on the Jersey side, has at last reached a satisfactory conclusion. The Pennsylvania Railroad has agreed to pay and the Hatch Bros. have agreed to accept the sum of $57,000 as compensation, and the railroad will give the Hatches, in addition, seven acres of adjoining land. That's all there is to it. Now will they be good!

The year closes with the death of Robert McCay, a well-known brickmaker, an ex-member of the city's select Council and a stanch Jeffersonian Democrat, at the age of eighty-one years, being born on the 17th of December, 1815. In 1853 Robert McCay came to this city from Media, Pa. (where he had practiced law, and was Media's first District Attorney), to engage in brickmaking under the firm name of Turner & McCay, on a twenty-acre lot at Long lane and Moore street. Later Turner retired, and Robert McCay was joined by his brother William, and so the firm continued until the death of William in 1863. Those were the days of hand gangs and high prices, and Robert McCay continued turning clay into gold dollars until 1886, when he found the ground depleted of brickmaking material and retired. W. P. L.

TEXAS ENTERPRISE—FROM HAND MOLDING TO MACHINERY.

We are starting a brickyard, so send along the Clay-Worker. We are now making by hand, but want to put in machinery for 20,000 daily capacity. Our clay is sediment found in an old canal. It is about five feet thick and is in layers, some of which have more pure clay than others, but all of it resembling potter's clay. After it is washed, as it is for hand-made brick, we put in one part sand and two of clay. This clay, as it comes out, is damp, most of it ready for (we think) an auger machine. We will want dies for making tiling, etc., also a repress. Our foreman tells us that the screw machine is what we want. A common pug mill won't mix or temper our clay; it comes out lumpy, or in balls, but for all that makes a good hand brick of nice red color. If you know from this description what we want, please have some firm who deals in machinery of the kind send us prices and cuts of same. We have boiler and engine of 40-horse-power, which we think will do for power.

There is a dry press machine about town, on which has been spent about $25,000, but it is no good. The clay is somewhat different from ours, more of a sandy, shaly nature, and is also a sediment. Our clay is just like clay which is washed and run off in pits, the same as we used to do in the pottery, but this wash comes from different floods, and after we dig this out we open the canal when the water is muddy and let our clay hole fill up with fresh sediment from the Rio Grande river. That is of a different nature, coming from different sections of the country. So you see from this our reason for thinking machinery for drying the clay, fuel being expensive, and then rolling it and cutting through the dry press, is not just the thing. At any rate, would like your opinion on same.

El Paso, Tex. GEO. W. NORTH.

THE CHICAGO BRICK MACHINERY COMPANY.

ON ANOTHER page (497) the reader will find the introductory announcement of the Chicago Machinery Company, a new firm, whose mission it will be to furnish the progressive brickmakers of the land with improved machinery and appliances of any and every sort. The head of this new firm, Mr. Johnny Moroney, is a native of Chicago, and possesses the hustling proclivities for which the name Chicago has grown to be a synonym. For the past decade he has been connected with Chisholm, Boyd & White Company. For a number of years he had charge of their clay-testing department, handling all kinds of clays and shales from Maine to California and from Canada to Mexico. In that way he became one of the best posted experts on clay in America. Mr. Moroney's memory is simply phenomenal. Of the thousands of clays that have gone through his hands he can, even to this day, describe the material belonging to any given brickmaker, state how it worked, the color and kind of brick it made, and, in most instances, give the serial number of the test. He can also give the name and address of every party who has contemplated going into the dry press brick business in the last ten years, almost without exception.

JOHN J. MORONEY, Chicago.

For the last three or four years Mr. Moroney has been on the road selling machinery, and has been very successful. He has covered a great deal of territory, from New York to Cripple Creek and all through the South to Galveston, Tex. His acquaintance among brickmakers is as large as that of any one in the business, and his genial disposition, together with the fact that he never forgets a face, have won him hosts of friends all over the country. Indeed, if Mr. Moroney has an enemy anywhere, we have not yet found it out. He has all the Irish good nature and love of fun and jokes.

In Mr. Moroney's position as President of the Chicago Brick Machinery Company he does not intend to confine his work by any means to the selling of dry press machinery, as his travels have familiarized him with all kinds of brickmaking and the merits of all systems. Mr. Moroney's intimate knowledge of clays, as well as the fact that he is not tied to any particular system, makes him the best kind of adviser to parties contemplating a change in their system or wishing to know the value of or the best way to work a new material.

Mr. Moroney is also President of the United States Rocking Grate Bar Company, the patents of which he has owned for several years. The Grate Bar Company has offices with the Chicago Brick Machinery Company, in the Temple Court Building, 225 Dearborn street, Chicago.

The longest pole knocks the persimmon, they say,
And no sensible man will deny it;
And the largest ad. catches the trade every time.
If you don't believe it, just try it. —Fame.

OUT OF THE MUD — A BRICK-PAVED COUNTRY ROAD.

UNDER THE ABOVE CAPTION the Monmouth Daily Review contains an account of the great strides which the people of Monmouth township, Warren county, Illinois, have made in road building. It is claimed that in this county there has been constructed the first brick roadway for country use in the United States. The brick road came by way of evolution, says the Review. "When hard road building began in this township, four years ago, it was decided to expend the money available in an experimental way, and that was done. The combination dirt and stone roads were built first, nearly five miles being completed. Then came the experimental stretch of paving brick. All of the roads are now in a condition to give general satisfaction the whole year round, and are reached with great delight in the muddy season. Several other townships are planning a similar movement, and there is no doubt that a few years will see the main roads of Warren county passable at all seasons of the year. * * * For years all kinds of travel has been impeded by the mud, and in the winter the blockade has been complete. For several days about the first of March there was usually a complete blockade all over the county, two horses being required to pull even a light buggy over the roads. In Monmouth the 'bus and dray lines quit business altogether. Wheelbarrows were called into requisition to transfer baggage, mail and freight to and from the depot.

"This work of road building was done under the act of the Legislature of 1883, which provided for an expression from the people on the question of road building and the levying of a tax not to exceed one dollar on each one hundred dollars of all the taxable property, including railroads, for the purpose of constructing and maintaining gravel, rock, macadam or other hard roads. Such a question could be placed before the people on a petition of fifty land owners. On the occasion of an election held in 1892 there was an overwhelming vote in favor of additional taxation for good roads.

"The brick road built was three thousand feet long and cost 90 cents per running foot. The ground was prepared first by grading and allowing it to stand for two months. It was treated to an occasional scraping, so that it would pack evenly, and when the contractors were ready to lay brick it was as hard and even as a floor.

"The first thing was the setting of the curbing. This was made of 2x6-inch oak plank, set seven feet apart and held by oak stakes eighteen inches long and put down every four feet. Inside this was put a five-inch bed of sand. This was evened up and the single course of No. 1 paving brick, made by the Galesburg Paving Brick Company, was put down. They were set on edge, and made a fine roadbed. Outside the curb eight inches of crushed rock was laid, graded up to make an easy approach. The earth on each side was graded and worked, making it, in all, forty feet wide, and affording tracks on each side for use in dry weather."

"Particular attention was paid to drainage. In some instances there were tile drains on each side; in other instances a drain on one side was found sufficient.

"About the only objection that has been urged against the roads is that they are not wide enough. This may be an objection, but it is not a serious one. The road is able to take care of its travel, excepting in extraordinary instances. When it comes to repairs, a great saving in time and trouble can be noticed."

OHIO VALLEY NEWS.

THERE HAS BEEN a decided improvement in the sewer pipe and brick business since the election. For two months previous to the election there was scarcely anything doing in this line. No business suffers in comparison to that of clay manufacturing when an unsettled condition of finances exists. The cause of this is simple, for 75 per cent. of their products are used for public improvements, which must be paid for usually by the sale of bonds, and the inability of municipal authorities to float such bonds practically paralyzed the clay industry. A decided change has taken place, and, with few exceptions, all the brick and sewer pipe works are running to their full capacity, notwithstanding, ordinarily, this is the dull season of the year.

Mr. Frank McElfresh has returned from Cambria, Pa., where he had been interested in the Patton Clay Manufacturing Company, and has again assumed the management of the McElfresh Clay Manufacturing Company at Penrith, W. Va., placing the sewer pipe works in operation, which had been idle for about eight months.

There seems to be little prospect of the Chelsea Pottery, at New Cumberland, W. Va., resuming under the present management, but it is rumored that some Trenton, N. J., parties are negotiating for a lease of the plant, with a year's option for its purchase.

Messrs. Garlick and Atchison, who purchased the two brick works of the defunct American Fire Clay Company, at Freeman's Landing, W. Va., have about completed the repairs on the buildings and machinery, and will at once commence the manufacture of paving brick.

Evidence is being heard before Carl Bigger, of Steubenville, as Master Commissioner for the Court of Common Pleas of Jefferson county, in the case of the various creditors of the Markle Fire Clay Company against the stockholders of that company, to enforce the individual liability of the stockholders. Under the laws of Ohio the stockholders are liable for double the amount of their stock. This company failed about three years ago, with heavy indebtedness against them, and should the creditors win in this suit it will seriously cripple many of the stockholders, none of them being men of great wealth.

Messrs. McMahon, Porter & Co., of New Cumberland, W. Va., who have been for over a year running their works, making paving brick, are now running night and day, making sewer pipe in the daytime and brick at night.

Over two million brick and several barge loads of sewer pipe went out on the December rise in the Ohio river for the Southern markets.

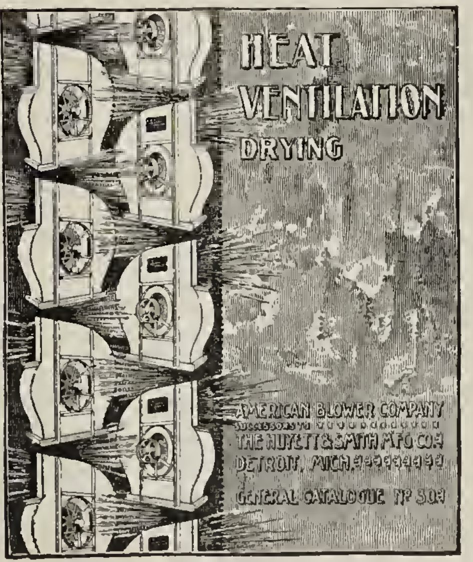
Mr. Jas. M. McClure, of Toronto, O., has resigned his position as Actuary of the White Granite Ware Manufacturers' Association, and becomes Secretary of the Kenneddy-Kling Company, fire brick and sewer pipe manufacturers, located at Toronto, O.

There was a meeting of sewer pipe manufacturers at the Monongahela House, in Pittsburg, Pa., on Dec. 1 and 2, for the purpose of forming another combination. No conclusion was reached, but as they adjourned to meet again in the near future there is every reason to believe the first of the year will see the strongest association of firms in this business yet formed, as many who, in the past, have refused to co-operate are taking an active interest in the formation of the proposed combination.

BUCKEYE.

A HANDSOME CATALOGUE.

The finest catalogue that has come to our desk for a long time is that recently issued by the American Blower Company, Detroit, Mich. The cover is both odd and attractive, as the reader may judge from the accompanying sketch, which is a miniature reproduction, while the inside title is a work of art. Indeen, the entire book is beautifully printed. Many of the illustrations would do credit to an art catalogue, being executed in three colors throughout. The arrangement of the book, which numbers over two hundred pages, is admirable, it being divided into thirteen parts, each part devoted to a different subject. It contains much new matter of interest to engineers, heating contractors and architects; new and complete fan and blower capacity tables, tables giving for the first time to the public the amount of heating surface used with fans and blowers of different sizes, fully illustrated description of the fan system as applied to the heating of almost every type of large building, churches, factory buildings, schools, theaters, public buildings, etc. The drying of brick, lumber, tobacco and many other materials is fully described.



THE CLAY-WORKER

Entered at the Indianapolis postoffice as second-class matter.

A Practical Illustrated Monthly Magazine, devoted to Brickmaking and allied Clayworking Arts and Industries.

THIRTEENTH YEAR OF PUBLICATION.

OFFICIAL ORGAN OF THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION OF THE UNITED STATES OF AMERICA.

TERMS OF SUBSCRIPTION:

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One copy, one year (if not paid in advance)	2.50
Six copies, " "	10.00
Ten copies, " "	15.00

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☞Subscribers when ordering a change of address should give both the old and the new address.

ADVERTISING RATES

Furnished on application. The CLAY-WORKER is unquestionably the most effective medium in its field, and character and circulation considered it is the cheapest. To insure insertion in current issue, advertising matter should be sent to office of publication on, or before the first of the month.

Correspondence on all subjects of interest to Clayworkers solicited. All communications should be addressed to

5 Monument Place.] T. A. RANDALL & CO., Indianapolis.

VOL. XXVI. DECEMBER 1896. No. 6.

THIRTEEN.

"All's Well That Ends Well."

'Tis said that every mortal, high or low, is more or less superstitious. Many deny the charge in toto, but nevertheless are loth to go against any proposition that is commonly considered an omen of ill luck. We know many successful, hard-headed contractors who are not daunted by any combination of employes or competitors, no matter how formidable, who would not, under any emergency, begin a building or important contract on Friday, but always find some pretext for putting off the work another day. Perhaps the most common of the modern superstitions clings to the number 13. How few there are who will sit at the table with only that number participating. Hotel managers find it necessary to skip the 13 in numbering their rooms, for guests, particularly commercial travelers, refuse to occupy apartments so numbered.

May be, as so many think, 13 is really a "hoodoo." We do not believe it, though, for we have just passed through our thirteenth year, and notwithstanding it has been a year of depression, the Clay-Worker has made the same decided advance as a trade magazine that has marked each previous year. Our subscription receipts have already exceeded those of 1895. Our readers have been served with the same generous measure of instructive matter as in former years, and we close the year's work with complacency, facing the new year with assurances of still greater efficiency. We already have in hand a number of interesting articles on "Brickmaking in the Antipodes," and with the January issue will commence a new series of articles by Prof. Edward Orton, Jr. Several new contributors will be introduced and all the old favorites retained. The old year ends well and the new dawns auspiciously for the Clay-Worker and all its hosts of readers, to whom we extend the compliments of the season.

THE CONVENTION SEASON.

We have already referred to the meeting of our National Convention of Brickmakers, to be held in the charming city of Buffalo the first week in February, but we would hardly be doing our duty towards our patrons if we did not again urge them to attend in full force. It is not too late to especially invite our English brethren, who have professed such interest in the Clay-Worker. We promise them not only many a valuable hint as to the making and marketing of brick, but such a good social time that they will not regret the time and expense it may cost. Of course, Canada brickmakers will be present in large numbers. We will be so near the border that they will feel quite at home, though it may be necessary to gently remind them that they must put on no airs at the Falls, for they own only half of the Horseshoe, while we own the other half and all of the American Falls. But we are particularly anxious to greet a dozen or so from over the water, and we are free to confess that it is not all pure selfishness. In addition to widening our acquaintance, we expect to learn something from them that may be useful to the craft here, while we may be able to communicate to them much information by word of mouth which cannot be conveyed by the printed page. We guarantee to every Britisher a jolly good time, and that he shall know a great many things when he gets home that he did not know when he came.

ATTEND YOUR STATE CONVENTIONS.

To our home people we have a word of earnest exhortation. In several of the States conventions of clayworkers are to be held. Make these interesting and profitable by your personal presence and your earnest participation in the business. It is as it should be that the smaller attendance at these gives greater opportunity for every one to hear and to be heard, and brings a closer intimacy than is possible in the National Convention. It is impossible to say which is the better school, the State or the National Convention, for they are necessarily unlike, and yet each is equally dependent on the other. If any State has not a State Convention, let us urge the organization of one at once, and be not discouraged if, at first, the attendance is small, or, for that matter, if it remains smaller than the National. A dozen earnest brickmakers cannot spend a few days in discussing the various features of the industry without profit. Go to receive good and to impart good, and you will never regret it. In some respects the winter months are months of leisure to our craft, but they should be a period of development. It is the season of conventions. Make much of it.

ARE TIMES IMPROVING.

Late in the summer we met one of our personal friends moping moodily on the sidewalk before his door, in strange contrast with his buoyant gait and bearing that time a year ago. We saluted him cheerfully, and expressed our gratification at seeing him out and about, though evidently feeble. There was something inexpressibly sad in his acknowledgment of our neighborly salutation. His look betrayed utter discouragement and absolute despair, while he told us how weak his knees were and with what difficulty he walked at all, and how dreadful life was under such circumstances. "But you forget," we replied, "how, less than six weeks ago, no one expected you to live another day, and how you certainly would have died but for that heroic wife of yours and that attentive physician. You have been indiscreet in your diet and have been using unwholesome water, and typhoid fever was inevitable. Its progress was slow but sure, until it seemed you must pay the penalty of your sin against sanitary laws. You early gave up, too, contrary to your usual pluckiness, but your wife rallied you by her hopeful words. One day you were almost gone, and the doctor announced the crisis was near; you would be better in twelve hours or die. When I called the next morning you had asked for nourishment, and had relished a little beef tea, and the doctor had said the crisis had passed;

you would get well. How tenderly your wife nursed you and how anxiously we watched every indication of returning strength, you were not in condition to appreciate. In a week you were able to sit up in bed and were clamorous for more food and richer food than the doctor would allow. In another week you could sit in a chair, walk about the house, and now you walk abroad, though not with vigor you once had. Wait awhile; you will be yourself again. A recovery to full strength from such a prostration is not the work of a day, or a week, or a month, even. There was something in passing the crisis and beginning to gain strength."

That man is well now, and goes about his business with about his old-time vigor, though it is noticeable that he is not so gluttonous as he was a year ago. He seems to think that there are sanitary laws which must be observed, or typhoid fever or some other ailment must be the penalty.

SLOW GROWTH BEST.

Just how many people are like our neighbor in their impatience to recover their wonted business prosperity we cannot tell. He seemed to forget that the waste of muscle and strength that three or four weeks in bed had caused, not to mention the waste that had brought him to bed, could be restored only by slow accretions from the wholesome food he ate; that ceasing to grow worse and beginning to grow better was an epoch worth remembering. That there was to be a reversal in the tide of business in the case of the election of Mr. McKinley was a general opinion, not of one party only, but more or less of all parties. Has it come? Are times improving? To the Clay-Worker there seems to be but one answer. The crisis is past. Some things are unmistakable. Millions of gold was brought forth from its hiding place within a week after the election, and work in many industries was resumed. It is as unreasonable to expect that every interest should at once leap into former vigor as it was for our neighbor to expect or even wish to bound at once from a bed on which he had oscillated between life and death for many days to his usual activity in his place of business. Some industries must necessarily feel the effect of a revival later than others, and one of the latest is the brick business. Men who have been deterred from building by the exaggerated threatening of the times cannot at once reverse their policy and order brick. Let us be patient and hopeful. Times are improving. Every business is feeling it. Time is as essential to business recuperation as to the regaining of strength after a tussle with typhoid fever. And then let us learn a lesson from the typhoid patient. He was much more prudent after his recovery in the observance of the laws of health. A more careful observance of Poor Richard's maxims regarding wealth would have greatly alleviated the late calamitous hard times.

CHRISTMAS IS COMING.

One does not need to refer to the calendar to know that Christmas is coming. It is in the air, and by this we do not refer to the temperature, for that is a very uncertain quantity at this time of the year, and hence we have no homily to write about a green Christmas or a white one; we mean only to say that the show windows of the stores and shops proclaim the coming of Christmas, if everything else were silent. There never has been a more lavish preparation by merchants for this annual holiday, and, judging from the activity of early purchasers, they have reason to expect a remunerative business. This has more than one significance. It indicates that however much the times may have enforced economy along some lines, there is a living sentiment abroad which no adversity has been able to suppress. Indications are that a cheaper style of goods may be the rule and that utility may, in many cases, be consulted at the expense of the merely ornamental, yet there is the old-time purpose to be happy by making others happy in the bestowal of some article on the festive day. This is as it should be. Long let us perpetuate the custom of being generous and joyous at Christmastide. This need not always involve a gift, even of small value. Words and tempers and actions are such valuable accessories for material favors that without them no commercial value can make a material gift acceptable, while in the absence of the material they constitute a most delightful substitute. Not only let us perpetuate the generous sentiment which differentiates Christmas from all other days, but let us count him an enemy, not only to childhood, but to the race, who attempts to philosophize out of existance our venerable Christmas friend, old Santa Claus. He is a veritable entity, and perish the wretch who is not acquainted with him, and who therefore makes light of him or his office. It may be inevitable that sooner or later some suspicion may arise as to his reindeers and express wagon, and his agility in traveling down and up chimneys, especially since six-inch stovepipes have superseded the six-foot-by-four chimneys of primitive times, but let Santa live forever as the lover of good children, and so benevolent that he overlooks a spell of bad behavior in others and bestows favors, as the All Father does the rain, hoping for better behavior in the future. The world cannot afford to banish Santa Claus, that invisible, ever-present embodiment of good will to children, from the forces which contribute to the happiness of Christmas.

It is in no mere perfunctory sense the Clay-Worker wishes its readers a merry Christmas. The year has brought its accustomed sorrows and disappointments. Possibly in some cases it has been exceptionally adverse, as we see things from our present standpoint, but even those who have had most cause for sorrow have had many occasions of joy. Let us join in all the festivities of the season and share in the joy that abounds, and see that we communicate none of our sorrows, if we feel that from any cause we have had an undue amount of them. The sun above us will shine as bright as ever it did. Other years are to come, with their duties and pleasures. Let us enter upon them with hope and determination. Be merry.

PERSONAL ATTENDANCE UPON CONVENVIONS.

The broadening influence of the attendance upon conventions year after after is not to be overestimated. Some of us may think that there is nothing particular to be lost by failure to attend a particular Convention. They have been to many before, and the columns of the Clay-Worker, as they know, will give them a full and complete record of the proceedings. But in such a thought the member loses sight of the influence of personal contact and the social touch with successful men who are interested in his line of work. Not only that, but one meets new faces—the public officials, the builders and contractors of the cities in which they meet. There is the influence of the progressive spirit of the various localities, so that, altogether, one misses the spirit of the body of live, energetic and successful men through the failure of personal attendance upon the meetings of that body. The way to get most out of the Convention is to be there. Thus one gets both the active and the passive influence. One can measure his loss through failure of attendance on these conventions by considering what it would have meant to him had he never attended any of them. Would he be the man in his business to-day that he is had he neglected to attend all conventions? The spirit which will lead to a single neglect is a part of the spirit which would have led to total neglect.

BRICK-PAVED COUNTRY ROADS.

The rich soil of Illinois has one disadvantage—that of being very muddy during certain months of the year. The people of Monmouth township, in Warren county, in that State, have been making material advances in the construction of good roads. The experiment of brick road building has proved a great success, and is enthusiastically received by the people of that section. The Monmouth Daily Review gives a detailed account of the construction of the first highway paved with brick.

In another column we have presented extracts from this account, and commend it to the attention of our readers.

In a general sense, brick roadways for the country cannot be considered an experiment. In Holland, where the soil is very soft and rich, they have been in common and successful use for many years. They are certain to come into more general use throughout this country. It is only a question of time.

FAKE METHODS OF ADVERTISING.

Some people are behind the times. They cannot help it. They were born that way. Ten to twenty years ago many a bright, shrewd and enterprising publisher turned a nimble, if not an honest, penny by giving out that at a certain time, on some special occasion, he would issue an extra edition of "The Highflyer," and would guarantee that it would reach thousands upon thousands of the very kind of readers who would want to buy the identical kind of goods that this or that man had to sell, and at first many a credulous merchant or manufacturer was inveigled into trying the scheme. The inventor of this little fraud did right well in a small way with his first venture, and he repeated it several times, with ever diminishing results.

Encouraged by his success, some of his contemporaries tried it with like results, fairly profitable the first time, but never afterwards, because advertisers were not slow to learn that buyers look for what they want in the advertising columns of the paper whose intrinsic merits recommend it to them, or to circulars which may more fully explain the special merits of the particular thing advertised. They never read circulars in papers and seldom notice advertisements in extras, sometimes to evade the postal laws, called "sample copies." Because of the manifest unfitness of this method of advertising the scheme was long ago practically abandoned; but now and then one of these "behind the times" people bob up with the old, discarded method of "raising the wind," but it is usually a failure, because advertisers of valuable goods refuse to be enticed into the trap. It is, withal, a rather bungling way for a paper to advertise its own lack of the necessary circulation to constitute it a profitable medium of advertising except on extraordinary occasions. It is gratifying to the friends of the Clay-Worker that it does not have to resort to any such an exploded method. Its readers are solid men, as its advertisers know by the returns they receive from their regular advertising.

THE SMILE THAT CAPTIVATES.

Notwithstanding the fact that the brickmakers of Chicago are still complaining of hard times, the Purington-Kimbell Brick Company sold and delivered 43,000,000 brick between June 1 and Nov. 15. At the prevailing price of $4.50 a thousand they did not coin money. They did not lose any, either, so D. V. is happy, and will take the same "child-like and bland" smile to the Buffalo Convention that has endeared him to all the older members and captivates the new ones instanter.

BLOCK PAVEMENTS BEFORE THE AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.

Some weeks ago our Board of Public Works in Indianapolis decided that it would put down no more asphalt pavement because of the cost of maintenance. About that time it made contracts for a number of wooden block pavements. Subsequent to that time Mr. Downing, President of the Board of Public Works, who was a strong advocate of wood pavements, read a paper on creosoted block pavements before the American Society of Municipal Improvements at their meeting at Chicago. There he was talking to people who had had definite experience. His ideas were not received with favor. The engineers of our great cities are, for the most part, men who know something about block pavements. It was agreed that there were certain merits connected with the wooden pavement, and also that there were certain prominent demerits. For instance, it is a pavement which does not last very long. Again, it is not a sanitary pavement. It is absorbent; it takes to itself all of the filth which may be deposited upon it to the point of saturation, and, under the influence of sun and moisture, gives it forth to the people on or near it. The best engineers say that the pavement might be tolerated if it were not for these two considerations. If one could remove the unsanitary qualities on one hand, and, on the other, the people did not care for the cost of its renewal every few years, it might then be considered very satisfactory. But these are vital considerations, and we are not sure that the people lay greater store upon the question of cost than they do upon that of health. Block pavements are used to a considerable extent on the other side of the sea, with the full knowledge that, after a careful inspection, creosoting and subsequent care, the pavement will not last longer than four and a half to five and a half years. The latter was the limit of expectancy on wood pavements which were laid in Paris in 1891.

THE CURRENCY SYSTEM.

Early in this month a conference of a large number of business men of the Middle States was held in this city for the purpose of calling together a convention next January which will consider a method of developing the best possible financial and currency system for this country. The first meeting was very successful, and the spirit of it has spread throughout the country. Mr. H. H. Hanna, of this city, who is Chairman of the Executive Committee, has letters from many parts of the country which indicate a lively interest in the movement. Ex-Governor Stanard, of St. Louis, prominent business men of New York, and others from Cincinnati, Pittsburg, Louisville, and, in fact, many of the best business men from the great cities of this country, are industriously engaged in the effort to bring together the best people, with a view of giving this question the very best possible consideration. It is not the purpose of the convention which is to assemble next month to recommend a definite currency system. On the other hand, it is their intention to organize a commission, composed of the best business people in this country, who shall systematically and intelligently investigate, with a view of making recommendations to Congress as to the best currency system to be adopted. At the same time, it is the intention to organize the country at large in a way to give the greatest possible force to the work of this commission. It is an intelligent movement, under clear-headed and most intelligent guidance, and, if successful, will relieve this country from the imminent danger of an unsatisfactory, illogical, effete, patchwork currency system, under which it is now struggling.

ORGANIZATION.

As prices become lower in clay products, as they do in all products, the tendency of all values being downward, profits are relatively less. This calls for protection against ourselves. It calls for organization. The Clay-Worker has always been an advocate of local organization; we believe that it should be a part of the work of all conventions to foster this spirit. It is true that it is not possible in all cases to perfect a local organization which will agree upon prices at the beginning of a year and maintain them throughout the season. Oftentimes this may be done. Sometimes it is not done. Effective organization is prevalent in many lines other than brickmaking. It is simply a question of organizing ability. The coming together of local brick manufacturers, the discussion of trade issues, the social contact, have in themselves an influence in maintaining prices. With this start made, and with the added intelligence of time and experience, we will soon find ourselves in a position to more absolutely control prices through united effort in local organization. A few cents per thousand can mean very little to the individual or the community; it means everything to the manufacturer of brick. It is probable that there is not an important line of manufacture in the United States which must not look to organization in one form or another to restrain competition.

THE COST OF BUILDING IN 1897.

A leading architect of Indianapolis was recently interviewed by the Daily Journal, and in answer to the question, "How about the cost of building in 1897?" said:

"I don't see that there can be much difference from what it was last year. The cost of building is not as much a matter of excessive competition as is generally supposed. It is as much a matter of method of manufacture as anything else. We can all remember when brick, for instance, which came into this market were made in a large number of small yards. It was a kind of a roadside industry. Only a few kilns of brick were made each year. A kiln or two were burned in the fall to have them ready next spring. Think how different it is now. They are produced in great manufacturing establishments which work the year round, and which operate independent of wind or weather. We now have extended treaties on brickmaking. Great manufacturing establishments are constructed for the sole purpose of making brickmaking machinery. The State of Ohio has established a school which is devoted to this one industry. It is chemistry and general science which keeps down the price of brick, and not the mere matter of competition. The same thing is true in woodworking. It is science. Machinery is constructed, the work is done; the art of handicraft is all but passed. Freight rates are less, year after year, so that, taking it all in all, we need not expect to see building any higher next year than it has been."

"Might not a strike affect prices?"

"Certainly not much. The planing mills and manufactories of that class, for the most part, pay good wages and would not be affected by a strike. So do the better class of contractors. Masons of various kinds are pretty well organized and have always received good wages, and, as said before, the use of machinery has reduced the amount of labor in all buildings, so that an absolute increase in wages does not make the same relative increase in the price of the building that it once did. Furthermore, the large increase in the use of machinery must, in time, have the effect of increasing wages by enabling a man to do more work. This is history.

"You can just say in a general way that we are going to have more building and better building, and, as well, better building for the same money, than we have had for some years past."

DAMAGES FOR BEACH OF CONTRACT.

A recent decision by the Supreme Court of Appeals of Virginia is of importance to all engaged in contracting for the manufacture and delivery of articles for a specified time or period, and while in this instance it covered the manufacture of brick, yet the principles are applicable to any other articles to be prepared or even procured for future deliveries. It appeared from the testimony that on the 20th of January, 1891, the Salem Improvement Company entered into a contract, under seal, with George W. Bethel & Co., by which the latter agreed to make and burn for the former 1,500,000 bricks during the summer of 1891, the Improvement Company agreeing to pay $6.50 per 1,000 for the bricks in the kiln, etc. Bethel & Co., under this contract, burned 803,491 bricks, and received therefor $3,212.31. A disagreement having arisen between the parties as to their rights under the contract, Bethel & Co., on March 5, 1892, brought an action against the Improvement Company, and after setting out the terms of the contract, alleged that, except in so far as they have been prevented by the Improvement Company, they have always well and truly performed all things in said contract on their part to be done, but that the Improvement Company has not hitherto kept and performed its agreements in said contract, "in this: that after the manufacture of said 803,491 bricks, and when they were proceeding with the manufacture of the residue of said 1,500,000 bricks, the Improvement Company notified them that it would not purchase any more of the said bricks than had already been made, and to discontinue the manufacture of the same;" and that although the bricks already manufactured were made according to contract, the Improvement Company had not paid for them according to agreement, except the said sum of $3,212.31, whereby they had been damaged on account of the failure to pay for the bricks actually manufactured, and by the outlay necessarily incurred in the preparation for the manufacture of the residue of said bricks, and the failure of the Improvement Company to allow them to continue the manufacture of the residue of said 1,500,000 bricks, or to pay them their reasonable profit, namely, the sum of $3 per thousand for the same to be manufactured.

The court said: For the breach of contract to pay money, no matter what the amount of inconvenience sustained by the party suing, the measure of damages is the interest of the money only. That this is the rule is admitted. That there are exceptions to it may also be conceded; but this is the ordinary case of a failure to comply with a contract to pay money at a stipulated time, and in such cases the measure of damages is the principal sum due, and legal interest thereon. To make the Improvement Company responsible for the profits which might have accrued by the use of the money in addition to the interest would be harsh and oppressive, and should not be sanctioned by the court, unless the other can bring his case within some well recognized exception to the rule.

Parties can recover for prospective profits when they are prevented from going on by being ordered to desist from the work, or by the omission to perform some condition precedent to its further prosecution by the other party. The court said, further: The theory upon which this action was brought, as appears from the pleadings, was that the party suing was entitled to recover because the other had broken its contract, not by failure to pay for the bricks manufactured, but by its notification that it would not purchase any more of the bricks than had already been made, and to discontinue the manufacture of the same. Had this breach been established by the evidence, there is abundant authority to warrant a judgment for the greater loss; but the case was tried upon the theory of liability by reason of non-payment of the installments.

PACIFIC COAST NEWS.

The personal and real property of the Steiger Pottery plant, of San Jose, Cal., was sold under foreclosure proceedings instituted by the First National Bank of San Jose. The personal property brought $13,500 and the real estate $31,938. The entire property was bought in by the bank, and representatives have visited the plant preparatory to making arrangements for starting up again.

The rehabilitated Stockton Art Pottery Company bought in the property at public auction at Stockton, Cal., assuming all the claims against the old company, including a mortgage of about $7,000 held by the Stockton Savings and Loan Society. The company is getting ready to begin operations, and workmen are now engaged in putting the plant in repairs.

The next California Legislature will be asked to pass a bill authorizing the expenditure of $300,000 for a sewerage system in Holly Park, San Francisco.

T. G. Proctor, Manager of the brickyard at Nelson, B. C., will put in improved machinery this winter.

The Midland Pottery Company, of Roseville, O., is advertising for representatives in various cities on the Pacific coast.

Crude petroleum is being used for fuel in the Grant brickyards at Santa Barbara, Cal.

William Collins, father of Collins Bros., mantel and tile dealers of Los Angeles, Cal., died last month in Seattle, Wash.

Bricks can be shipped from Seattle to Juneau, Alaska, for $3 per thousand, making them cheaper than they can be manufactured in Alaska.

The Salem, Ore., Labor Exchange has found by its experimental brick kiln that there exists a very good quality of fire clay in the Lake Labish bed. The deposit is about a foot thick, and the discovery of its quality was accidental.

The Mexican tile factory at Montecito, Cal., which was closed down last month, is now running again, and has 10,000 tiles ready for delivery.

Large bunkers have just been completed at the claybank in Stewartsville, Cal., which is one of the chief sources of supply of clay for the Antioch pottery.

There is talk of resuming operations at the terra cotta works in Elsinore, Cal., which have been idle for three years.

Frank C. Brodie, of Goldendale, Wash., who is interested with Representative-elect Herbert Baker in a kaolin mine near Baker City, Ore., has received information from Jesse Insley, of the Enameled Pottery Works, at Trenton, N. J., which, in all probability, will result, since McKinley's triumph, in the erection of a first-class plant in Oregon that will manufacture from the native kaolin all kinds of crockery ware such as is now shipped from the Orient and the East.

A. M. Smith, of the Oregon Pottery Company, has been elected member of the Board of Directors of the Portland, Ore., Manufacturers' Association.

A HOPEFUL VIEW.

The Chisholm, Boyd & White Company, Chicago, report an improvement in business. It is coming slow, but sure, and they feel confident that in a few months they will again be running their shops night and day, as they were in 1894. They have something new in the line of dry pans that they think will take first prize wherever exhibited.

KENTUCKY, OHIO AND VIRGINIA NOTES.

The Lone Star Plant, that had been idle for more than a year, was recently leased and put in operation by R. A. Whiston, at Steubenville, O.

In the brick and tile field about Steubenville, O., there has been considerable revival of activity since the election, but by no means all of the plants have been able to resume.

The Freeman Fire Clay Company, of Steubenville, O., will build two new kilns and generally repair their plant as soon as a kiln of brick now burning for that purpose is completed.

The Portsmouth (O.) Red Brick Works have but recently disposed of their last brick of the 1895 product, and have 600,000 of this year's make yet on hand. Sales have lately been rather slow.

The Ironton (O.) Fire Brick Works have resumed since the election, and expect to be able to keep in motion the remainder of the winter. The company has been shipping considerably the past two weeks.

Harris & Rice, of Richmond, Ky., contractors and builders, have arranged for the starting of their red brick works at that point to manufacture one million building brick. The plant has been idle for two years.

The Chester (Va.) Clayworking Company contemplate the early removal of their plant from Chester to Bermuda Hundred, Va. In such event, a sewer pipe plant will be placed at Chester by the same concern.

All of the fire clay mines of the eastern Kentucky field, in Carter county, are shipping considerably, the demand increasing with the resumption of the Ironton and Portsmouth, O., yards, which they largely supply.

All of the eastern Kentucky fire clay and fire brick companies are preparing to have elaborate exhibits at the coming Tennessee Centennial, as the opportunity will be of great advantage for advertising the already known excellence of this product.

The Mountain State Brick and Tile Works recently built at Point Pleasant, W. Va., have so far made a most flattering showing, and have been constantly in operation. They have about completed their winter's run, however, and are shipping somewhat.

The suit of the Kentucky Fire Brick Company, near Indian Run, Ky., against D. R. Lean, of Pittsburg, will be argued this month in the United States Court at Cincinnati, O. The company asks damages of $30,000 for alleged defects in the erection of kilns.

The owners of an abandoned coal mine at Ferguson, W. Va., on the line of the Norfolk & Western Railway, are investigating the quality of the fire clay therein, with just what intention has not been stated. The mine was abandoned because of the prevalence of the clay.

Huntington, W. Va., parties are figuring upon the revival of the now abandoned brickyard at Kenova, in case that town takes the building spurt that is expected in the spring by reason of additions to be made in the railroad interests of the Norfolk & Western at that point.

The Catlettsburg (Ky.) Brick and Tile Company, whose plant has been idle for nearly a year, will overhaul the plant this winter, at considerable expense, making improvements and changes that are calculated to improve not only the product, but the prospects of the concern.

Extensive repairs and improvements have been made recently at the plant of the Ashland (Ky.) Fire Brick Works, and the company is keeping the plant in constant operation and disposing of their entire product, shipments being largely confined to the South and the Virginia coal fields.

The promoters of the proposed new town in West Virginia, opposite East Liverpool, O., have a large area of fine clay lands, identical in quality with that of the East Liverpool section, and expect the village to become quite a pottery center, encouraging investment by offers of free sites, etc.

The indications are that Greenup county, Kentucky, fire clay interests will receive more attention and development the coming season than ever before. A good quality of second-class clay is found along the first bench of hills fronting the river, and of easy reach by incline to the C. & O. Railway. Advantage will be taken of these conditions.

The coke manufacturing companies operating in the Kanawha, New River, Loup Creek and Pocahontas fields of West Virginia have, the past year or so, used considerable imported fire brick in their oven work, finding the foreign product cheaper than that offered by the brickmakers of southern Ohio and eastern Kentucky. The latter have acknowledged the situation in disgust.

The latest report with regard to the rumored proposed move of the Parke Fire Clay and Brick Company from Kenilworth to New Cumberland, W. Va., is to the effect that no change will be made in location, but that the plant will be overhauled and its capacity doubled. The location of another clay supply is accountable for the change of programme.

J. A. Haskell, of Ashland, Ky., associated with Cincinnati and Chicago capitalists, have secured options upon some fifteen thousand acres of fine fire clay lands in Carter and Rowan counties, in the vicinity of Soldier, Ky., with the intention of purchasing and establishing fire brick and tile works. Mr. Haskell was for awhile connected with the Forest Dale Fire Brick Company, at Ironton, O., and claims brick can be made in Carter county at a saving of $5 per thousand over the Ironton cost.

The Camden Clay Company, erecting an extensive fire brick plant at Spillman, Mason county, West Virginia, are making pleasing progress, and have an iron inclosed two-story building already in place. The plant will be steam heated, will have immense dry-house room, a dozen or more ovens and kilns, and will be run by a 175-horse-power Corliss engine. Operations will begin in January. Fire brick, plain and ornamental tile, etc., will be made.

C. O. L.

A NEW ASPIRANT FOR TRADE FAVORS.

The Wellington (O.) Machine Company advise us that they have made a compact with Jas. W. Hensley, of Indianapolis, late of the Horton Manufacturing Company, whereby he will represent them henceforth, handling their machinery for or in the territory formerly covered by S. K. Fletcher, the latter having gone into other lines of business. Mr. Hensley is thoroughly acquainted with the business, and the field, too, and will be glad to hear from those wanting anything in the line of brickyard supplies.

THE BUCK-NEWTON LITIGATION ENDED.

Jas. A. Buck, of Crescent, N. Y., advises us that the patent litigation so long pending between him and A. H. Newton as to the ownership of the patent of the well-known Buck brick sander has finally been decided in his (Mr. B.'s) favor by the Court of Last Appeal. He has fought a hard fight, and is to be congratulated on the termination of the case, as is Mr. Newton, also, for now they can both turn their efforts to selling sanders, instead of fighting one another.

WOOLLEY TO THE FRONT.

Our good neighbor, W. W. Woolley, who directs the destinies of the Woolley Foundry and Machine Works, Anderson, Ind., reports a satisfactory trade condition in the natural-gas belt. The present year has been a busy one for him, and the prospects are good for a still busier one to come. He has been adding considerable machinery to his already well-equipped shops, and will be able to take good care of any orders for brick machinery that may be intrusted to his company. He promises something new in the line of clay-preparing machinery in the near future.

A NEW SANDER FOR WIRE-CUT BRICK.

Chambers Bros. Company, Philadelphia, are sending out a new four-page circular, illustrating some improved machinery which they will offer to the brick trade the coming season, the most notable of which is a "head sanding and brushing machine." By means of this device sand is brushed into the ends of common end-cut brick, producing a good grade of stretcher brick at comparatively no additional expense. Manufacturers of end-cut brick will do well to investigate this device.

PENNSYLVANIA AND VANDALIA LINES HOLIDAY EXCURSIONS.

One and one-third fare for the round trip. Tickets sold Dec. 24, 25 and 31, 1896, and Jan. 1, 1897. Also liberal rates and limits for students attending colleges, seminaries, etc., presenting certificates signed by principal or superintendent.

Ticket offices: No. 48 West Washington street, No. 46 Jackson Place, and Union Station, Indianapolis, Ind.

E. A. FORD, G. P. A. GEO. E. ROCKWELL, D. P. A.

AT BUFFALO.

By C. McD.

Where do the brickmakers convene this year,
To renew old friendships and exchange good cheer,
And drink "long life" in good old beer?
At Buffalo.

Each one bringing a hard, square brick,
Telling how he made it—cheap and quick—
Trying to make old boasters sick—
At Buffalo.

Hundreds are saving nickels and dimes
To have again one of those good old times,
Usually lasting till morning chimes—
At Buffalo.

Business men come there, quiet, intense,
To turn, next year, into dollars and cents,
The ideas gotten (if they prove common sense)
At Buffalo.

Old-timers, primed with a brand new speech,
Quiet ones ready with a campaign screech
To voice applause, if it proves a "peach"—
At Buffalo.

Drier, kiln and machine men galore
Will be there in their glory, but will not bore,
'Cause they fear 'twould make the Convention sore—
At Buffalo.

Young men have come, finely dressed, each year,
But will return again, shedding tear after tear,
'Cause they couldn't "catch" our superb sten-og-ra-phere—
At Buffalo.

Brush Bros.' great yard will run full blast,
Their "Monarch" machine making bricks so fast
You hardly can count them as they go past—
At Buffalo.

Many a "Superintendent" has turned out a fool,
And good ones are wanted who can work by rule,
So we will discuss starting for them a school—
At Buffalo.

The "Pow-wow!"—what memories are stirred
Of the eloquent speeches there to be heard!
While some eat and drink till they won't speak a word—
At Buffalo.

Friday—sight-seeing we go as of yore,
This time to hear old Niagara roar,
Taking in sights till we can stand no more—
At Buffalo.

Saturday—shake hands all round, pack grips, large and small;
We all hate to leave, but to one another call:
"By Jove! 'twas the best Convention of all!"—
At Buffalo.

READY FOR AN "ALL-TOGETHER" PULL.

Editor Clay-Worker:

Inclosed please find check for $2 to pay for the Clay-Worker for the ensuing year.

Now that the election is over, we feel here in Iowa that all has ended well, and we are expecting to double our energies next year and do more business than has been done here for the last three years, so send on the Clay-Worker for the year 1897.

T. F. MARDIS.

Winterset, Ia.

PARTNER WANTED.

Publishers Clay-Worker:

Inclosed find one dollar, for which send the Clay-Worker for six months, beginning with the December number.

I have only been in the tile and brick business for the past season, and am not very rich. Would like to sell entire or part interest in my business. I have a big territory and good clay.

New Haven, Ill. H. C. McMULLEN.

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PLENTY OF RAW MATERIAL.

Publishers Clay-Worker:

Your various sample copies have been read with so much interest that I herewith inclose you the price for one year's subscription—$2.

As I learn more about my clay I feel certain that I have a very fine clay. One party, Mr. Norris, Superintendent of the Terre Haute Tile and Marble Company, says it is superior to the famous Woodbridge and Trenton clay of New Jersey. If this be the case, you will hear from me further in the near future. This is destined to be a great clay center, I am sure, for there are great veins of all kinds of clay, from common brick clay to fine potter's and fire clay. H. T. THORP.

Terre Haute, Ind., Dec. 8.

ITTNER'S BRICKS.

27,000,000 Made Annually at St. Louis and Belleville Ill.

ESTABLISHED 1859.

Red Pressed and Ornamental Brick of unsurpassed quality a specialty and can be furnished in any desired quantity. Builders who desire the finest pressed brick at reasonable prices, are requested to write for illustrated catalogue and price list.

Rock-faced and Roman brick, red and brown, granite, mottled and other colors made on order.

Orders for special designs and ornamental patterns solicited.

ANTHONY ITTNER, Telephone Building, ST. LOUIS, MO.

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WHEN WRITING TO ADVERTISERS
Mention the Clay-Worker

Brick and Tile Manufacturers:

IF YOU WANT Prices on any sort of Machinery, Kilns, Dryers or Brick and Tile Supplies of any kind address a Postal card to

The CLAY-WORKER,
Indianapolis, Ind.,

Stating just what you want and **We will do the rest.**

Christmas is Near.

A good book is one of the best Christmas gifts. If you want to make a young brickmaker happy put one or all of the following books in his stocking.

CLAY GLAZES AND ENAMELS, By H. R. Griffen. The latest and best work on Enameling Brick, Terra Cotta, etc. Tells just how to do it. Price........	$ 5.00
BRICKMAKERS MANUAL, By R. B. Morrison and J. A. Reep. Treats on making and burning brick in a plain practical manner. Price........	$ 3.00
SIXTY YEARS A BRICKMAKER, By J. W. Crary, Sr. The lessons of a life long brickmaker told in an interesting and instructive manner. Price........	$ 2.50
VITRIFIED PAVING BRICK, By H. A. Wheeler, E. M. An up-to date book telling how and why Paving Brick should be made and used. Price........	$ 1.00
TABLE OF ANALYSES OF CLAYS, By A. Crossley. Contains the analysis of most of the American and European clays. Price	$ 1.00
PRACTICAL FARM DRAINAGE, By J. J. W. Billingsley. Tells how to make, burn and salt glaze drain tile, and why tile drainage pays. Price........	$ 1.00

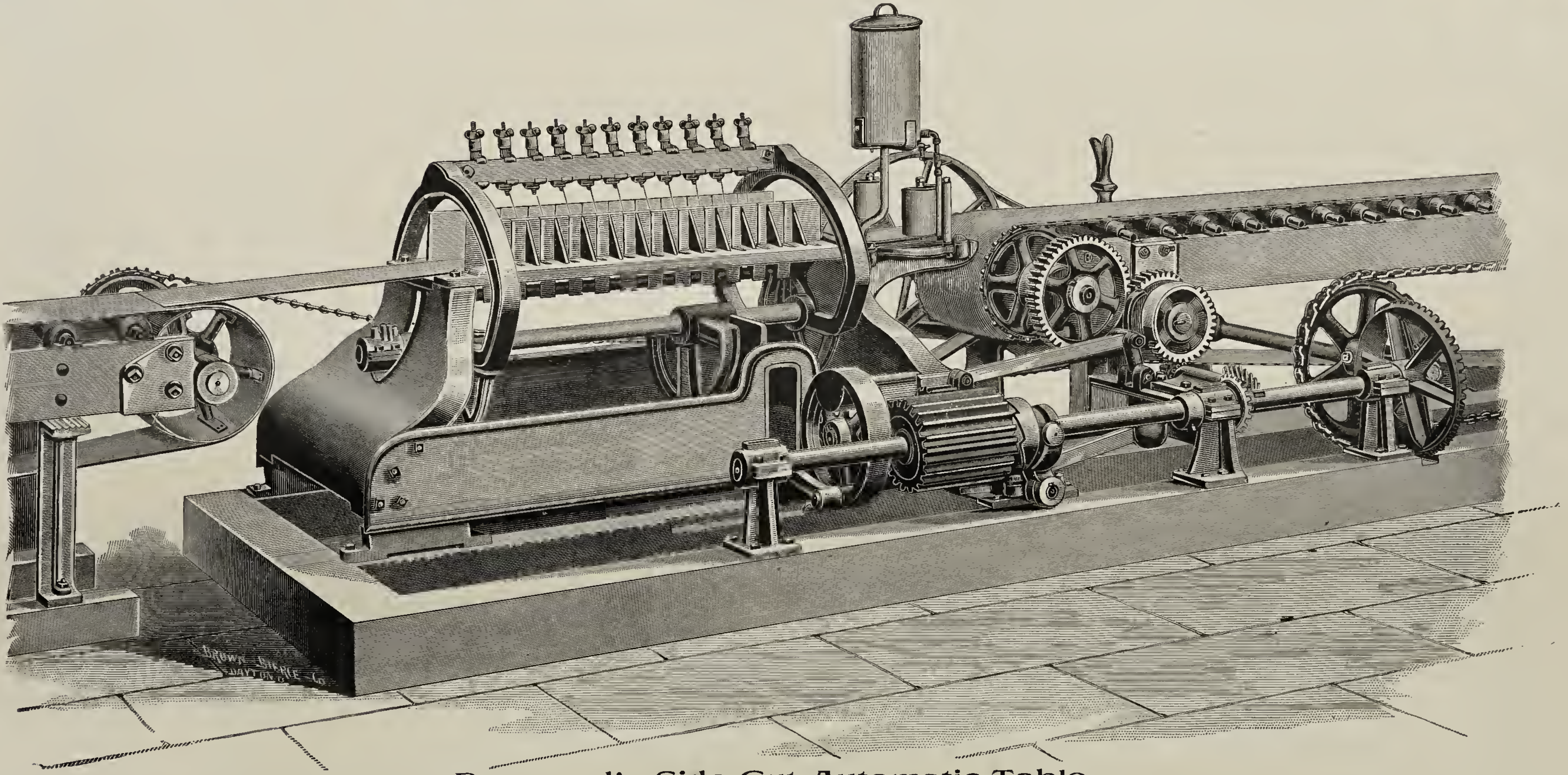
A Little Library for Clayworkers,

All these books mailed to one address, Postage prepaid, for . . .

$ 10.00

T. A. Randall & Co.,
Publishers,
5 Monument Place, INDIANAPOLIS.

IT IS ALL OVER NOW,

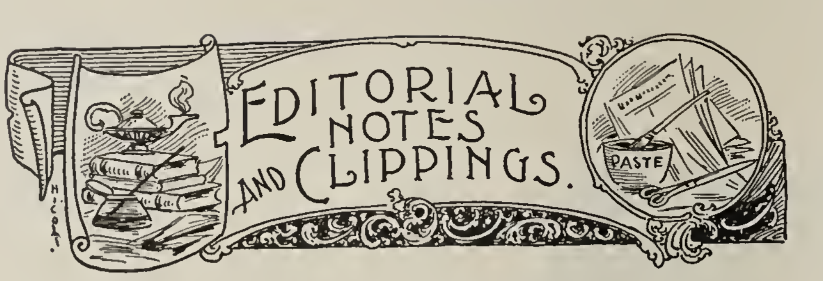


Raymond's Side Cut Automatic Table.

And, as you again return to making brick, we would remind you that we are on the market with a larger line of brickyard supplies than ever before, which we can furnish promptly and at reasonable prices. We furnish everything from the clay pit to the Kiln.

C. W. RAYMOND & CO.,

Send for Catalogue. **DAYTON. OHIO.**



Arbuckle & Sons will manufacture tile at Ray's Crossing, Ind.

Ingall Thronson expects to manufacture flower pots at Tallmadge, O., in the spring.

The Greer Machinery Company, of Knoxville, Tenn., is in the market for a good second-hand dry press.

Chas. Wollin, of Trade Lake, Wis., contemplates going into the brick business at Grantsburg next spring.

The Union Sewer Pipe Company has been incorporated at Red Wing, Minn., with a capital stock of $50,000.

The Tiffany Pressed Brick Company, of Chicago, Ill., has certified to a change of name to Tiffany Enameled Brick Company.

The Stone Brick Plant, at Michigan City, Ind., was sold to Simeon D. Haskell, a representative of Chicago capitalists, for $7,200.

The Jamestown (N. Y.) Shale and Paving Brick Company are rebuilding their plant, which was destroyed by fire last spring.

The number of brick handled by the Central Brick Exchange, of New Haven, Conn., the past season, aggregated 50,000,000.

The Vulcan Clay Company, of Wellsville, O., are so rushed with orders that they have found it necessary to build several new kilns.

A. B. Mounts, Ruston, La., writes for a sample copy of the Clay-Worker, stating that he is going into the brick business at that place.

The Ruby Pressed Brick Company, of Lockland, O., which has been closed for some time, has resumed operations with a full force of men.

Jos. Towers is making extensive improvements in his brick plant at Kensington, Conn., in order to meet the growing demand for his brick.

Arrangements are being made to rebuild the Kirkham Art Tile and Pottery Company's plant, at Akron, O., which was burned in March, 1893.

M. E. Jantsen, Stotesbury, Mo., is considering the advisability of putting in a tile machine, and would like to receive catalogues, price lists, etc.

Alex. A. Scott, 1323 Central avenue, Knoxville, Tenn., requests us to state that he is in the market for one tile machine and some brick trucks.

The Moline (Ill.) Manufacturing Company will put in a new brick press and dry house. They expect to spend about $3,000 in improving their plant.

Peter Proulx has sold his interest in the brick plant of Peter Proulx & Co., Epping, N. H., to his partner, Jos. B. Proulx, who will continue the business.

R. S. Burdick, of Harrington, Del., writes for a sample copy of the Clay-Worker, as he is going to put in some brick machinery and wants to see what is advertised.

Wallace & Son, whose tile factory and sawmill, at Delaware, O., were destroyed by fire last summer, are now rebuilding the same, and hope to be in operation in a short time.

H. C. Moseley, of Peru, Ind., advises us that he desires to correspond with manufacturers of drain tile or sewer pipe. He wants tile of not less than three feet in length.

Geo. I. Loucraft, a well-known brick manufacturer, of Elmwood Village, Mass., died Nov. 11 at his home in East Bridgewater. Mr. Loucraft was but twenty-six years old.

Graham Spencer, President of the American Kaolin Works, Kaolin, Pa., died quite suddenly of hemorrhage of the stomach, Nov. 21. His wife and seven children survive him.

Dr. Chas. Leali, of Kingsland, Ark., writes that he has a fine bed of good fire clay that he would like to dispose of. For full particulars in regard to same address Dr. Leali direct.

Mrs. Rose M. Roesener, of Hagerman, Fla., writes that there is a splendid opening at that place for a brick and tile factory. She says she owns a large tract of land, on which there is a good deposit of clay, and will give to any manufacturing company locating there forty acres of land, with a railroad running through it. She will be pleased to correspond with parties looking for a desirable Southern location.

The Moberly (Mo.) Brick, Tiling and Earthenware Company, which has been working a small force short hours for several months past, is now running full time with an increased force.

W. A. Tate and Walter P. Webber, of Columbus, Ga., have formed a partnership to manufacture paving brick from pulverized chert and furnace slag, which, they claim, will be as hard as adamant.

H. C. McMullen, of New Haven, Ill., would like to correspond with parties with a view of selling his plant outright or forming a partnership. He says he has a first-class factory and a fine deposit of clay.

The brick manufacturing firm of Weaver & Harmon, Baltimore, Md., has been dissolved by mutual agreement. W. H. Weaver will continue to manufacture brick under the old firm name of Weaver & Harmon.

The death of John Wilson Lahugh, of the Penn Brick Company, at Leetsdale, occurred at his residence in Pittsburg, Pa., the 6th ult. Mr. Lahugh was prominent in both the business and political circles of Pittsburg.

Ambrose Teeter, a tile manufacturer near Sheridan, Ind., was instantly killed by a gas explosion in a tile kiln which he was repairing. Mr. Teeter was in his sixty-first year, and highly esteemed by his associates.

Since the death of Charles McShane, of the firm of McShane Brothers, tilo manufacturers at Lostant, Ill., Richard McShane, the surviving member, has assumed entire control of the factory and will continue the business as heretofore.

"Regarding the business outlook," say the Marion (O.) Steam Shovel Company, "it is good. We have closed up nearly $100,000 worth of business since the election, and expect to close up considerable more in the near future."

M. C. Meigs, Lafayette, Ind., will make improvements in his brick and tile plant that will enable him to run the entire year. Mr. Meigs has a fine bed of clay and uses natural gas for fuel, turning out a brick rich red in color and as hard as flint.

The Montello Brick Company, of Reading, Pa., has recently purchased from Chambers Bros. Company, Philadelphia, one of their largest power brick presses, to be used in the manufacture of paving brick. The press has a capacity of 3,000 brick an hour.

A. T. Prescott, of Ruston, La., writes as follows: "Please send me a sample copy of your paper. It is likely that the manufacture of brick will be developed in this section, and we are seeking a publication that will be of assistance in such an enterprise."

President Healy, of the Cook County (Ill.) Poor Farm, advises the plan of putting in brick machinery, so the able-bodied paupers can make brick instead of loafing all day long. Mr. Healy says there is good clay on the farm, and thinks his plan a profitable and feasible one.

B. F. Ormond, who is now running a small hand yard at Meridian, Miss., writes that he contemplates building a large plant soon, which he will equip with modern machinery, and naturally subscribes for the Clay-Worker, so he may get in communication with machinery manufacturers.

The plant of the Mayer Pottery Company, Beaver Falls, Pa., which was recently burned, is being rebuilt. J. Mayer, President of the firm, says they are putting up a plant with a view to economy in labor and space, and expect to have, when complete, a pottery that will be a model in every respect.

Chisholm, Boyd & White Company, of Chicago, Ill., want an experienced man to go to South America to start a Boyd press and complete outfit of their machines; one who is a good burner and speaks Spanish desired. They also want a good man who speaks German to go to Germany for the same purpose.

C. and A. Potts & Co., of this city, report having closed a contract for a complete plant, including an all-iron horizontal brick machine, disintegrator, mold sander, trucks, barrows and molds, for Klein Bros., of Baltimore, Md. With the equipment of this yard for machine-made brick, the last of the hand yards of that city has disappeared.

The Thomas B. McAvoy Vitrified Brick Works, located at Pawling, Chester county, Pennsylvania, which were recently destroyed by fire, will be ready to resume operations in a couple of weeks, the company having erected buildings as near fireproof as possible, and increased the works by adding a 250-horse-power engine, also one of the largest Chamber & Bros. brick machines, with a capacity of sixty to eighty thousand per day, and two large clay pans, capable of crushing over

[CONTINUED ON PAGE 482.]

One of the "Sights" at the Convention.

• • • •

WM. C. BRUSH. **WM. H. BRUSH.** **WARREN H. BRUSH.** **S. C. BRUSH.**

BRUSH BROS.,

Manufacturers of . . .
. . . ALL KINDS OF **BRICK.**

TELEPHONE, {Howard 5 A. Seneca 101.

No. 927 Clinton Street, and No. 2 Builders' Exchange.

Buffalo, N. Y., Nov. 13th, 1896.

THE WELLINGTON MACHINE CO., Wellington, Ohio.

Dear Sirs:--We are now using your "Monarch" Brick Machine, taking clay direct from the bank. We have had it in operation the last four years, and have been well pleased and satisfied with it.

We expect to have the National Brick Convention in our city and your friends or prospective buyers will have the opportunity of seeing it in actual operation. Yours, etc., WM. H. BRUSH.

* * *

No Other Machine was Ever Able to Present Such as Follows.

IN 1897 CATALOGUE ARE MANY MORE LETTERS OF SAME TENOR.

Council Bluffs, Iowa, October 20th, 1896.

Gentlemen:—We have used the "Monarch" Brick Machine the past five years with the best of satisfaction, and we take pleasure in recommending it to anyone contemplating the purchase of a Brick Machine.

We have given our machine a severe test, and if we were going to buy another today we know of no other soft-mud machine that we would prefer to the "Monarch."

It will make brick as good and as rapidly as any in the market. We have made as high as 6,000 brick per hour—all good square brick.

In regard to repairs for the "Monarch"—with good care they will not amount to one per cent of the cost of the machine per year.

With best wishes for your success, we are,

Yours truly, WICKHAM BROS.

Menomonie, Wis., October 22nd, 1896.

Gentlemen:—We have now used the "Monarch" Brick Machine for four seasons, making an average of about 5,000,000 each season, and I believe we have not sent back to you for any repairs since we purchased the machine. The strength and durability of the "Monarch" is indeed very satisfactory, and to this you may add my testimony of 1893.

Respectfully yours, S. L. ALEXANDER,
Supt. Wisconsin Red Pressed Brick Co.

Lincoln, Ill., October 14th, 1896.

Gentlemen:—We have used your "Monarch" machine during the last three brickmaking seasons and are firmly convinced that it is the best machine of its class made. We have received the bulk of the brick trade here mainly on account of the difference in shape and superiority of brick made on a "Monarch" Machine, over those made on other makes here and commend it where desirable to have the best building brick possible to obtain by a mould machine.

We have not had a single break in the last three years and have made over 7,000,000 brick. Yours truly,

CITIZENS COAL MINING CO.,
T. F. Holmes, Supt.

Hamburg, Pa., November 19th, 1896.

Gentlemen:—After five seasons use of the "Monarch" we are confident that our confidence was not misplaced in the least, in purchasing it. During this time we have made over 16,000,000 of brick and this season up to date we have not lost one hour through any fault of the machine.

Our machine is just as good practically as it was the day we first started, allowing for natural wear which all machinery is subject to. All claims which you make for the "Monarch" we unhesitatingly substantiate. To brickmakers who want a machine that will last them a life-time we say, "Buy a 'Monarch.'"

Yours very respectfully,
TOBIAS BROS. & CO.

* * *

The Wellington Machine Co.,

Send for Catalogue. *WELLINGTON, OHIO, U. S. A.*

EDITORIAL NOTES AND CLIPPINGS.—Continued.

four hundred tons of rock per day. They have also built drying tunnels to dry the daily output, and will employ about one hundred hands when in full operation. The firm has a large number of orders for spring trade. These bricks are used principally for paving the streets of Philadelphia.

The large paving brick plant of the East Clayton Clay Manufacturing Company, near Nelsonville, O., was destroyed by fire early in the morning of the 28th ult. All the buildings and machinery were completely destroyed and the loss is estimated at $37,000, on which there is an insurance of $22,000, and the company will probably rebuild at once.

The brick manufacturers of Toledo, O., have formed an organization known as the Toledo Brick Supply Company. It is their purpose to have all the brick sold in the city handled by the Brick Supply Company, which will fix the price of the brick and regulate matters generally. It is expected that the combination will be beneficial to all brick men.

The plant of the Bucyrus (O.) Brick and Terra Cotta Co., which has been idle for a number of years, has been leased by Wm. Pate and Henry Stiles, of Cleveland, who say they will have the plant in full operation by the first of the year. The product of the plant will not be the same as formerly, but, instead, will be confined at the start to crock, jugs, etc.

William Taylor, Carleton Place, Ontario, in remitting for the Clay-Worker, says: "Inclosed find $2, for which send the Clay-Worker for one year. Thanks for the sample copy. I have a brickyard, and intend to buy machinery, including a tile machine and a crusher, to make tile next summer, and I notice advertisements in the Clay-Worker for such as I want."

Mr. John T. Winslow, originator of the Portland (Me.) Stoneware Company, died at the home of his daughter, in Deering, Me., on the 10th of November, in his seventy-seventh year. Mr. Winslow started this pottery in a small way fifty years ago, and until recent years had taken an active part in its management. An exceptionally genial and warm-hearted man, he leaves a large circle of friends, who, with five children, mourn his death.

Jno. Armstrong, an extensive contractor and brick manufacturer, of Cuba, N. Y., died quite suddenly from apoplexy, Nov. 10. In a notice of his death the Cuba Patriot says: "Perhaps no more fitting tribute could be paid to the memory of the deceased than to say that he was a thoroughly honest man, square and upright in all his dealings and a true and faithful friend. Kind of heart, noble of character and a valued and respected citizen, his death will be mourned by all."

The Monmouth (Ill.) Pottery Company advise us that they are now negotiating with St. Louis and Omaha parties with a view of establishing branch houses at those points. These two, they say, will complete the chain of houses, which includes those at Chicago, Minneapolis, St. Paul and Kansas City. Besides these, there are direct agencies at all the large towns along the Mississippi. When they are all established it will afford the pottery splendid facilities for handling the ware where the demand for it is the greatest.

Jacob Bowers, fifty-five years old, a brickmaker at James Dingee's brickyards, Twenty-sixth and York streets, Philadelphia, Pa., met with an accident recently which resulted in his death. He was working on the top of a kiln, and in reaching for a board with which to cover the opening at the top lost his balance and fell headlong to the ground, a distance of twenty feet, striking on the back of his neck. He was picked up in an unconscious condition and hurried to the hospital, but expired just as he was being carried into the ward.

A fire of unknown origin almost completely destroyed the brick plant of Bernard Gunn & Co., Eleventh street and Erie avenue, Philadelphia, Pa., Nov. 19. The flames were first discovered in the dry house, but spread so rapidly that before the firemen could get water turned on the large machine house was ablaze and all adjoining buildings were threatened. The loss, which will aggregate about $20,000, is principally on the machinery and a large quantity of brick in the process of burning, which were ruined by the water. The company carried insurance to the extent of $15,000.

D. P. Guise, of Williamsport, Pa., advises us that he is looking for a good foreman to take the place of his former foreman, Oliver Haines, who was accidentally killed on the yard Dec. 3. While attempting to throw a belt on to a pulley his clothing caught on the shaft, and he was whirled about at a frightful velocity, his body striking the ceiling of the engine room at every revolution. Mr. Haines was terribly crushed. He was unconscious when released from the shaft, and died at his home, No. 1217 Market street, about an hour later, without having regained consciousness. Deceased is survived by a wife and three children. He was a veteran of the late war, having served in Company H, Fifty-eighth Pennsylvania Volunteer Infantry. He fought in fourteen battles, and was present at the blowing up of Petersburg. He was a member of Reno Post, G. A. R. He was also a member of the Royal Arcanum, P. O. S. of A., and other orders. "Mr. Haines was with me for twenty-three years," writes Mr. Guise, "and was a very faithful man."

The United States Geological Survey has just published a "Bibliography of Clay and the Ceramic Arts." It is Bulletin 143, and can be had by any one at the price of printing (15 cents) by addressing the Director of the United States Geological Survey, Washington, D. C. This is the first list of the works on the ceramic arts ever published in this country. The author is Dr. J. C. Branner, Professor of Geology in Stanford University, California. Dr. Branner was formerly Professor of Geology at the State University of Indiana, and afterwards State Geologist of Arkansas.

In a recent letter Charles Ebert, of Parkersburg, W. Va., says that he is going to make some improvements, and, among other things, will add a hot floor. He asks: "What kind of roof would you recommend for a drier? An iron or tin roof will rust out from the under side on account of steam or water-smoke in the course of drying the brick. Do you know what would prevent such rust? I have run two seasons and hacked my stiff mud brick on open yard, with disastrous results. You know how rainy this season of 1896 has been, and I am not anxious to renew my experience in 1897. The profit of 1896 will not enable me to put in a car drier, therefore I must content myself with a hot floor."

A terrible accident occurred at the National Brick Works, Garfield, N. J., Nov. 13, at which time Wm. Miller, the foreman, in some unaccountable manner, was caught in the machinery, and his head was completely severed from his body. He and a fellow-workman were working overtime, rigging up a switch for the track on which the clay was hauled by cable from the pit to machine. He had gone up to the big drum on which the cable winds to haul a car out of the way of the proposed switch, and, it is supposed, got so close to the machinery that his clothing was caught in such a way as to render him helpless, and he was drawn in. Mr. Miller lived at Stony Point, N. Y., at which place he leaves a wife and two small children.

A Trenton, N. J., pottery company has shipped to San Francisco two earthenware bathtubs for the new residence of Claus Spreckles, the sugar king. Each weighs about 1,200 pounds, and they are the largest and heaviest pieces of earthenware ever put through a pottery kiln in this country. The order is for four, and the other two are to be completed within two weeks. The tubs are seven inches in thickness in some parts, are six feet in length, and about three feet high. They are enameled on the inside. The outside is plain ware, and will be decorated after they are put in place. Several American potteries have been experimenting with this kind of work, but up to this time none had been successful. Earthenware tubs have heretofore been made by English potteries.

Those of our readers who are in want of a good, cheap pump, one that can be relied upon at all times, and that cannot freeze up nor get out of order, and does not cost much money, will do well to give their most favorable consideration to the Van Duzen steam jet pump, advertised in our columns. They cost only from $7 each up to $75 each, and are guaranteed in every case to do the work claimed for them. Thousands of them are in use, and those who have ever tried one will always get additional ones if needed. Messrs. Kinzer & Schaeffer, of Blacksburg, Va., write as follows: "We are using your No. 7 'L' jet pumps in our coal mines. We use a 10-horse-power boiler and raise the water one hundred feet. It has given entire satisfaction." The firm can show hundreds of letters just like this. A better and more successful pump cannot be found for the money.

In a recent letter the American Clayworking Machinery Company, Bucyrus, O., say: "We have the following sales to report, which have been made since Nov. 3, 1896: Three Eagle represses to the Purington Paving Brick Company, of Galesburg, Ill. They now have seven of our Eagle represses. This gives us thirteen Eagle represses in the city of Galesburg alone. One 50,000 capacity drier and clay-preparing machinery to the Darlington Coal and Clayworking Company, of Darlington, Pa.; three Eagle represses to the Barr Clay Company, Streator, Ill.; one Eagle repress and one automatic side brick cutter to the Scioto Star Fire Brick Company, of Portsmouth, O.; one Centennial brick machine outfit to the Trenton Fire Clay and Porcelain Company, of Trenton, N. J.; one No. 10 D heavy compound 4-roll crusher to the C. Pardee Works, of Perth Amboy, N. J.; one special wet pan to the Woodland Fire Brick Company, of Woodland, Pa.; one special grinding machine to E. B. Seidel, Philadelphia, Pa.; one hundred special rack cars to the Sioux City Starch Company, of Sioux City, Ia."

Progress. . . . .

IN ORDER to carry out more fully the plans and purposes with which we, under the firm name of **W. D. Richardson & Co.,** entered upon the business of supplying the mechanical needs of our fellow brickmakers, we have secured a machine shop especially for our own use and have furnished it with entirely new and modern tools and appliances. We have also secured additional capital and more expert assistance in men who are skilled machinists and practical clay-workers. We have reorganized our company and been incorporated under the laws of the state of Ohio, as

The OHIO CERAMIC ENGINEERING COMPANY.

This name signifies what we aim to accomplish for the clayworking industries as engineers and machinists, as manufacturers of superior clayworking machinery and designers and builders of improved dryers and kilns. Realizing, as practical clayworkers of long experience, that no single type or form of machine or dryer, or kiln is adapted to all clays and conditions of manufacture it is our purpose, after careful investigation, to furnish or recommend such as will insure the best results in every special case. To do this we know that we must exercise skill and judgment as well as our own inventive faculties, and must practice such principles of honesty and integrity as will command the respect and confidence of all with whom we deal.

We are about to issue a new catalog showing the improvements which we have already in successful operation. We shall likewise from time to time bring to your notice in this journal such other improvements as we may be able to devise, and which we shall have tested in practice and proved to be of undoubted value. We invite all clayworkers who are seeking better facilities for turning out a better product to correspond with us. Let us know what difficulty you want to overcome or what good you want to accomplish and if we cannot help you our efforts shall cost you nothing.

With the compliments of the season, we are, Respectfully yours,

The OHIO CERAMIC ENGINEERING CO.,

59-63 Center Street, CLEVELAND, OHIO.

ROPKEY MASON ENGRAVING Co.
INDIANAPOLIS.
THE BEST HALF-TONES, ETCHINGS AND WOOD CUTS, AS WELL AS THE MOST ARTISTIC DESIGNS EVER USED BY THE CLAY-WORKER WERE MADE BY THE ROPKEY MASON ENG. Co.
Sincerely
F.A. Randall & Co

THE NEW YORK MARKET.

THANKSGIVING DAY, 1896, is another milestone passed in life's journey of the business man, and the men engaged in the manufacture of common brick throughout the States enjoyed their turkey and cranberry sauce on that day with a feeling that was absent a year ago.

Had the season of 1896 up to that date been satisfactory in financial returns; had the brickmaker received for his brick a price which would, when his bills were paid, leave something over to call his own, then the feeling which should prevail on that day would be his indeed—a feeling and a knowledge that he was square with the world. I am of the opinion that if the thoughts of each manufacturer, from Maine to Mexico and from Sandy Hook to the Golden Gate, could find expression, so that all could read them, the majority would be of a nature far from cheerful and hearty thanksgiving.

In the spring many of the manufacturers did not look over the situation carefully, but based their belief on the fact that this was going to be a good year, because the last year the New York market showed a larger number of buildings in process of construction than its predecessor, so they said: "This year, of course, will be good, without a doubt." The only chance that they had to have a surplus in the bank to buy the turkey and Christmas presents was thrown away before it was time to make brick, pumping out the clay bank when the weather was so cold that the pumps froze up, and afterwards by commencing to mold one month earlier than the preceding years.

The brickmaking industry in this portion of the State is on open yards, and, as a result, must lie idle a portion of the year. If each year the length of time was extended till May all would be benefited, especially when the stock on hand averages the same each year, and then there would be time enough left to make all their lease calls for.

During the campaign just closed the money kings and all who have control of the divisions of trade, and who make money, were loudly scored because they were successful, and no doubt many of the brick manufacturers throughout the Union helped raise that cry, and pointed to the low state of their own business, not brought to that condition by the successful man in other trades, but by his own continued output of full capacity, fearing something might turn up and his neighbor might make a few more brick, and, should the price advance, he would be just that much out. It does seem that this is a good time for them to study and profit in the future by the ways of the successful men, and adapt their business, in its productive form, to the demand—not what it may be before the season is out, but what it is—and there is no shadow of a doubt that his Thanksgiving day of 1897 will be one in which he will be truly thankful for the return of remunerative prices.

—A Woman Buyer.—

In the October number, under this head, was quoted the transaction in brick with one of our manufacturers, which, at that time, looked as if it was likely to result in quite a loss. I refer to it again, as the developments which have since come out may touch other brickmakers in other sections of the country. To be forewarned is to be forearmed. Some of your readers may have seen in the New York papers and extracts copied from them in the papers of their own town and city reports of the doings of Valintine & Co., who were dealing in everything and anything, or, in other words, reaching out to skin all whom they could, and brick was one of the articles which came within their reach, but, as it has turned out, the loss will not be large.

The brick were to be delivered in Brooklyn, the parties being out of the regular trade. When some of the brick had been drawn off the boat the owner called for a payment of his freight, and was paid $100 on account, when there were still 60,000 on the vessel. The owner of the boat told the captain not to let them have any more brick till the balance of the freight was paid, about $200. He, however, failed to follow orders, with the result that, after a long hunt, the lady was found. She wanted the owner of the boat to take payment out of a five-hundred-dollar check on a Chicago bank, which he would not do. After waiting around to see if she could not get it cashed, she disappeared. During the time the owner of the boat was waiting for the lady to appear, along came a North river manufacturer. He saluted him with: "What are you doing here?" As there must have been a fellow-feeling that both men were on the same intent bent, the reply was: "I am looking for parties by the name of Johnson." "So am I," with a remark from the owner of the boat that he had better keep clear of him, explaining the situation.

The North river man then told him that he had sold three million brick to the parties, and had two barge loads, with half a million brick on, now at the dock ready to discharge, and he was there to notify them. It was a close shave. The brick from Hackensack had been piled in a vacant lot, and the parties had tried to sell them to a third party. In one case they thought they had a customer, who came to look at them. "Why," he said, "I bought just the same brick and had to pay a higher rate than you ask. There must be some mistake. Produce your bill of sale and I will take them." That settled it.

The manufacturer had to get an order from the court and then replevin the brick where they lay, and will likely have to take less for them than if they were on a boat. Where the same or a similar gang may begin operations it is hard to tell; that they will, there is no doubt. There is hardly a day passes but that the New York papers contain some new phase of their operations.

—That Trust—

Among the brick men which is to have its home in Chicago, and if the accounts which have appeared in the Eastern papers, metropolitan and suburban, materialize and become a success, the originators will be entitled to great credit. The whole country is a great field.

—The Market.—

It is certainly not far from close of navigation, unless the coming winter is different from those which have preceded it. November has been warm, so that a large number of brick could be laid, as well as large shipments made. At the outside, twenty days from the present writing navigation will be closed from Rondout to Albany, and possibly as far down as Newburg. If so, it may help the market to advance so that Santa Claus will not be forgotten among the brick men. At the present rate the first of December makes a poor show for Christmas presents: From $4 to $4.75 for North River; Jersey, $3.75 to $4.25, with 9 shillings freight and a shilling commission off—a good showing for so late in the season.

A. N. OLDTIMER.

BRICK AND TILE MANUFACTURERS

Put Money in Your Purse.

SWIFTS KILN FURNACE

E.H.B.
F.E Swift's Patent
Slack Coal Coker, Gas
Generator and Smoke Consumer.
Washington, Iowa.

CAN BE ATTACHED to any kind or style of Up or Down-Draft kiln. Nothing but slack or waste coal used from start to finish of burn. Fires not disturbed but once in 10 hours till watersmoke is off. Guaranteed to watersmoke dry press brick or the tenderest of clays or ware of any kind without damage. These furnaces can be seen in operation at my works at all seasons burning drain tile in winter and brick in Summer. It will pay you to investigate—I can save you good money.

F. E. SWIFT, Washington, D. C.

DEAR SIR—In reply to yours of the 25th inst. I will say that I have burned our Eudaly kiln with your furnace attached four times, and have each time saved fifteen tons of coal over the other kilns of the same size containing one hundred thousand brick. In the others I used the best of lump coal and after raising the heat up to the highest point have to use wood in connection with the coal, so as to prevent sticking. With your furnace I use slack entirely, and have no trouble and less work and less smoke. The greatest advantage of all is where I used to have several courses of checked brick in the other kilns, I now have my very best brick. I consider it the very best furnace in existence.

CARL NEIS, Burlington, Ia.

For further particulars, address

F. E. SWIFT, Burlington, Iowa.

Wonders

Never

Cease.

Little Wonder Brick and Tile Machine, Capacity 25,000 brick.
Intermediate Wonder Brick and Tile Machine, Capacity 35,000 brick.
Big Wonder Brick Machine, Capacity 50,000 brick.
Wonder No. 4 Brick Machine, Capacity 75,000 to 100,000 brick.

....Are Unexcelled.

Cunningham's Automatic Rotary, Single Bar, End=Cut Brick Cutter.
Cunningham's Automatic Rotary, Multiple Bar, End=Cut Brick Cutter.
Cunningham's Automatic Rotary, Side-Cut Brick Cutter.

....Have no Equal.

Open and Closed Top Pug Mills, ranging in capacity from 20,000 to 100,000 brick per day.

Will "Pug" to Your Satisfaction.

Corrogated Clay Crushers and Stone Separators of all sorts and sizes.

....None Better.

Clay Elevators of all widths and lengths.
Brick and Tile Yard Tools too numerous to mention.

Manufactured by

The Wallace Manufacturing. Co.,

See "Ad." on Back Inside Cover Page.

FRANKFORT, IND.

FOR SALE, WANTED, ETC.

☛ Advertising rates in this column 25 cents a line, or 4 cent a word, each insertion; about seven words make a line. Cash should accompany the advertisement to insure insertion. No ad. inserted for less than $1.00.

WANTED—Capital to manufacture for sale a simple "hydraulic brick press," patented; capacity, 15,000 to 20,000 dry press brick per day; cost $900 to build, complete, including pumps and connections. Address, JOHN J. BISHOP,
12 1 cm Memphis, Tenn.

WANTED—PARTNER—To take active management of vitrified brick plant. Must thoroughly understand the practical part of the business. Ability, rather than capital, required. Rare opening for the right man. For particulars address,
WHITMAN,
12 1 d Care Clay-Worker.

WANTED—Burner and superintendent for works making both dry press and mud bricks. Must be well recommended; a first-class burner and a pusher. Address, with references, and stating wages expected,
HYDRAULIC BRICK CO.,
12 1 d Louisville, Ky.

WANTED—Situation as a superintendent in sewer pipe, fire brick or paving brick works, by a practical and reliable man. Industrious and sober, and fully competent to manage either of the above works. Address, TILE,
12 1 d Care of Clay-Worker.

WANTED—A competent man to go to Germany to erect and start a Boyd brick press and complete outfit of our machines. Don't apply unless you have experience and are a good burner. One who speaks German preferred.
CHISHOLM, BOYD & WHITE CO.,
Fifty-seventh and Wallace Streets,
12 1 d Chicago, Ill.

WANTED—Situation as superintendent of dry pressed brick works, by a practical and competent manufacturer. Have also had considerable experience in manufacturing mud brick. No. 1 references given. Address, OHIO,
12 1 c Care of Clay-Worker.

FOR SALE, CHEAP—Brick and tile factory, in Indianola, Warren county, Iowa, or brick machinery, boiler and engine will be sold separately. Present owners cannot handle it. Correspondence solicited. BERGER,
12 2 d Care of Clay-Worker.

WANTED—Re-engagement as superintendent of fire brick works; thoroughly experienced in fire brick manufacture, also architectural and paving brick, particularly the former. First-class references. Address, "FIRE BRICK,"
10 3 d Care Clay-Worker.

WANTED—A competent man to go to South America to erect and start a Boyd brick press and complete outfit of our machines. Don't apply unless you have had experience and are a good burner. One who speaks Spanish preferred.
CHISHOLM, BOYD & WHITE CO.,
Fifty-seventh and Wallace Streets,
12 1 d Chicago, Ill.

FOR SALE—A splendid field of first-class fire clay, situated in Cleveland county, Arkansas, near railroad. Good local demand, with no competition in State. Property comprises 80 acres, with good buildings. Clay is from 6 to 20 feet below surface. Address DR. CHARLES LEALI,
Kingsland, Ark.,
12 1 cm Cleveland County.

WANTED—A situation as burner in a sewer pipe manufactory, by a practical, sober and industrious workman of many years' experience, competent to take entire charge of burning, salt glazing, etc. Best of references given. Southern location preferred. Permanent situation desired. Address, "SOBER,"
12 1 t Care of Clay-Worker.

A RARE OPPORTUNITY

To buy a modern brick plant, newly fitted up. Cost, $27,000. Good reason given for selling. Address, GEO. W. SPARKS,
209 North Williams Street,
12 3 cm Moberly, Mo.

FOR SALE—$1,500 will buy the brick plant at West Brattleboro, Vt. Chief machine, good clay; brick sell for $6 at yard; house, barn, 4 acres land. Write for particulars to E. S. MORSE, Brattleboro, Vt., or D. H. BOYD,
11 3 cm Brooklyn, N. Y.

FOR SALE OR LEASE.

A dry pressed brick plant, equipped with Boyd presses, down-draft and continuous kilns. The best location in northwestern Iowa. Products, A1 red and buff bricks. No competition, and contracts in sight for over one million brick for 1897 trade. Has been operated ten years. No experiment. Proprietor has other business. Most liberal terms.
CHISHOLM, BOYD & WHITE CO.,
Fifty-seventh and Wallace Streets,
12 1 d Chicago, Ill.

THE CHEMISTRY OF POTTERY.

By Karl Langenbeck.

This book is written by a practical potter and chemist. It contains matter of great pecuniary value to every progressive potter, and is thoroughly up to date. Price, $2.00.

We also publish:

"Chemistry for Beginners," by Edward Hart; $1.50.

"Development of the Periodic Law," by F. P. Venable; $2.50.

"Notes on Metallurgical Analysis," by N. W. Lord; $1.25.

"Notes on Qualitative Analysis," by W. P. Mason; 80 cents.

"Engineering Chemistry," by T. B. Stillman; $3.50. CHEMICAL PUB. CO.,
11 3 d Easton, Pa.

BRICK MACHINERY FOR SALE.

One 2-mold Whittaker dry-press brick machine.
One 2-mold Whittaker semi-dry-press brick machine.
One 1-mold ornamental Whittaker brick machine.
One 4-mold dry-press brick machine, Simpson make.
One 4-mold dry-press Eureka brick machine.
Two repress brick machines.
One stiff-mud brick machine.
One brick and tile machine combined.
One dryer.
Also disintegrators, breakers, screens, trucks, etc.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

Mention the CLAY-WORKER,
When writing to Advertisers,
Mention the CLAY-WORKER.

FOR SALE, CHEAP—One Chambers brick machine, all in good order, having been run but a short time.
THE CHESTER FENCE CO. (L't'd),
12 1 c Care of Clay-Worker.

WANTED—Position as enameled-brick maker; capable of making the best enameled bricks without any costly experiments. Has held a similar position before. Good references. Address, T. H.,
12 1 cm Care of the Clay-Worker.

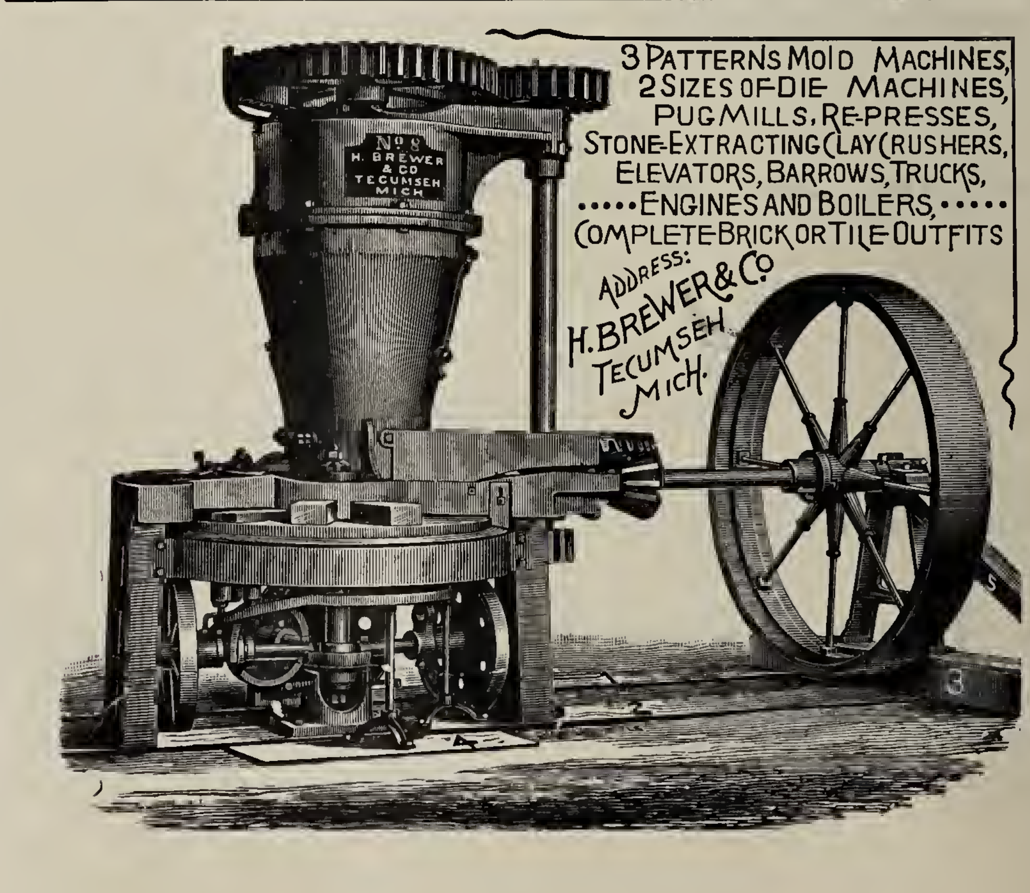
BRICK PROPERTY FOR SALE.

Consists of a farm on Staten Island, about one mile from Rossville, and on Fresh Kill, Staten Island Sound, sixteen miles from New York city, and containing 121½ acres, 103 of which is good farming land and 18½ salt meadow. Perhaps 90 or more acres of this property is composed of clay, red and blue, and is from 15 to 30 feet in depth, and in some places probably much deeper, the supply being practically inexhaustible. The red clay is of such a nature that no sand is required for manufacturing brick.

The present improvements consist of four frame dwellings, one frame barn and a large brick barn, a brickyard, in good and complete order, three circular pits and five machines on one side of brick engine house, all in good working order; two circular pits and three machines on the other side of engine house never have been used. Kiln shed, about 320 feet long, capable of holding 4,000,000 brick, and a wharf, about 250 feet long, capable of being increased to 1,000 feet at a small expense; 7 to 8 feet of water alongside. This property is most advantageously situated for the purpose desired. Its close proximity to New York enables the manufacturer to market the bricks later in the fall and earlier in the spring than can, in ordinary seasons, be done from any point on the Hudson river, which is the chief source of supply for the New York market. When the Hudson is closed the company's brick will bring from $1 to $2 per thousand more than in the summer, and this yard has for many years been worked for the supply of this very trade. Three million bricks were marketed in two weeks, from Feb. 25 to March 12, 1895, at $6 per thousand, a dollar advance over price at close of navigation and a dollar above prices of Hudson river brick immediately after opening of navigation, March 15, 1895.

This plant could be changed for plant for making hollow brick, for which there seems to be an increasing demand, but nowhere is there such a brick property, with such advantageous facilities for shipping so near the best market in the country, New York and vicinity, as well as Newark and vicinity.

This property belonged to the late firm of Wood & Keenan. Both members of the firm being now deceased, the property is offered for sale. If not sold, will be rented. Apply to H. N. WOOD,
12 2 d Haverstraw, N. Y.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PUG MILLS, RE-PRESSES,
STONE-EXTRACTING CLAY CRUSHERS,
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COMPLETE BRICK OR TILE OUTFITS
ADDRESS:
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A THING OF BEAUTY IS A JOY FOREVER,

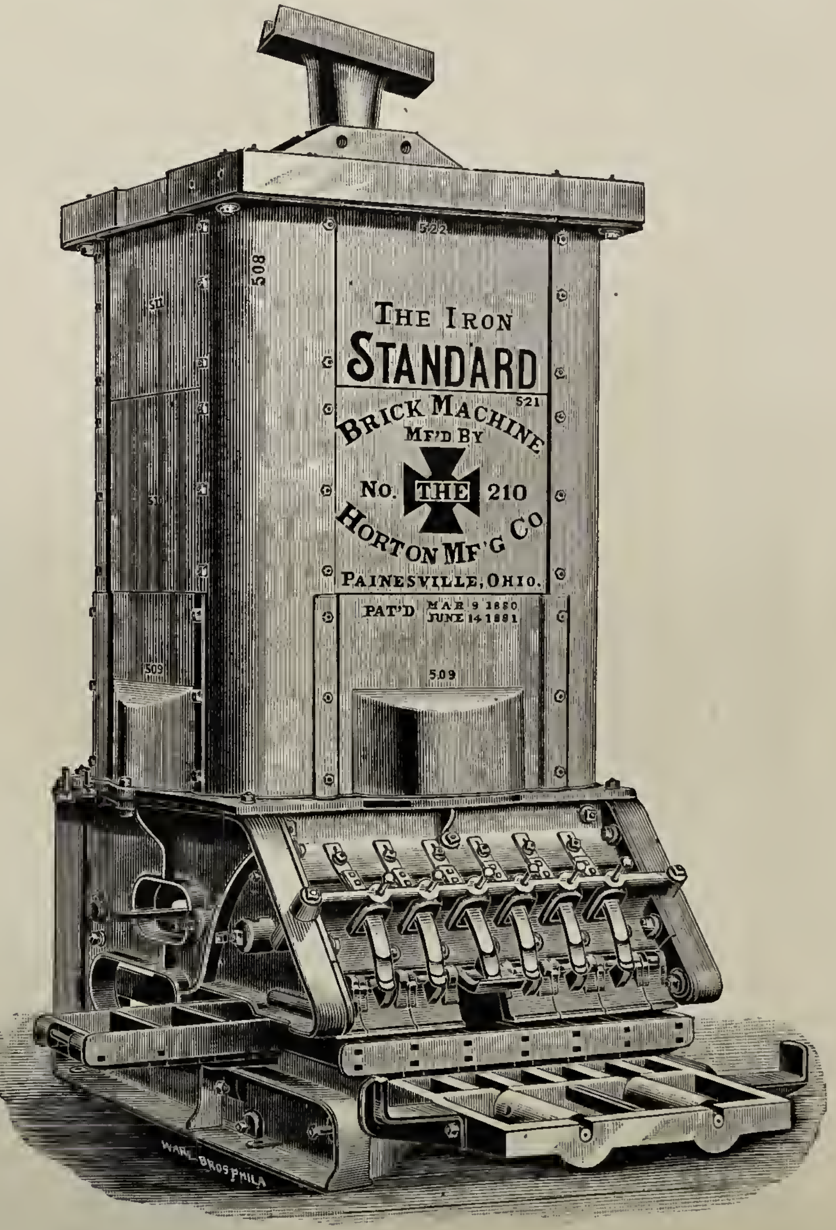
To be Found in our New "IRON STANDARD."

PRICES
ALWAYS
TELL.

✣ We are now making a strictly **Iron and Steel Machine,** not even the sills are made of wood. It is not only one of the best working machines but one of the nicest looking machines on the market. . . . .

✣ If in need of a Pug Mill, Disintegrator, Conveyor, etc., write us for rock bottom prices. . . . . . .

SEE A COPY OF OUR NEW CATALOGUE.



THE HORTON MANUFACTURING CO., = Painesville, Ohio.

NO DRY PRESS Brick Plant complete without the Carmichael Clay Steamer.
T. W. CARMICHAEL,
Inventor and Manufacturer,
6 t f d Wellsburg, W. Va.

FOR SALE—Two Simpson presses, one Plymouth brick and tile machine, Plymouth board delivery, brick cutting table, Plymouth tile cutting table, Freese "A Special" brick machine, Stevenson pug mill and Emens granulator. For description of this machinery see page 579, June Clay-Worker, or address
CLEVELAND VITRIFIED PRESSED BRICK CO., 809 Cuyahoga Bldg.,
7 tf d Cleveland, O.

I WILL LEASE OR SELL my plant at a reasonable price to one familiar with the roofing tile business. The factory cleared last year $20,000 (twenty thousand dollars), and is doing better than that at the present in all these hard times. Will sell all or part of it, or will give long lease at reasonable price to the right party. Why do I wish to dispose of a good thing? That's my business. ARTHUR,
9 t f d Care Clay-Worker.

NOTICE.

Parties wishing formulas for the manufacture of enameled or glaze brick (once or twice burning), either on clay or burnt brick, with full instructions; also, pure white dull enamel, or other colors, for terra cotta, new process, can obtain same by inclosing five dollars. Parties ordering must state nature and quality of clay they wish to enamel or glaze. In such cases, if instructions sent are strictly followed, a guarantee given that results will be obtained equal to anything manufactured, or money refunded. Address,
4 tf L EUREKA, care Clay-Worker.

EXPERT IN ROOFING TILE.

Charles Stolp, of European birth, with 6 years' American experience, 25 years in the roofing tile manufacturing, the last three years as superintendent of the Ludowici Roofing Tile Co., Chicago Heights, Ill., is open for consultation about the manufacturing of said article, as to erecting new factories, changing old brick into tile works, clays, machines, dryers, cars, kilns, glazes, slips, etc., etc. References—I can refer to Mr. H. B. Skeele, President of the Ludowici Roofing Tile Co. Terms moderate and according to information. Address,
CHARLES STOLP, Box 166,
3 tf 1 5p Chicago Heights, Ill.

ENGINES FOR SALE.

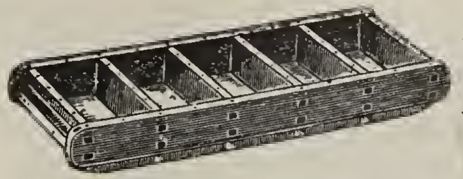
One 200-horse-power Corliss engine.
One 150-horse-power Corliss engine.
One 125-horse-power cut-off engine.
One 100-horse-power slide-valve engine.
One 80-horse-power slide-valve engine.
One 75-horse-power automatic cut-off engine.
One 60-horse-power center-crank engine.
One 55-horse-power self-contained engine.
One 50-horse-power self-contained engine.
One 40-horse-power self-contained engine
One 35-horse-power slide-valve engine.
One 30-horse-power slide-valve engine.
One 25-horse-power slide-valve engine.
One 20-horse-power slide-valve engine.
One 15-horse-power slide-valve engine.
One 12-horse-power upright engine.
One 10-horse-power upright engine.
One 8-horse-power upright engine.
One 12-horse-power engine and boiler combined.
One 10-horse-power engine and boiler combined.
One 8-horse-power engine and boiler combined.
Two hoisting engines.
Three steam elevator engines.
Four pair of mining engines.
One Ingersol steam drill.
SCHOELLHORN-ALBRECHT MACH. CO.,
4 tf d 610 N. Levee, St. Louis, Mo.

FAST TIME AND THROUGH SERVICE TO SOUTH BEND.

Commencing June 22, through parlor cars will be operated between Indianapolis and South Bend daily, except Sunday, on Big Four train No. 3, leaving Indianapolis at 5 p. m., making immediate connection with Vandalia line fast train at Colfax, which passes through Frankfort, Logansport, Lake Maxinkuckee and Plymouth, arriving at South Bend at 10:45 p. m. G. E. ROCKWELL, D. P. A., for details.

FIRE Dover Fire Brick Co.,
INCORPORATED 1870. MANUFACTURERS OF
Dover and Buckeye Fire Brick,
Unexcelled for Kiln Purposes.
44 Mercantile Bank Bldg., Cleveland, Ohio. **BRICK**

G. COLDEWE & CO.,



MANUFACTURERS OF ALL KINDS AND SHAPES OF
HAND and.... MACHINE **MOULDS**

We manufacture the the most substantial Moulds known, and guarantee every Mould to be first-class in material and workmanship.

A Special Discount on all orders received on or before March 1st.

No. 829 Sixth St., Milwaukee, Wis.

"LEVIATHAN."

"Upon Earth There is not His Like."

....Sept ....1896.

MAIN BELTING CO., 248 Randolph St., Chicago, Ill.
GENTLEMEN:—Please ship us via freight, 146 feet x 18" 8 ply "Leviathan" Belting. The reason you have not heard from us of late is, we have been trying the "just as good for less money" belting. You can count on our future orders for "**LEVIATHAN.**"
Prompt shipment of the above will oblige. Yours very truly,
....

Manufactured under Special Process.
A Guarantee of Superiority.

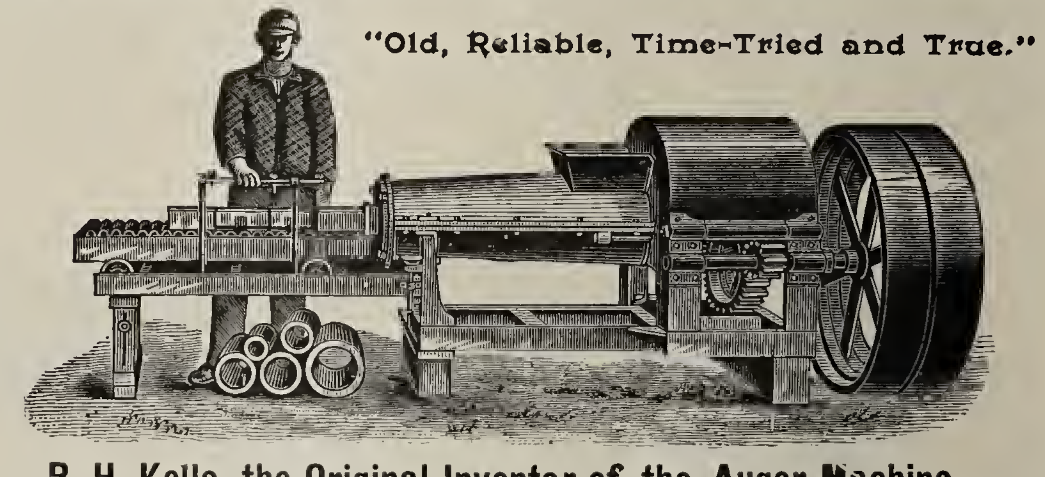
NOTE.—By our special process of treating the material used in the manufacture of this belting, the fibre is toughened, the elasticity is preserved and the stretch reduced to a minimum

MAIN BELTING COMPANY,

Sole Manufacturers LEVIATHAN BELTING,
248 Randolph St., CHICAGO, ILL.
PHILADELPHIA: 1219 Carpenter Street. BOSTON: 120 Pearl Street.

KELLS & SON'S IMPROVED BRICK AND . . . . TILE MACHINES.

"Old, Reliable, Time-Tried and True."



P. H. Kells, the Original Inventor of the Auger Machine.

This machine works clay direct from the bank for both brick and tile. Bricks are taken direct from the machine to the hacks and need no repressing for the finest fronts. It has but one set of gears and makes all kinds of brick and different sizes of tile by changing dies. For strength and durability we except none. We challenge the world to produce a combined machine that will do the same amount of work with the same amount of power. Patented June 22nd, 1880; and February 12, 1884. We manufacture Crushers, Trucks and Barrows. End-cut, side-cut paving brick and Board Delivery—make perfect edges and corners.

We have had Twenty-nine Years' Experience in the Manufacture of Brick and Tile Machines.

We have made an improvement on our No. 1 Machine by which we can make tile from 3 inches up to 12 inches and on our No. 2 Machine we can make tile from 2½ up to 10 inches.

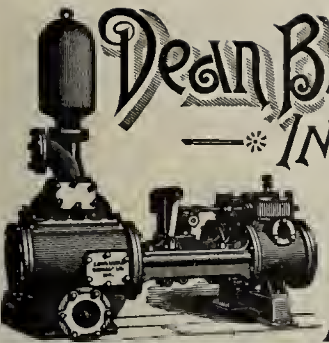
☞For Illustrated Circulars, Prices, Etc., address

KELLS & SONS, Adrian, Mich.

H. C. BAIRD & SON,

PARKHILL, ONTARIO,

Sole Manufacturers for the Dominion of Canada of the above machines, also makers of the NEW QUAKER BRICK MACHINE.



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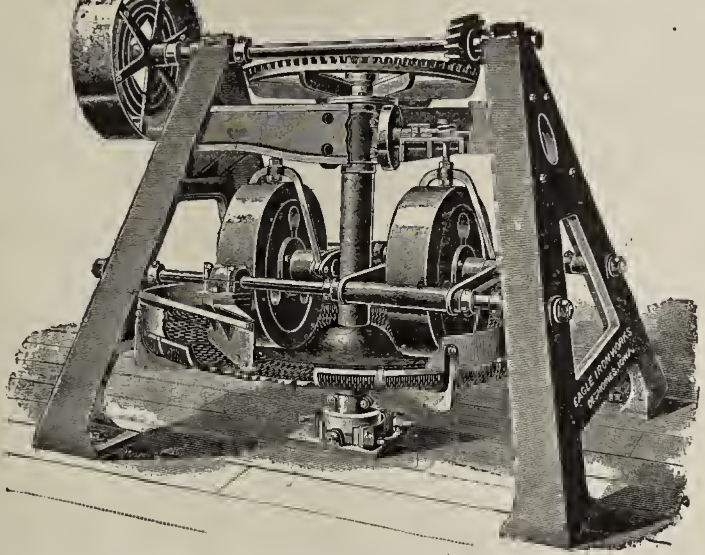
SINGLE & DUPLEX PUMPS.

HORIZONTAL AND VERTICAL PUMPS.

Best Design & Workmanship.

PRICES REDUCED Send for CATALOGUE.

OUR NEW 9 Ft. IRON FRAME DRY PAN

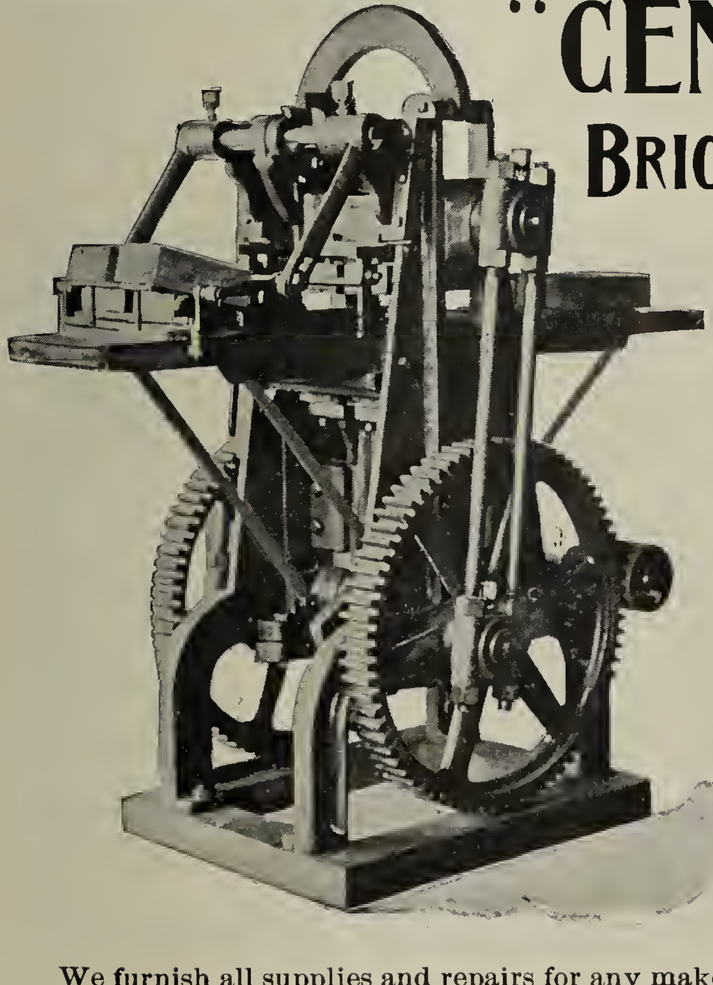


SEND for catalogue and read up on our patented features of this machine. Our motto in its construction and design is

"NOT HOW CHEAP, BUT HOW GOOD."

EAGLE IRON WORKS, Des Moines, Ia.

"CENTRAL" BRICK REPRESS.



This cut shows our double die machine, which is acknowledged to be the simplest and best repress on the market.

It is no experiment, having been in use over two years with best results. Will do same work as others of twice the size and cost.

For particulars address

Central Machine Works,

236 Abbey Street,
Cleveland, Ohio.

We furnish all supplies and repairs for any make of the "SWORD" Brick machine.

PUMPS FOR SALE.

One steam pump, 5-inch suction.
One steam pump, 4-inch suction.
Two steam pumps, 3-inch suction.
Two steam pumps, 2½-inch suction.
Three steam pumps, 2-inch suction.
A lot of similar machines.
One 6-inch plunger, steam doctor.
One 4-inch plunger, steam doctor.
One 2½-inch plunger, steam doctor.
SCHOELLHORN-ALBRECHT MACH. CO.,
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The F. F. V. Vestibule Limited via the Chesapeake & Ohio R'y, is the only Solid train with through Dining Car between New York, Philadelphia, Baltimore, Washington, Cincinnati and the West. Lighted with Electricity. Heated with Steam.

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Ass't Gen'l Pass. Agent.
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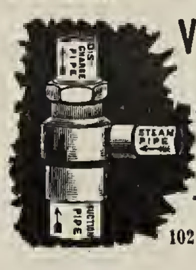

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THE BEST IN THE WORLD.

Pumps Any Kind of Liquid.

Always in Order, never Clogs nor freezes. Every Pump Guaranteed.

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200 to 12000 Gallons per Hour.

Cost $7 to $75 each. Address

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THE IMPROVED

Interlocking Brick,

For Hollow Walls and Ventilating.

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We have a large bank of a superior quality of SLIP CLAY. Price very low by barrel or carload. Best of reference as to quality.

Address

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Successor to JACKSON BROS.,
ALBANY, N. Y.
N. Y. State Drain Tile and Pipe Works.
Established 1852.

GEORGE C. HICKS,

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In matters relating to the manufacture of Gas Retorts, Fire Brick, Terra Cotta Building Brick, Faience and other clay products.

Plans furnished for kilns and complete manufacturing plants, also system of bookkeeping to ascertain daily cost of manufacture.

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Established in 1820.

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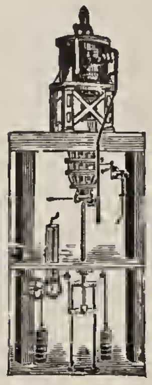

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PIPE PRESSES
OF DIFFERENT SIZES,
Making From 2 to 30-Inch Pipe Inclusive.

Pipe, Brick, Tile, Coping, Fire Proofing, and Building Block Dies.

Clay Grinding and Tempering Pans and Pug Mills.

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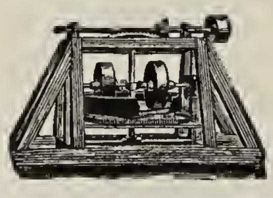

STEAM —— ENGINES

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Every Variety of Iron and Brass Castings Shafting and Pulleys.

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JAS. MEANS & CO.,
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Brick-Glazes
ready prepared
to burn successfully
in all kiln-systems,
we furnish for every
kind of material.

In general use
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NEW DISCOVERY KILN

Patented April 13, 1886, June 1888 Nov. 7 1891.

More Than 1,000 Now Stand as
Monuments of Fame to its Inventor

It is neat, compact, durable, easy to handle, constructed on scientific principles. Has been improved and now burning almost everything made from clay, such as Sewer Pipe, Vitrified Pavers, Etc., to Pottery and finer wares. Built any size up to 100,000. In short it leads the way.

Reward For Information of Infringements.

To know more and what they say of it, ddress,

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Elevators

For handling
CLAY,
COAL,
SAND,
BRICK,
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PACKAGES.

Also Furnish
RUBBER,
LEATHER,
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BELTING.

JEFFREY

Roller, Steel and Special CHAINS
—FOR—
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CONVEYING
MACHINERY
FOR HANDLING MATERIAL OF ALL KINDS.

Power Transmission Machinery.
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WIRE CABLE CONVEYORS.
For long and short distance conveying.

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HOT BLAST
APPARATUS
FOR
DRYING
BRICK
TILE AND
TERRA COTTA

American Blower Co
SUCCESSOR TO
HUYETT & SMITH MFG CO
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SEND FOR CATALOGUE

DO NOT BUY A FOUNDED 1879.]

SOFT CLAY BRICK MACHINE

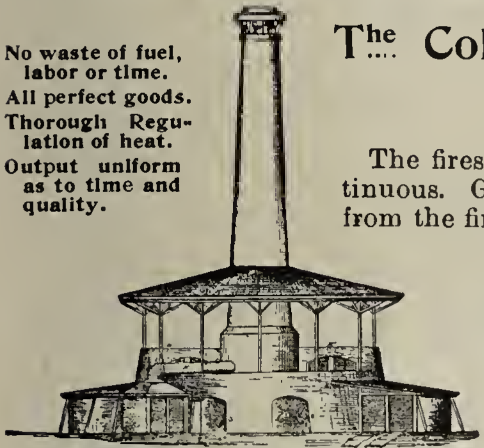
Until You Have Investigated Ours.

Send for Photo. W. E. TALLCOT & CO., Croton-on-Hudson, N. Y.

NEW AND NOVEL,

The Columbian Pottery and Brick Kiln.

No waste of fuel, labor or time.
All perfect goods.
Thorough Regulation of heat.
Output uniform as to time and quality.



The fires remain in one division ONLY and are continuous. Goods move on a ROTATING FLOOR to and from the fires. Radiating heat and spare heat are used for drying and heating air for combustion.

A perfect and reliable factory Winter and Summer. Kiln and dryer combined. The best kiln for vitrifying Paving brick and glazing

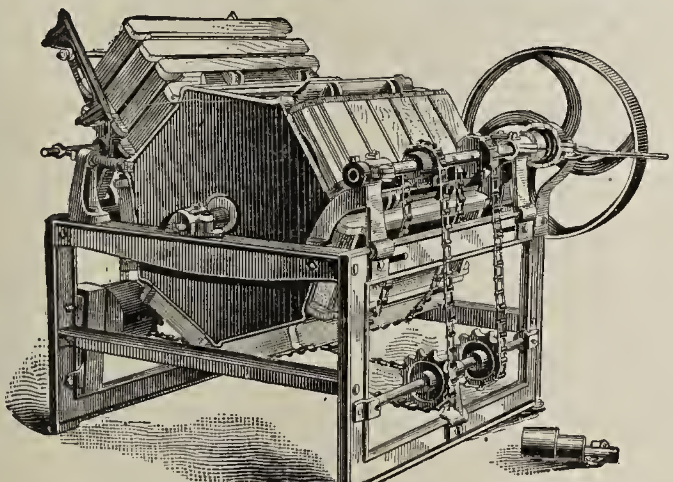
Full information on application.

COLUMBIAN POTTERY & BRICK KILN CO., Dexter B'ld'g., 84 Adams St., CHICAGO, ILL.

CHAMPION Brick Mould SANDING MACHINES.

This cut represents the latest improved Champion. No belts, apron or gearing. Simple, strong, and Serviceable.

A. H. NEWTON,
Manager and Sole Agent,
HAVERSTRAW, N. Y.



THE case of Newton vs. Buck was decided by Judge Cox March 16th, and a decree entered. The court decides that Newton is the owner and has the exclusive right to manufacture sanding machines under the Buck patents, that Buck has infringed said patents, and orders Buck to pay Newton all damages and profits on all machines made or sold by Buck since March 6th, 1889, and costs of the action and grants an injunction against Buck, his agents, attorneys, clerks, servants and all persons claiming or holding under or through him from making or selling or using such machines.

An accounting for damages and profits against Buck is now proceeding before Charles W. Mead, a United States Commissioner, as Master at Albany.

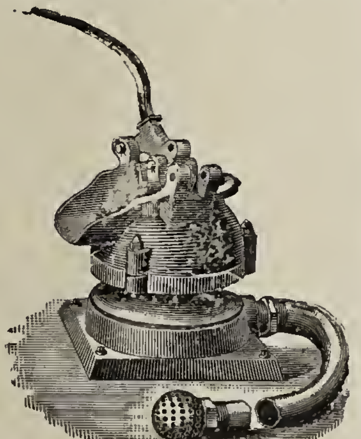
All persons who have purchased machines from Buck since March 6th, 1889, will now have to settle with Newton. A copy of the decision and decree in full will be mailed on application to anyone desiring the same.

4000 TO 5500 (Gallons of Water per hour.)

BY HAND-POWER.

Pumps, Hand-power Pumps,

(LOUD'S PATENT.)



These Pumps are simple, durable and low-priced.

A large capacity and easy working pump for **Brick Yards, Water Works, Sewer Contractors, Foundation Builders, Miners, Quarries** or wherever it is desired to raise a *large quantity* of water by *Hand-power.* The pump has large valves (*accessible by hand*) and will pump water containing *sand, gravel, mud, sewage matter, etc.,* without *choking* or any *perceptible wear.*

Send for circular and price list. Manufactured by

THE UNION HARDWARE CO.,
TORRINGTON, CONNECTICUT

GEO. S. COX'S

Ready Made Cutting Wires,

Always give Satisfaction.

EAST LIVERPOOL, OHIO.
Send for Samples and Prices.

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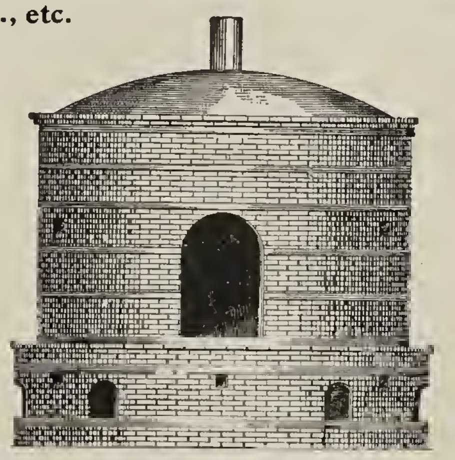
AN IMPROVED MUFFLED KILN

For Burning Terra Cotta, Fine Front Brick, Enameled Brick, Encaustic Tile, etc., etc.



WE have had many years experience in building terra cotta, brick and tile kilns of different kinds and can guarantee successful and satisfactory results **being practical Kiln Builders. Our terms are reasonable.** Write for particulars stating character and capacity of kilns desired.

F. HUNDT & CO.,
801 Dudley St., CHICAGO, ILL.

CINCINNATI SEWER PIPE CO.

(Successors to J. V. Nicolai.)

N. U. WALKER, Pres. | WM. NICKEL, Sec. & Treas.

Besides making Vitrified Stone sewer Pipe we manufacture and keep in stock a full line of

Fire Brick

— FOR —

Kiln Building & Boiler Setting.

Also Headquarters For

Cement, Lime, Plaster, Stoneware, Etc.

OFFICE & FACTORY: Cor. Elm & Water Sts.
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M. V. B. WAGONER'S

SLIP CLAY { For Glazing of Pottery } WORKS

ESTABLISHED 1845.

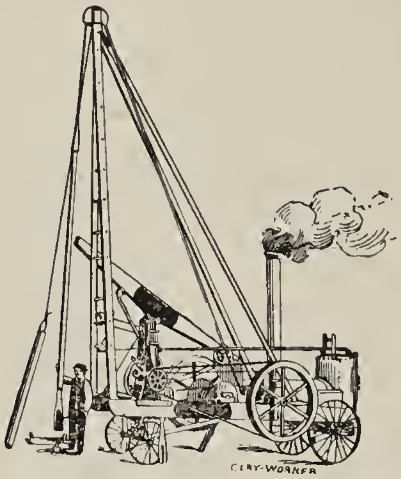
Clay in stock in any quantity, in barrels and bulk by the carload.

Office, 20 Ten Broeck St., ALBANY, N. Y

W. R. Osborne,

Contractor for

Artesian Wells of any Diameter.



PUMPS, WIND MILLS with large pumps specially adapted for keeping clay pits clear of water.

Eastern agent for the famous Star Drilling Machinery. Machines capable of drilling wells from 150 to 2,500 feet, any diameter desired. Practical men furnished for work of this class. All machinery handled by me guaranteed first-class

Tanks of any size from 100 to 100,000 gallons capacity.

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LEAVE INDIANAPOLIS,	Ar. TERRA HAUTE	AR. ST. LOUIS.
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All trains carry first-class coaches. 12:40 noon train has Parlor and Dining Cars for St. Louis. 11:20 pm train has local sleeping cars starting from Indianapolis for Evansville, open every night at 8:30. All trains enter the Union Passenger Station at Terre Haute and St. Louis.

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BIG 4
TO
S^T. LOUIS

FIRE BRICK, FIRE CLAY and FIRE CLAY TILES.

Sewer Pipe all Sizes.

We keep a large assortment fire brick and tiles and stock for kiln building and repairs. Floor tile a specialty. Special shapes and sizes made to order on short notice. Our goods have been standard in all markets for forty years. Write for prices.

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INCORPORATED 1896. CAPITAL $100,000

National Fire Clay ... Mining & Mfg. Co.,

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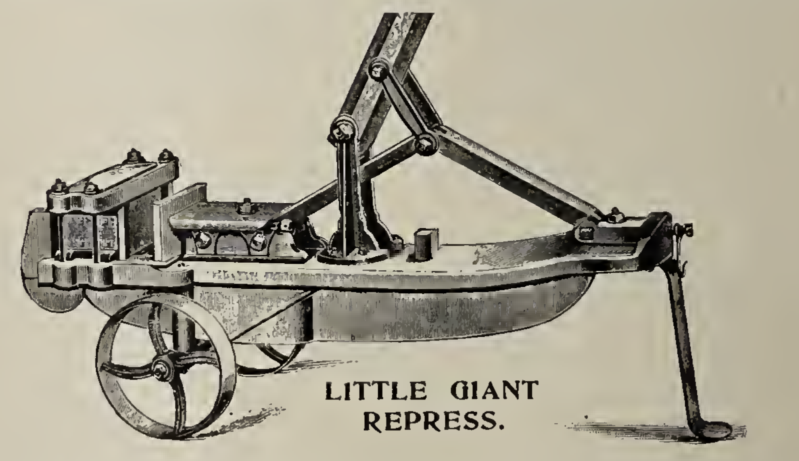
A. S. BARADA, *Secretary.*

915 Chestnut St., ST. LOUIS, MO.

THE highest quality of Clay for Glass House Pots, Fire Brick, Tank and Furnace Blocks and all articles of Fire Clay used in the construction of Glass and Metallurgical Furnaces. Our XX Special Brick are absolutely indestructible and non-absorbing, specially adapted to smelting and refining furnaces and all furnaces and mills requiring high heat.

Read the analysis carefully and note that our clay is the superior of the imported article.

Silica	45.24
Alumina	39.31
Oxide Iron	.37
Lime	.29
Magnesia	.10
Alkalies	.27
Water	14.54
Total	100.12



LITTLE GIANT REPRESS.

ELI Auger Machine, Capacity 45,000 to 70,000.

ELI Jr. Auger Machine, Capacity 30,000 to 40,000.

LITTLE ELI Auger Machine, Capacity 15,000 to 20,000.

No. 1 A, Auger Machine, Capacity 25,000 to 35,000.

No. 2 B, Auger Machine, Capacity 12,000 to 20,000.

THE No. 1 A and No. 2 B Machines furnished with Square Hopper in place of Upright Pug Mill if desired.

DISINTEGRATORS, HORIZONTAL CONVEYORS,
GRANULATORS—SINGLE AND DOUBLE SHAFT,
UP-RIGHT PUG-MILLS, WINDING DRUMS,
BRICK TILE AND HOLLOW BLOCK TABLES.
TRUCKS, WHEELBARROWS, ETC.

Manufactured and fully warranted by

Michigan Brick and Tile Machine Co.,

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Make Money

WITH THE ONLY SUCCESSFUL

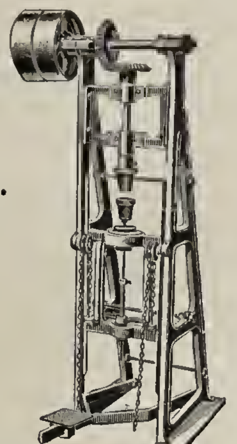
Flower Pot Machine.

(PATENTED.)

No expert workmen required.
Capacity in 10 hours:
6,000 two-inch Pots; 3,500 five-inch Pots;
4,000 four-inch " 2,000 seven-inch "
Write for Circular and prices.

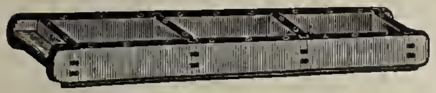
The Rockwood Mfg. Co.,

78 South Pennsylvania St., INDIANAPOLIS, IND.



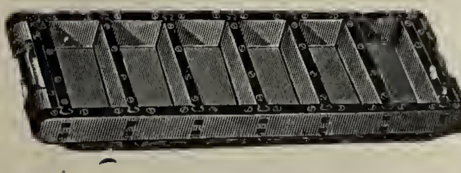
ARNOLD'S BRICKYARD SUPPLIES.

They are the Best that are Made.



3 Brick Hand Mold.

6 Brick Hand Mold



6 Brick Machine Mold.

Moulds. A large stock of Hand and Machine moulds of the standard sizes on hand to fill orders from promptly. All kinds of shapes made to order. Two grades of molds made, the cheaper kind is the standard of quality and is largely imitated by other makers, but we make a grade we call **Specials**, that are better and cost more. If you get these you will know you have **the best**. Some odd sizes for sale very cheap. State about the size you could use and how many you want and a list of sizes nearest will be sent you with price for the lot.

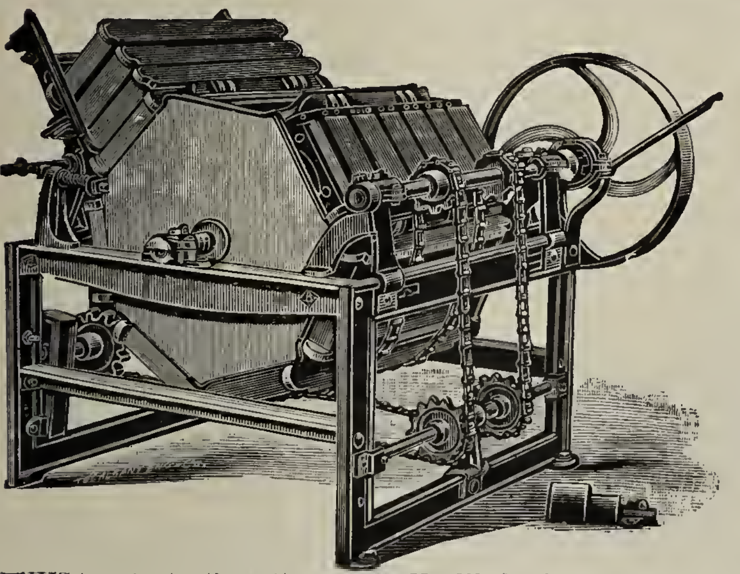
WHEEL-BARROWS For Brick, Tile, (with and without springs,) Mud, Sand, Sewer Pipe, etc. **All-Metal** Barrows for Brick. **All-Metal** Barrows for Tile. Trucks in various different styles and prices, for moulds, pallets and Dry Press Brick. **Revolving Dumping Tables** nearly all iron and steel, **Strong, Cheap and Durable.** 4, 5 and 6 Tables.

Kiln Bands made up ready to use except putting rivets in; tighteners riveted on, pieces cut to length and holes punched, rivets furnished, put up in bundles at prices only a little more than steel and tighteners cost. Band Tighteners sold separately, if desired—our own make—good ones. Kiln Covers, Ventilators, Door Frames, Grates, etc. Wrought Iron, also Cast Iron, Barrow Wheels, Car Wheels, Axles, etc.

Anything in the line of Brickyard Supplies promptly furnished. Address

D. J. C. ARNOLD, New London, Ohio.

BUCK'S NEW CHAMPION Brick Mould Sanding Machine.



Judge Wallace's Decision.

[COPY.]

U. S. Circuit Court Southern District of New York.

ADDIE NEWTON vs. WILLIAM W. RIDER } In Equity.

This cause having come on to be heard this sixth day of April, 1895, upon argument of demurer, and Mr. Walter E. Ward having been heard on the part of the plaintiff, and Mr. George A. Mosher on the part of the defendant, and due deliberation having been had, it is. Ordered, adjudged and decreed that demurrer be sustained, and that the plaintiff's bill of complaint be dismissed with costs to the defendant to be taxed.

WM. J. WALLACE,
Circuit Judge.

THIS terminates the suit on patent No. 301,087 which Newton has so extensively advertised. It was defended by J. A. Buck without expense to Rider. Any interest which Newton may have had in this patent has since been sold at receiver's sale, April 30, 1895. The other patents relating to this machine had been previously sold January 21, 1892, at a similar sale. J. A. Buck now owns or controls all patents relating to this machine, and the trade is warned that so-called "Champion" machines made by other parties are infringements upon these patents.

J. A. BUCK, 76 Oneida St., Cohoes, N. Y.

WHITEHEAD BROS. & CO., General Agents, 517 West 15th St., New York City.

TO CHICAGO THE WEST and NORTHWEST

MONON ROUTE
LOUISVILLE, NEW ALBANY & CHICAGO RY.

TIME TABLE IN EFFECT SEPT. 13.

3 DAILY TRAINS

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7:00 am, 3:35 pm, 12:55 Night

ARRIVE CHICAGO

12:00 Noon. 8:20 pm. 7:20 am.

Lv Chicago	2:45 am.	11:50 am.	8:58 pm.
Arr Indianapolis	7:45 am.	4:37 pm.	3:30 am.

Indianapolis Sleeper returns on 2:45 am, train.

SHORTEST AND FASTEST LINE.
LATEST EQUIPMENT.
ALWAYS "UP-TO-DATE."

TICKES OFFICES: 2 West Washington St., Union Station and Massachusetts Ave. Depot.

GEO. W. HAYLER, Dist. Pass. Agt.

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FOR A CHANGE IN LOCATION?

If you are not satisfied with your present site, or if you are not doing quite as well as you would like to, why not consider the advantages of a location on the Illinois Central R. R. or the Yazoo & Mississippi Valley R. R.? These roads run through South Dakota, Minnesota, Iowa, Wisconsin, Illinois, Indiana, Kentucky, Tennessee, Mississippi and Louisiana, and possess

FINE SITES FOR NEW MILLS

BEST OF FREIGHT FACILITIES

CLOSE PROXIMITY TO

COAL FIELDS and DISTRIBUTING CENTERS

AND

INTELLIGENT HELP OF ALL KINDS

MANY KINDS OF RAW MATERIAL

For full information write the undersigned for a copy of the pamphlet entitled

100 Cities and Towns WANTING INDUSTRIES

This will give you the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries, desired, etc.

To sound industries, which will bear investigation, substantial inducements will be given by many of the places on the lines of the Illinois Central R. R., which is the only road under one management running through from the Northwestern States to the Gulf of Mexico.
GEO. C. POWER, Industrial Commissioner I. C. R. R. Co., 506 Central Station, Chicago.

LAKE ERIE & WESTERN RAILROAD. NATURAL GAS ROUTE

Solid Train Between
Sandusky and Peoria
—AND—
INDIANAPOLIS and
MICHIGAN CITY,
FT. WAYNE and
CONNERSVILLE.

—o—

Through tickets sold to all points in the United States and Canada.

NORTH BOUND—LEAVES.

No. 20 Passenger	7:00 a. m.
*No. 22 Passenger	1:20 p. m.
No. 24 Passenger	7:00 p. m.

SOUTH BOUND—ARRIVES.

*No. 21 Passenger	10:20 a. m
No. 23 Passenger	2:50 p. m
No. 25 Passenger	6:20 p. m

*Daily.

Union Depot connections at BLOOMINGTON and PEORIA for points WEST, SOUTHWEST and NORTHWEST.

Direct connections made at LIMA, FOSTORIA, FREMONT or SANDUSKY for all points EAST.

Immediate connections at TIPTON with trains on Main Line and I. & M. C. Div., for all points NORTH, SOUTH, EAST and WEST.

For tickets, rates and general information, call on A. H. SELLARS, Agent,
Lake Erie & Western R. R.

C. F. DAILY, Gen. Pass. Agt.
INDIANAPOLIS, IND.

Indiana, Decatur & Western
RAILWAY.

Short line between **INDIANAPOLIS and KANSAS CITY.** The only line running **Reclining Chair Cars** between **INDIANAPOLIS, and DECATUR, SPRINGFIELD and JACKSONVILLE, ILLINOIS.**

TIME OF TRAINS AT INDIANAPOLIS:

LEAVE.

Mail and Express	8.30 a m
Accommodation	3.25 p m
Fast Express	11.20 p m

ARRIVE.

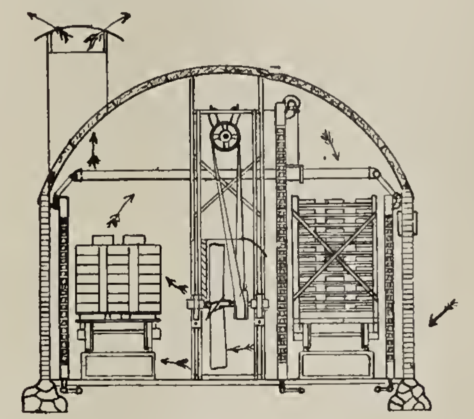
Fast Express	3.30 a m
Accommodation	10.40 a m
Mail and Express	4.50 p m

JNO. S. LAZARUS, Gen. Pass. Agent.

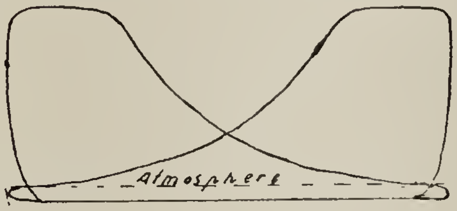
The Safety Dryer,

Made absolutely **Fire Proof,** at but little, or **no greater cost** than of wood erection. Much air at low temperature. Two tracks produce about as many **thoroughly** dried and **"solid"** brick as eight of other dryers.

Engine Exhaust Steam only, used for heating, much being employed, at no back pressure or extra cost for power, as the great circulation of air actually relieves the engine.



The INSIDE FAN DRYER.
U. S. Pat. Mar. 31, 1891. No. 449,170.
U. S. Pat. Mar. 31, 1891. No 449,231.
British Pat. Mar. 31, 1891. No. 5,520.
Canadian Pat. May 30, 1892. No. 39,025.
Canadian Pat. May 30, 1892. No. 39,026.



SAMUEL ROSS, President. JOHN MILLER, Treas. and Mgr

WASHINGTON BRICK AND TERRA COTTA CO.
WORKS:--Delaware Ave. and O St., S. W.
OFFICE:--Tenth and F Sts., N. W.

WASHINGTON, D. C., June 7th, 1895.
S. G. PHILLIPS, ESQ., Rahway, N. J.

DEAR SIR—What will you change our 8 tracks steam dryer to your system for? I am so well pleased with the way your dryer works, that I am considering making the change as I can feel the difference in fuel between your dryer and our —— You have the best dryer in the market.

I am yours very truly,
JNO. MILLER.

Under date of July 5th, 1895, (another month of use) Mr. Miller also writes, "You have the best and most economical dryer I ever saw."

FORDS, N. J., April 9th, 1894.
MR. S. G. PHILLIPS,

DEAR SIR—I refer you to the indicator diagram showing a vacuum of 5 pounds. You can easily see that the fans will create a vacuum. The vacuum pump was not employed—neither did any cooling water assist to draw the exhaust steam through the pipes. You may refer to me for full explanation.

I am yours very truly,
H. E. RAABE, M. E.

"And Met the Requirements in Every Case."

PHILADELPHIA, December 14, 1892.
MR. S. G. PHILLIPS, Woodbridge, N. J.

DEAR SIR—Replying to your favor of recent date, it gives us pleasure to state that all of the Dryers erected by us under your patents for customers have given satisfaction and met the requirements in every case. The brick have been dried uniformly without cracks.

Yours respectfully,
CHAMBERS BROTHERS Co.,
J. H. Chambers, Gen'l Mgr.

S. G. PHILLIPS.
Agent and Patentee,
161 Grand Street.
Rahway, N. J.

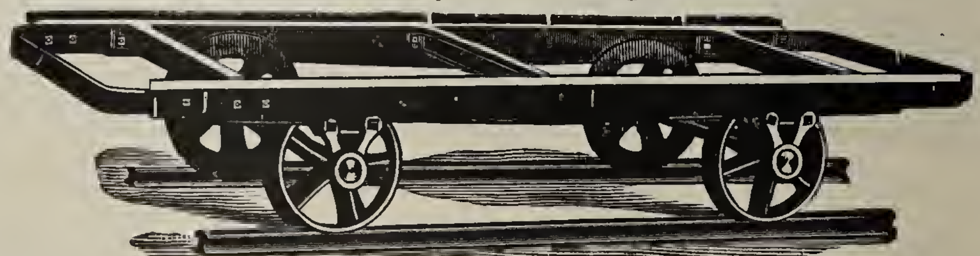
BRICK CARS.

THE BEST. NO EXPERIMENT.

Thirty styles of our cars in use in all parts of the United States and Canada. Nearly 2000 of our cars are in use in Cleveland alone by the following Brickmakers:

F. H. Eggers,
C. G. Barkwell,
Standard Brick Co.,
Peter Cullen,
Collinwood Brick Co.,
Cleveland Brick Co.,
Canadian Copper Co.,
George Gynn,
Warren Farr,
John Cullen.

Write Them,
Then Us.



Style 28.

Catalogue and Price List sent on application.

WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.
NEW BRUNSWICK FOUNDRY CO., New Brunswick, N. J.

The Standard Brick Machines,

MANUFACTURED BY

A. M. & W. H. WILES CO.,

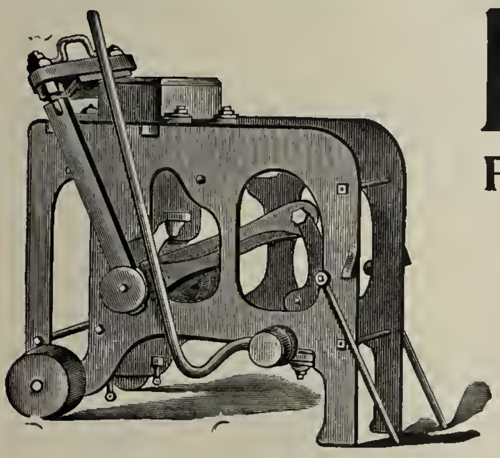
Grassy Point, Rockland Co., N. Y.

These Molding Machines have been in constant use for over 40 years and are the original of all machines now made that use a Pug Mill and Square Press, and are the best and most economical machines now in use.

Being established here in 1845, and having made a specialty of the manufacture of all articles used in Brickmaking since that year, and constantly making improvements, we are now enabled to offer parties the best and cheapest now in use.

We have fitted up many of the largest Brick Yards in the United States, and are prepared to furnish everything used in the manufacture of Brick in any part of the country.

[Mention the Clay-Worker.] CORRESPONDENCE SOLICITED.



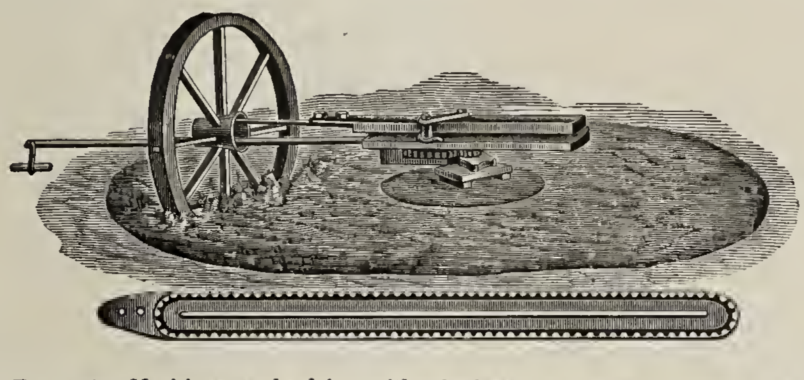
RED BRICK PRESS.

PHILADELPHIA BRICK MACHINE WORKS

Fire and Red Brick Presses all sizes.

....Machinists and Engineers.

Manufacturer of all kinds of Machinery used in the manufacture of Fire and Red Brick.

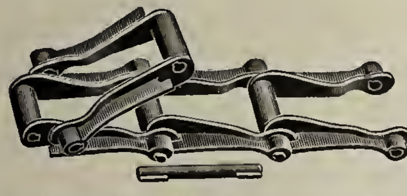


These Tempering Machines can be driven either by Steam or Horse Power. The latest improvement requires less power to run than the old style Steam Gearing, and fitted up 10 per cent. cheaper.

GEORGE CARNELL,

Nos. 1,819, 1,821 and 1,823 Germantown
Avenue and Fifth Street,
PHILADELPHIA, - - - PENN.

☞ Send for Circular and Price-List.



Mey Detachable Chain Belt, Pat. Feb. 7, 1888.

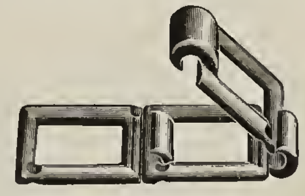
F. H. C. MEY,

Chain Belting Engineering Works,

Approved Appliances for

Elevating, Conveying and Transmission of Power.

64 to 68 Columbia Street, BUFFALO, N. Y.

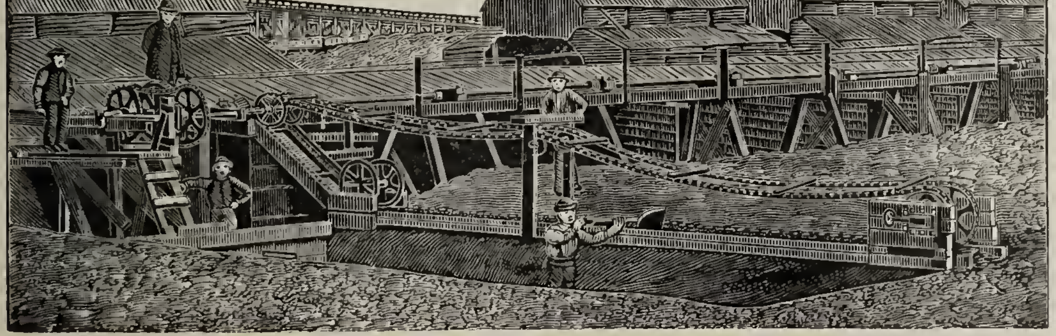


THIS Elevator is for taking the clay into the Brick Machine; the tempered clay is shoveled from the soak pit into the trough from which it is elevated into the brick machine. The advantages derived from this apparatus will be noticed at a glance by every practical brick-maker. It gives the machine a uniform feed, takes less power and manual labor to manipulate, and the manufacturer is enabled to

Make Many More Thousands

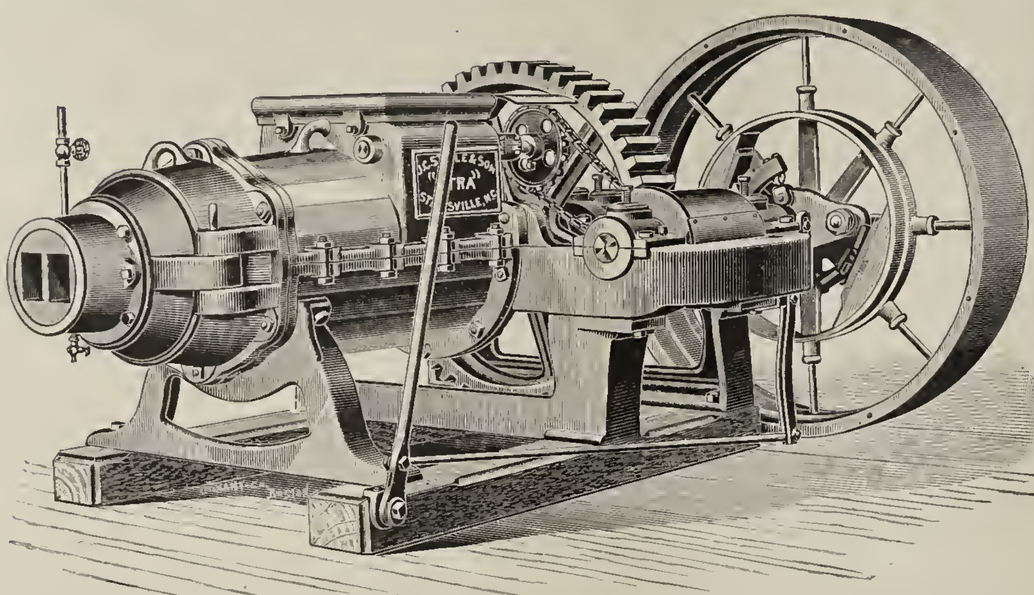
of the best quality of brick in a day than he can by the old method, thereby saving time and making money.

SEND FOR CATALOGUE.



MEY PATENT CLAY ELEVATOR.

The New South Brick Machinery



X-tra Machine. Capacity 25,000.

We don't claim the whole earth and don't want it, but our machines want large quantities of it. They are always hungry, and are never troubled with **indigestion or constipation.** No doctor bills to pay.

Cutting Tables, Clay Crushers, Winding Drums, Clay Cars, Dryer Cars, Brick Trucks, Elevators.

DANVILLE, VA., Sept. 22, 1896.

J. C. STEELE & SON, Statesville, N. C.

Gentlemen:—Answering your query as to how we are pleased with the outfit furnished us by you of brickmaking machinery and implements, we would say that it has given us good satisfaction. The brick machine does all that you claimed for it. The trucks are great labor saving implements and the winding drum and cars equally so. In our system we could hardly dispense with either the trucks or cars and drums.

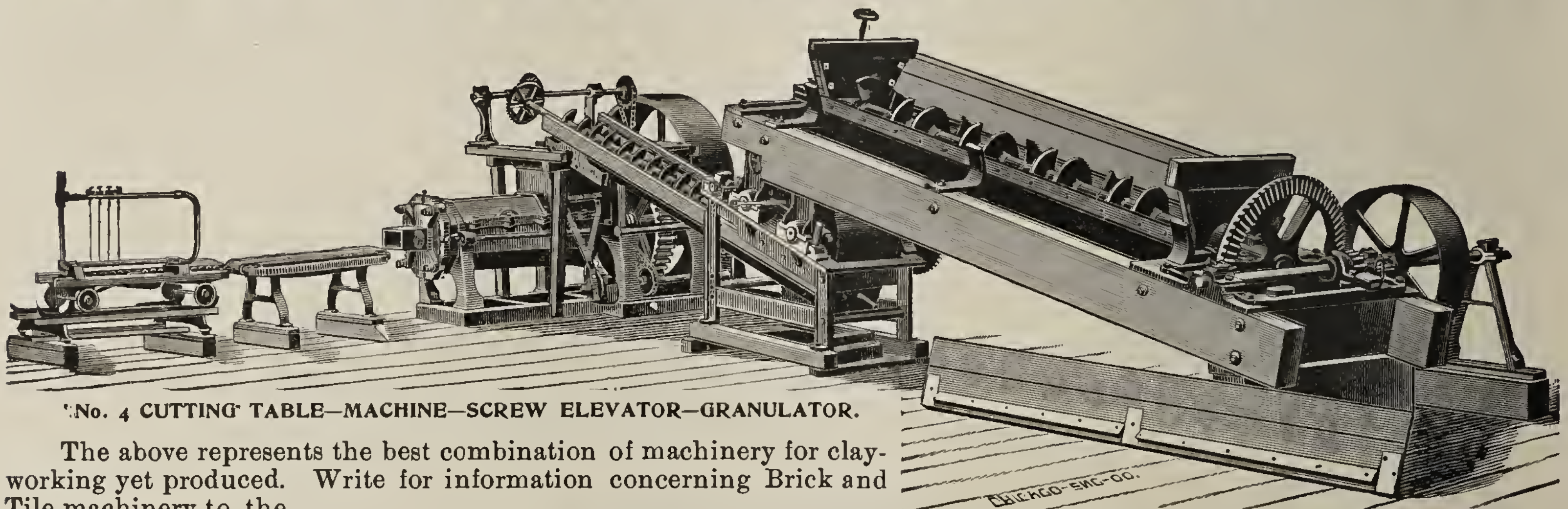
Respectfully,
DON VALLEY BRICK CO.

(This company is using the "X-tra" machine and make 30,000 brick per day.

Strictly modern machinery at the lowest price. Send for Catalogue.

J. C. STEELE & SON, Statesville, N. C.

ADRIAN BRICK AND TILE MACHINE CO.

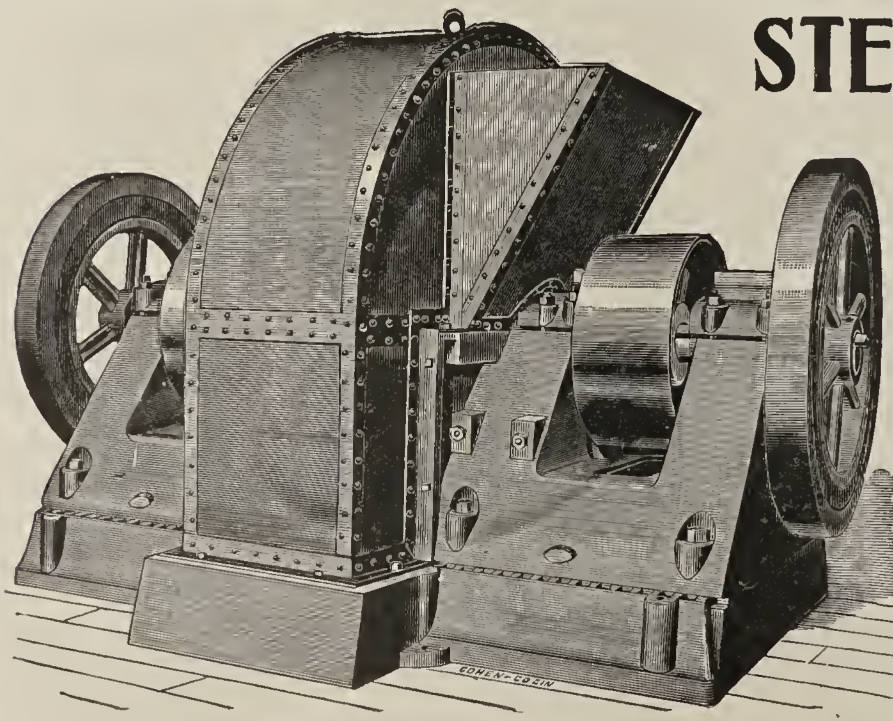

CHICAGO-ENG-CO.

No. 4 CUTTING TABLE—MACHINE—SCREW ELEVATOR—GRANULATOR.

The above represents the best combination of machinery for clay-working yet produced. Write for information concerning Brick and Tile machinery to the

ADRIAN BRICK AND TILE MACHINE CO., Adrian, Michigan.

STEDMAN'S IMPROVED CLAY DISINTEGRATOR



For Thoroughly Pulverizing Clay in a Dry, Semi-Dry or Damp Condition

Its construction is such that it **will not clog** in pulverizing damp clay, and the journal bearings are constructed dust proof.

Write for catalogue, giving full description, references and testimonials. Address,

Stedman's Foundry & Machine Works,

Aurora, Ind.

THE CHICAGO BRICK MACHINERY CO.,

Makes its best bow to the Brick and Tilemakers of this country, and begs to state that it is prepared to furnish all kinds of clay-working machinery and appliances. If anything is needed to equip your yard, from a Bundle of Wire to a Dry Press Machine or a Steam Dryer, write us for prices before purchasing. It will pay you to do so. . . . .

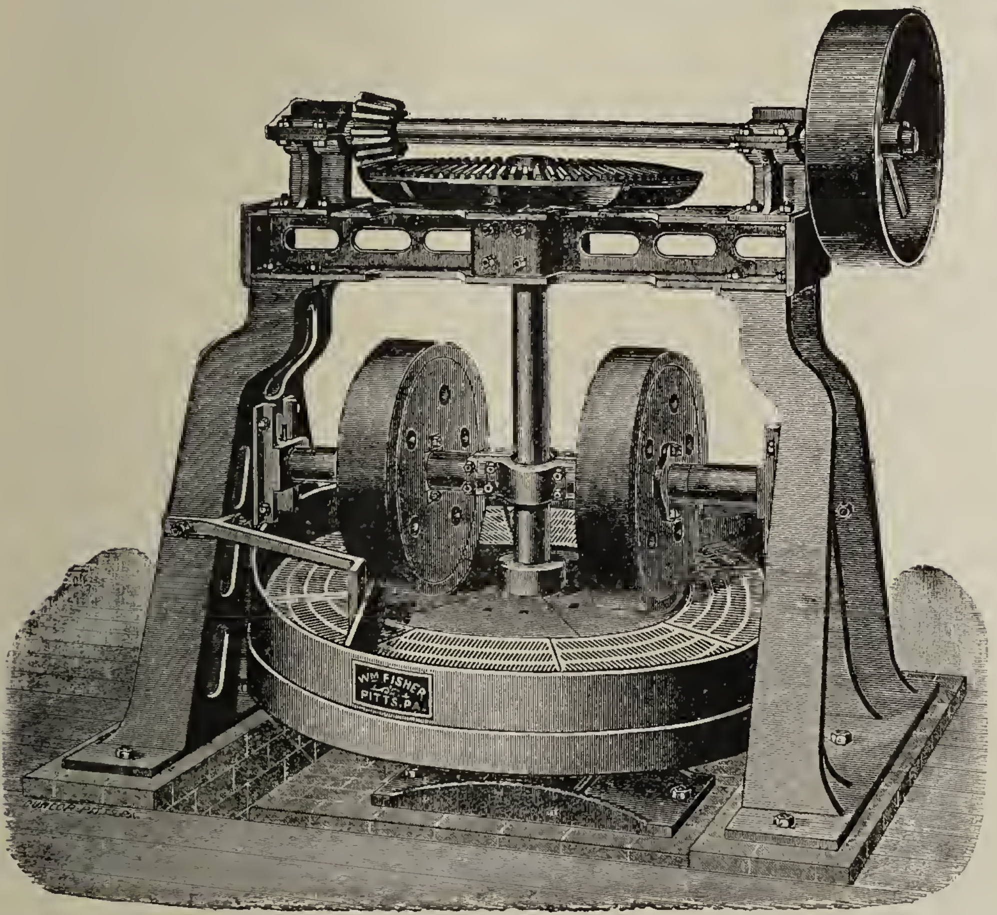
We have a complete line of the best Soft Clay Machinery, Stiff Clay Machinery, Dry Presses, Tile and Sewer Pipe Machines, Engines and Boilers, Pug Mills, Wet and Dry Pans, Disintegrators, Cars, Trucks, Barrows, Moulds, Pallets, etc., all of the highest grade and at the lowest possible prices. .

Write us for particulars to

225 Dearborn Street, CHICAGO.

STANDARD DRY AND WET GRINDING PANS,

IRON FRAME.



Fisher Engine, Foundry and Machine Works,

PHILLIPS & McLAREN,
Proprietors,

23rd, 24th and Smallman Streets,
PITTSBURGH, PENN.

FOR Fire Clay, Shale, Gravel, Limestone, Lime, Sand, Cment, Fertilizers, Building Brick, Paving Brick, Fire Brick, Steel Works, Glass Works, Paint Works, etc.

We make Pans from 4 to 12 feet Diameter, for Over and Undergear, and for Wood Frames; also, Pug Mills, Brick Presses and Moulds.

ENGINES and SPECIAL MACHINERY.

When writing for Prices, state kind of Clay or Material to be ground and Capacity required.

Would You Buy

A BRICK MACHINE
. . . . . A DRY PAN
. . . . A PUG MILL

WITHOUT LOOKING INTO THE MERITS OF

The Iron King

A BRICK MACHINE that has never made a failure.

The Woolley Dry Pan,

The Woolley Pug Mill,

All of these Machines have proven themselves equal to any and Superior to most on the Market.

SLIP PUMPS
. . . AND . . .
SLIP PRESSES

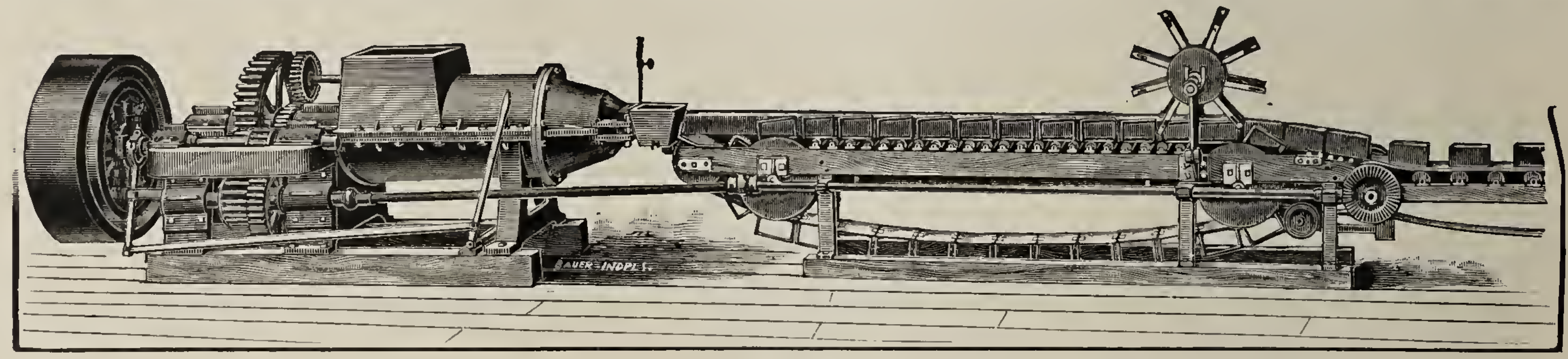
For Potteries and Encaustic Tile Works.

Our 15 Years' Experience In the Brick Machine business has taught us to build upon mechanical principles, machines that will do the work required of them.

Machine guaranteed. Terms reasonable. Let us tell you all about it and quote you prices.

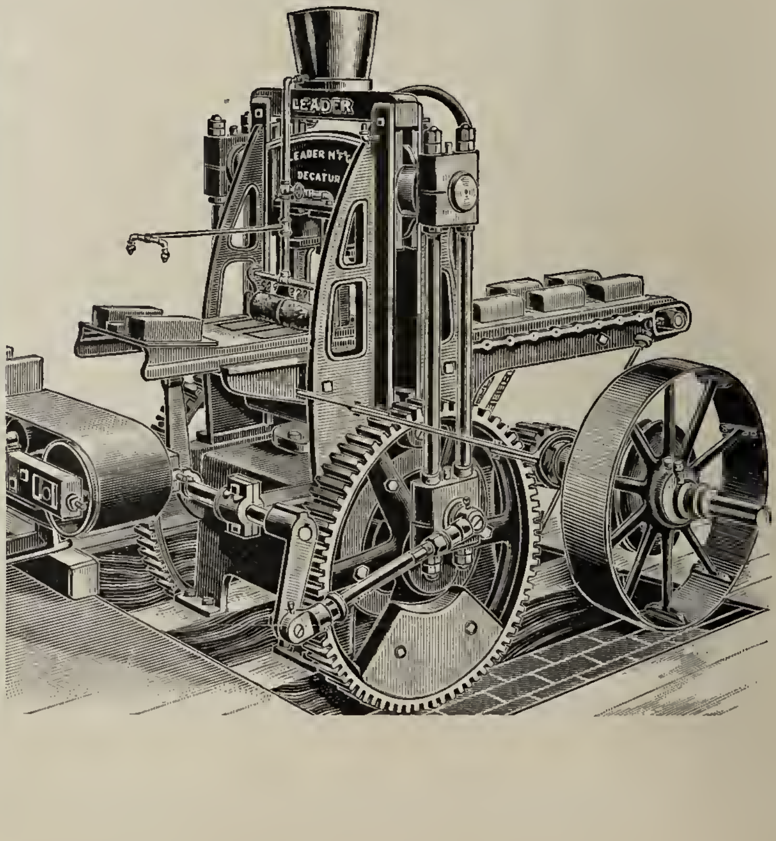
Woolley Foundry and Machine Works,

Send for Illustrated Catalogue. *ANDERSON, IND.*


BAUER-INDPLS.

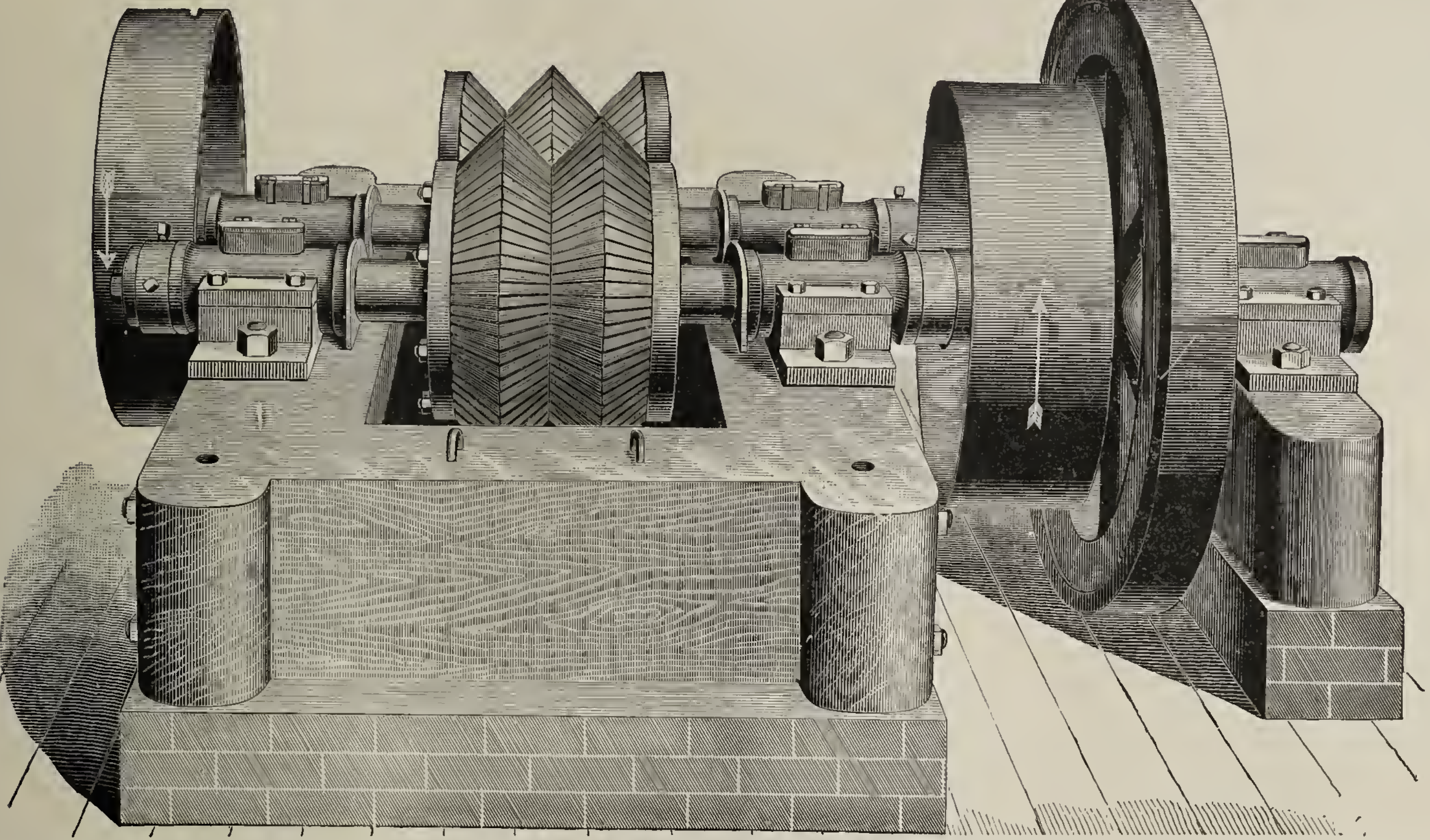
LEADER MANUFACTURING Co

DECATUR ILL.
MANUFACTURERS OF
BRICK MACHINES, BRICK PRESSES,
PUG-MILLS, CRUSHERS
DISINTEGRATORS, AUTOMATIC CUTTERS,
ELEVATORS
AND
COMPLETE OUTFITS.
SEND FOR PRINTED MATTER.



NEWELL IMPROVED CLAY PULVERIZER

Heavy Cold Rolled Shafts Running in Best Anti-Friction Metal Bearings protected from dirt.

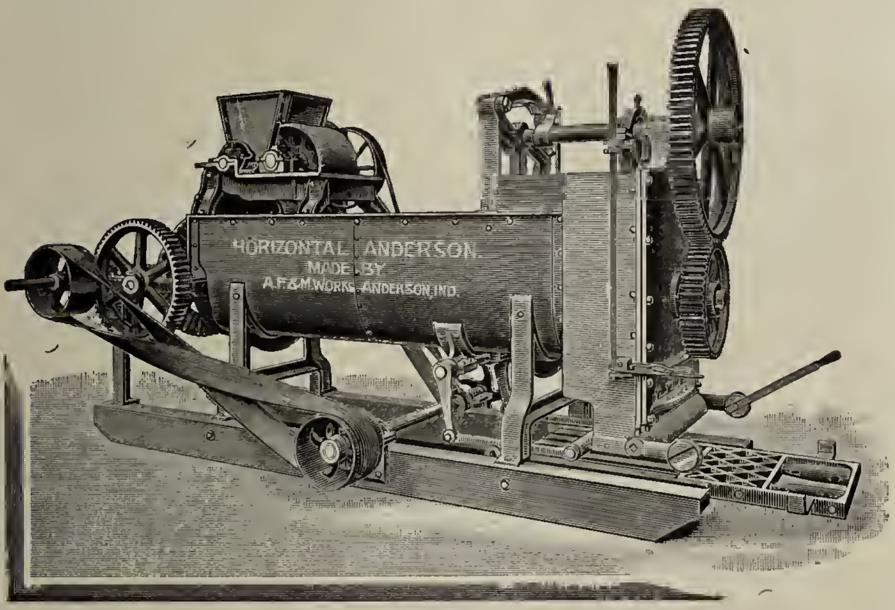


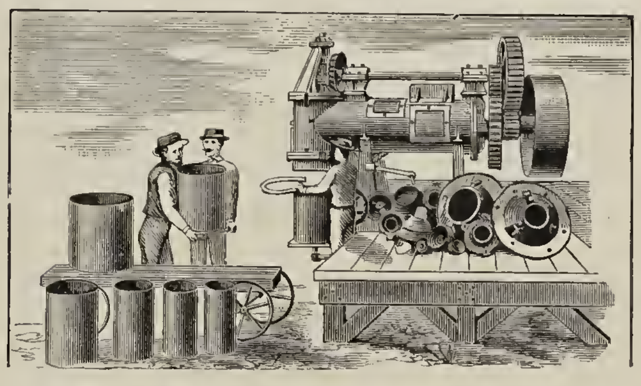
Our Clay Pulverizer grinds and prepares all clays used for manufacturing purposes thoroughly and economically, and is the only Mill in the market that will crush successfully clay containing stones, clay dogs, sulphur balls and other foreign substances, thus enabling manufucturers to make a first-class brick and saving the wastage of brick where these foreign substances are not ground. We also manufacture special Mills which thoroughly crush slate, which is being largely used for making bricks. Correspondence solicited.

NEWELL UNIVERSAL MILL CO., Room 710, Havermeyer Building 26 Cortland and 21 Dey Streets, **New York, U. S. A.**

The HORIZONTAL ANDERSON.

OUR latest and most complete combination of Brick Machine, Pug Mill and Disintegrator for the price of one Machine. No outside Plunger with bothersome Gibs and Plates. A Machine that will run for years without requiring any adjustment and never leak. **UNEXCELLED for GRINDING and PUGGING CAPACITY;** simple in construction and durable.


HORIZONTAL ANDERSON.
MADE BY
A.F.&M.WORKS ANDERSON, IND.



NEW DEPARTURE TILE MILL,

The only Machine for Tile from 3 to 24 inches.

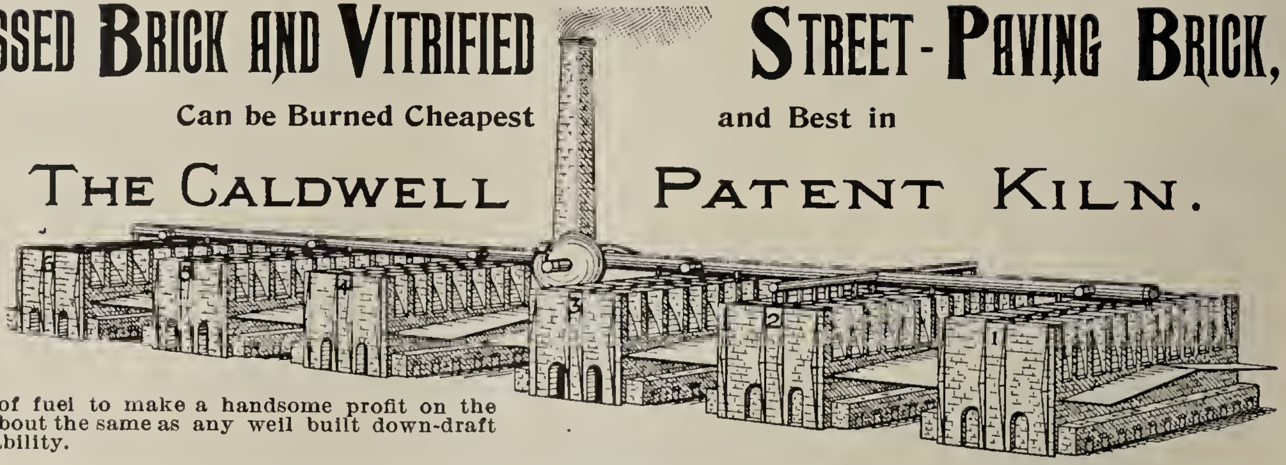
DISINTEGRATORS, PUG MILLS, ELEVATORS, and BRICKYARD SUPPLIES.

THE ANDERSON FOUNDRY & MACHINE WORKS, - - Anderson, Indiana

FRONT OR PRESSED BRICK AND VITRIFIED STREET-PAVING BRICK,

Can be Burned Cheapest and Best in

THE CALDWELL PATENT KILN.



Down-draft and Continuous combined.

All heat used twice at least.

Its Principal Advantages are:

First: Saving of fuel.
Second: Equalizing the drafts.
Third: More perfect combustion.
Fourth: Improved facilities for annealing.

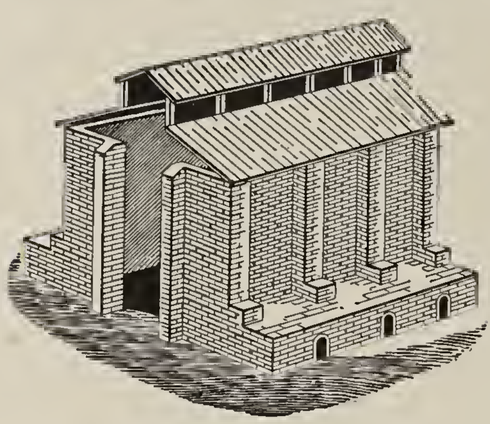
Will save enough in the cost of fuel to make a handsome profit on the years work. The cost of kiln about the same as any well built down-draft kiln of equal capacity and durability.

J. K. CALDWELL, 319 Hennepin Ave., ***Minneapolis, Minn.***

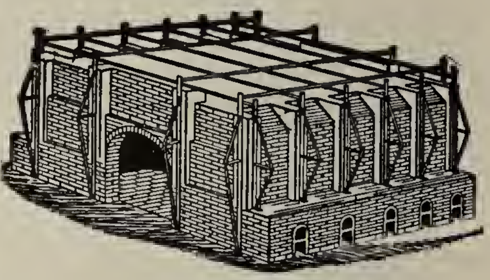
LOUIS H. REPPELL'S

IMPROVED-KILNS

For Burning all Kinds of Wares.



Up-Draft Kiln.



Down-Draft Kiln.

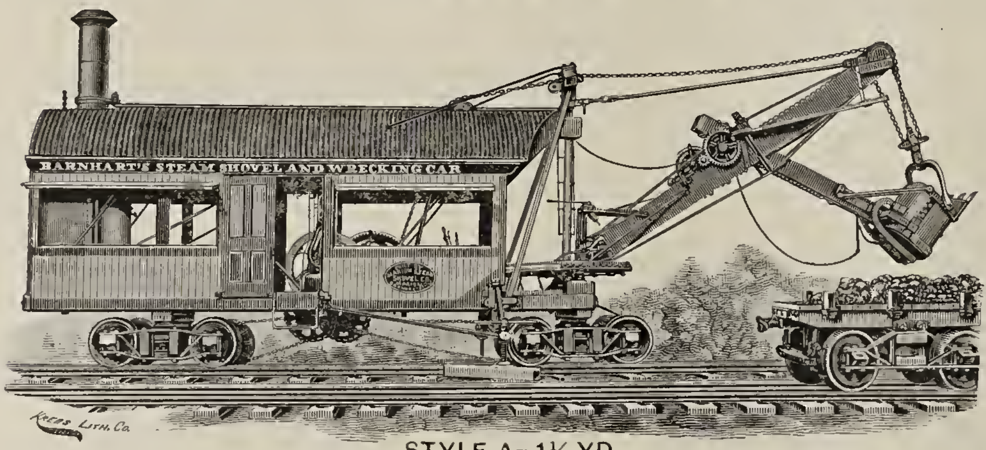
Having had years of practical experience in the management and actual burning of all kinds of kilns, claim it to be THE BEST Up-Draft KILN IN THE MARKET.

The above cut represents my recently patented Down-Draft Kilns, in which I have combined all the points of merit that have been found necessary and valuable in my years of experience in the burning of the above style kilns.

For further particulars and full explanation, address

LOUIS H. REPPELL, 1,919 Indiana Ave., ***Kansas City, Mo.***

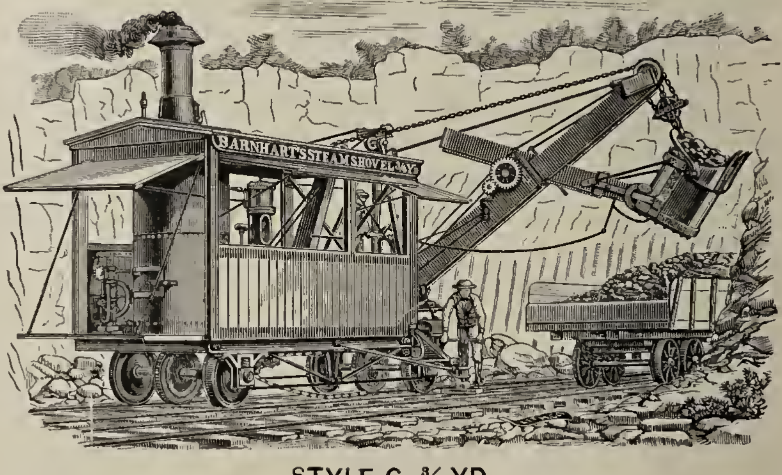
Steam Shovels for Brickyards.


BARNHART'S STEAM SHOVEL AND WRECKING CAR
Keeps Lith. Co.

STYLE A—1½ YD.

OUR large size steam shovels have a capacity equal to anything of this kind ever offered to the public and embody all the improvements to be found in excavating machinery. They are self-propelling and are particularly adapted for use in the larger brickyards. By the use of these machines, a much better brick can be made from the same material, beginning as it does, at the bottom and working up the bank until dipper is full. The different stratas of clay are thoroughly mixed which, in most yards, is an important feature. Our Excavators are no experiment, being used in all the principal brickyards of Chicago.

We have in and around Chicago, about twenty of these machines of different sizes. We also have many elsewhere of different capacities. The accompanying cut represents our style "A" (1½ yd.) with a capacity from 700 to 1500 cubic yards per day, and our style "C" (¾ yd.) with a capacity of 350 to 700 yards per day. Our machines are simple and easy of operation and are a great saving to brickmakers and also enables them to make a better quality of brick, and they are always ready for work.

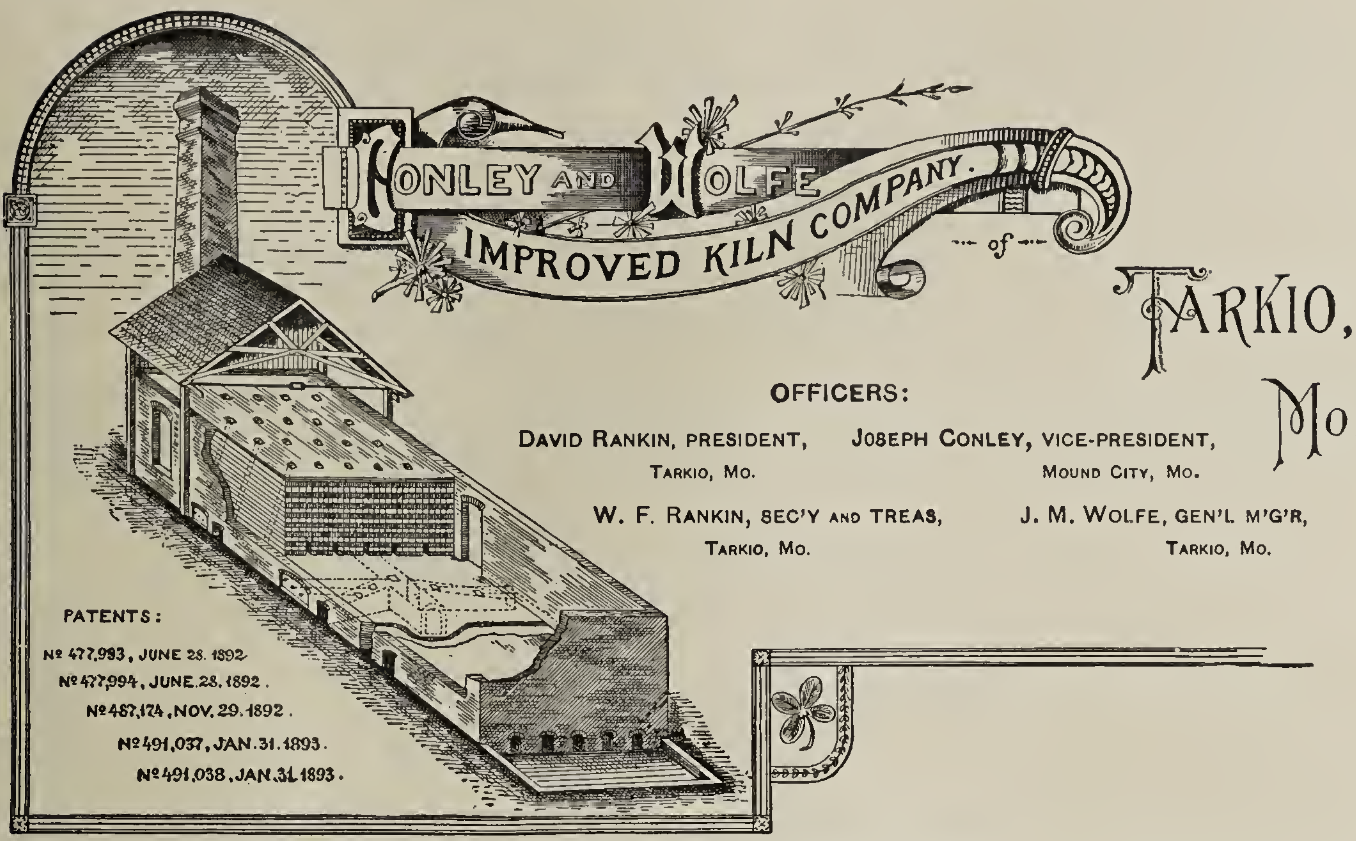

BARNHART'S STEAM SHOVEL CO.

STYLE C—¾ YD.

Write for testimonials and illustrated catalogue to

The Marion Steam Shovel Co.,

603 West Center Street, - **MARION, OHIO.**



OFFICERS:

DAVID RANKIN, PRESIDENT,
TARKIO, MO.

JOSEPH CONLEY, VICE-PRESIDENT,
MOUND CITY, MO.

W. F. RANKIN, SEC'Y AND TREAS,
TARKIO, MO.

J. M. WOLFE, GEN'L M'G'R,
TARKIO, MO.

PATENTS:
Nº 477,993, JUNE 28. 1892.
Nº 477,994, JUNE 28. 1892.
Nº 487,174, NOV. 29. 1892.
Nº 491,037, JAN. 31. 1893.
Nº 491,038, JAN. 31. 1893.

THIS KILN is cheap to construct, simple in operation and permanent in character. It has no crown to fall in and costs nothing for repairs. The dampers in the bottom give complete control of the heat and draft. It burns all brick evenly and thoroughly. It heats the brick gradually and cools the same, producing a tough and thoroughly annealed brick. It requires less than 200 lbs. slack coal per thousand to burn the very best annealed vitrified shale paving brick. It saves labor—one man can fire the largest kiln.

The Slack is converted into Gas and all the Heat Energy in the Coal is Utilized.

IT IS A SMOKE CONSUMER AND A PROFIT PRODUCER. ✣ YOU NEED THIS KILN. ✣ WRITE OUR GENERAL MANAGER FOR FULL INFORMATION.

ALSIP'S LATEST IMPROVED

Down and Up-draft Kiln.

* * *

The Alsip Kiln can be built so one smoke stack will accommodate two or more kilns.
The Alsip Kiln can be built with one small smoke stack.
The Alsip Kiln can be built with chimneys on the side of kiln.
The Alsip Kiln can watersmoke with the Up-draft.
The Alsip Kiln can watersmoke with the Down-draft.
The Alsip Kiln utilizes the waste heat from a cooling kiln for watersmoking a green kiln.
The Alsip Kiln uses furnaces with horizontal or slanting grate bars, also furnace without grate bars.

Any of the above styles of kiln guaranteed to give satisfaction.

We have a kiln that will convince and satisfy the most skeptical as to results of same if its merits are investigated.

For further information call at The Day Brick Works, or address

W. & S. H. ALSIP, 614 South Jackson Street. **Belleville, Ill.**

Morrison's Latest Improved Kiln,

FOR BURNING BUILDING BRICK.

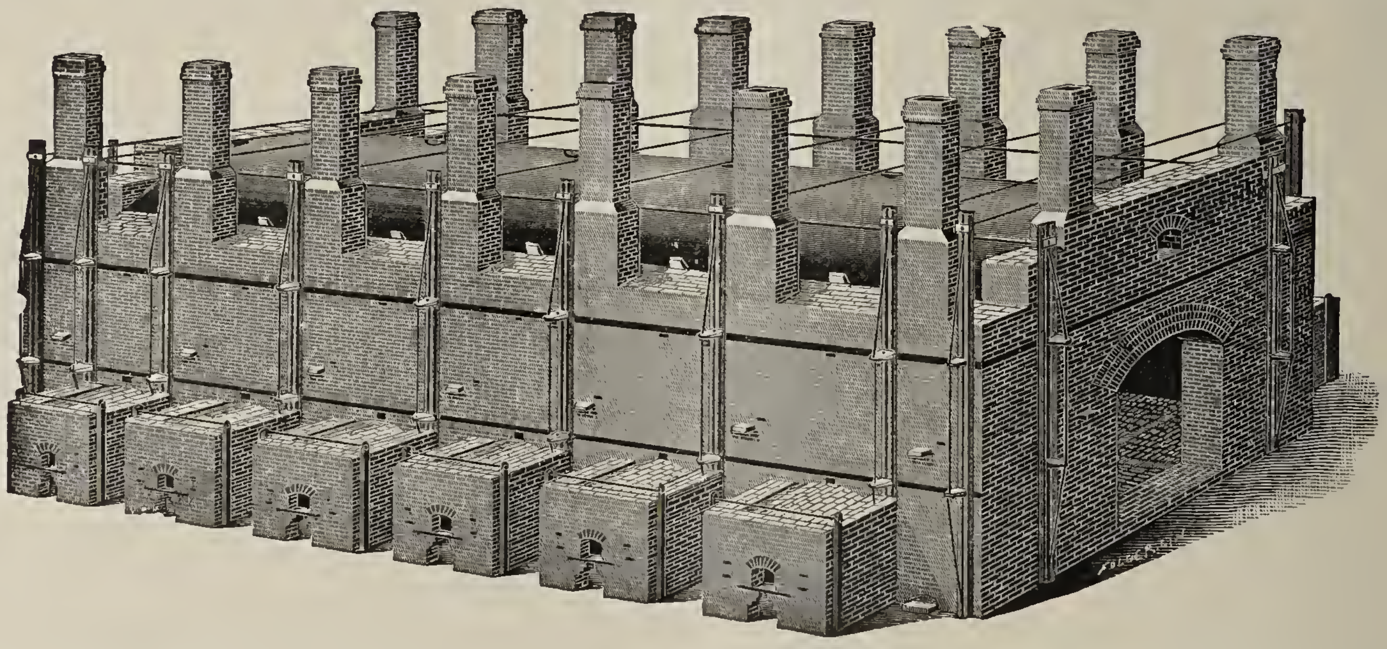
IT has no rival. Some of the largest brick plants in the country use it exclusively. Cost of construction within reach of every brickmaker. Price for license to use so reasonable that no one can object.

Write us for descriptive pamphlet, prices, etc., address

R. B. MORRISON & CO.,

P. O. Box 335. *ROME, GA., U. S. A.*

The EUDALY IMPROVED DOWN-DRAFT KILN and DRYING SYSTEM.



A very large number of manufacturers are now using the **"EUDALY KILN"** for burning all kinds of clay wares, especially **front, ornamental** and **paving brick.** These Kilns have gained a reputation for burning **all hard** and **uniform** brick. These Kilns are easily controlled and in every way practicable and desirable.

We have made a number of very valuable improvements since we first began the erecting of Kilns. Among these improvements is **a complete system for conveying the hot air from a cooling to a green kiln, or from a cooling kiln to the drying tunnels for drying purposes, or to the buildings for heating.**

The peculiar arrangement of the out-let flues makes it easy to carry the heat to any desired point through my system of **under-ground connecting tunnel flues. By this system brick can be dried with the waste heat.** We will take pleasure in giving any information we can on the subject of **handling, burning, or drying clays.** Address,

W. A. EUDALY, 509 Johnston Bldg. **Cincinnati, Ohio.**

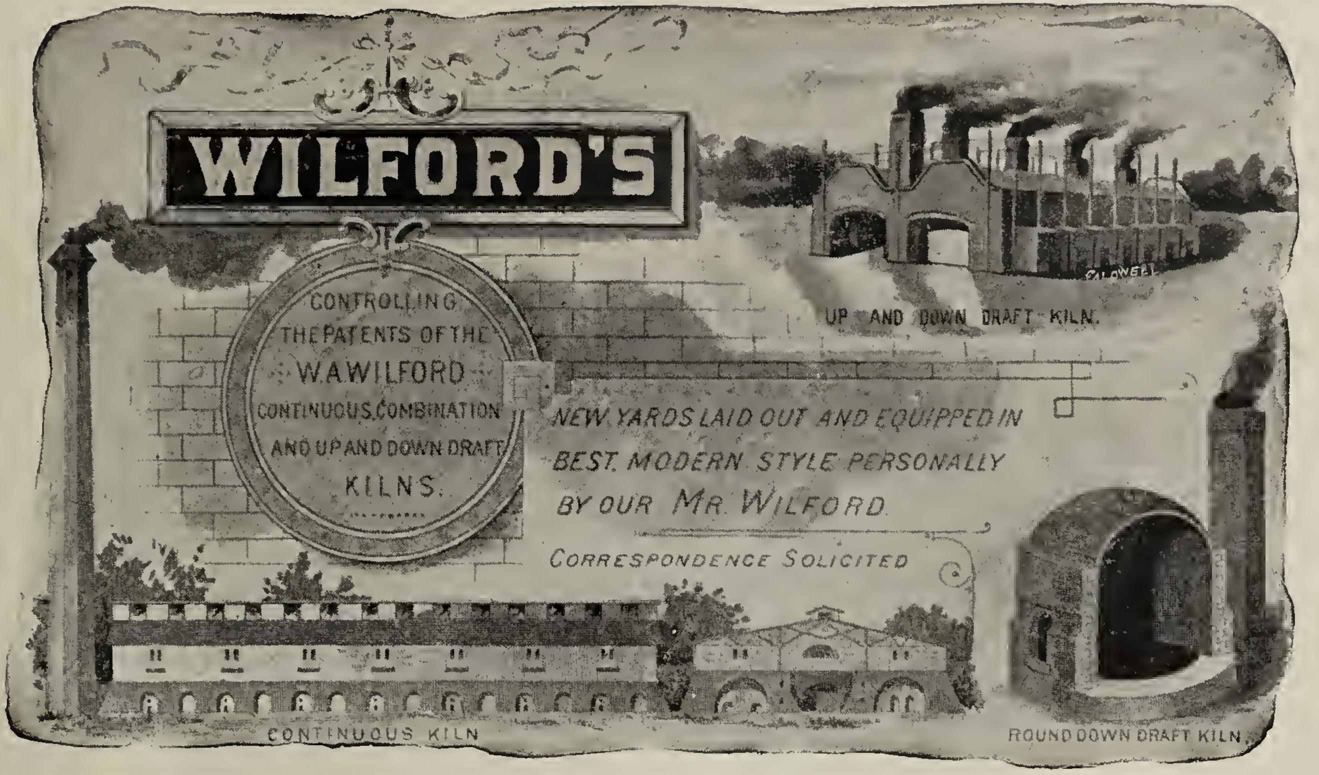
ECONOMY IS ESSENTIAL TO SUCCESS.

The Wilford Patent Continuous and Combination Kilns

Afford the most economical method of burning brick.

Points of Advantage:

Cheapness of construction; simplicity; the largest per cent. of good brick and the least amount of fuel.


WILFORD'S
CONTROLLING THE PATENTS OF THE W.A.WILFORD CONTINUOUS,COMBINATION AND UP AND DOWN DRAFT KILNS.
UP AND DOWN DRAFT KILN.
NEW YARDS LAID OUT AND EQUIPPED IN BEST MODERN STYLE PERSONALLY BY OUR MR. WILFORD
CORRESPONDENCE SOLICITED
CONTINUOUS KILN
ROUND DOWN DRAFT KILN.

TESTIMONIALS:

ROCHESTER BRICK & TILE M'F'G. CO.,
Brick and Drain Tiles, Hollow Brick, Etc.
243 *Power's Block.*

ROCHESTER, N. Y., June 19, 1896.

WILFORD PATENT KILN CO.

Dear Sir:—In answer to your inquiry as to what we can say in reference to your kiln recently constructed on our yard, we are very much pleased with it.

At the present time we have burned once and a half round, and we not only find it to be very economical in fuel, but the brick are coming out well burned, in first-class condition and very little waste.

After a little longer use we hope to make a still better showing.

Truly yours,
ROCHESTER BRICK & TILE M'F'G. CO.,
Per IRA L. OTIS, Pres.

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, July 21st, 1895.

WILFORD PATENT KILN CO.

Gentlemen:—Yours of the 19th inst to hand. The up and down-draft kilns which you built for us for burning our moulded and face bricks, have more than fulfilled our expectations. The class of goods we secure by this process of burning, enables us to maintain the lead over all our competitors in evenness of quality, color and finish. We get an average of 90 to 95 per cent. of first-class dry, press facing brick of any of our colors (of which you are aware we have a large variety)

Wishing you the success in the future you have obtained in the past, we are

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

OFFICE OF
TAYLOR BROTHERS,
Don Valley Pressed Brick Works.
60 *Adelaide Street East, Toronto.*

TORONTO, August 7th, 1895.

W. A. WILFORD, ESQ.,
WILFORD PATENT KILN CO.

Dear Sir:—In answer to yours of the 5th inst., we have pleasure in saying that after using your fourteen-chamber Continuous Kiln for over two years, we are thoroughly satisfied with the results. We get on an average 98 per cent. of uniform, hard brick; in fact we might say no waste at all, and have taken out pavers that are superior in strength and toughness to those we get in the other styles of kilns we use.

Wishing you success, we are,

Yours truly,
TAYLOR BROTHERS,
Per W. F. Tasker, *Man.*

ELMIRA SHALE BRICK WORKS.
PROPRIETORS,
J. PHILLIP WEYER & SON,

ELMIRA, N. Y., August 30th, 1895.

WILFORD PATENT KILN CO.,

Gentlemen:—In reply to your inquiry as to how your continuous kiln, built for us last fall, continues to work.

The kiln is doing duty in the most satisfactory manner. We burn cheaply, and we burn with very little waste indeed. The chief question about which we were anxious, was the life of the kiln. Our minds are now easy upon that point.

In a word, the kiln not only performs its work now as well as it did the first time round, but promises to continue to do so for many years. It is therefore a kiln meeting to the fullest degree the demands of true economy and business prudence.

We are not surprised to learn from you that orders for the kiln are multiplying.

Your well wishers,
J. PHILLIP WEYER & SON.

OFFICE OF
BRUSH BROTHERS, Buffalo, N. Y.
927 *Clinton Street and 2 Builders Exchange.*

WILFORD PATENT KILN CO.

BUFFALO, August 15th, 1895.

Gentlemen:—In reference to your enquiry, would say we are well satisfied with the Continuous Kiln you built for us more than a year ago The fires have never been out since you first started them. We are going round the twenty-sixth time. Our brick are all hard, and scarcely any waste. The kiln is as strong to-day as the day you built it. Wishing you every success in the future, we are,

Yours very truly,
BRUSH BROS.

Let us give you full Particulars.

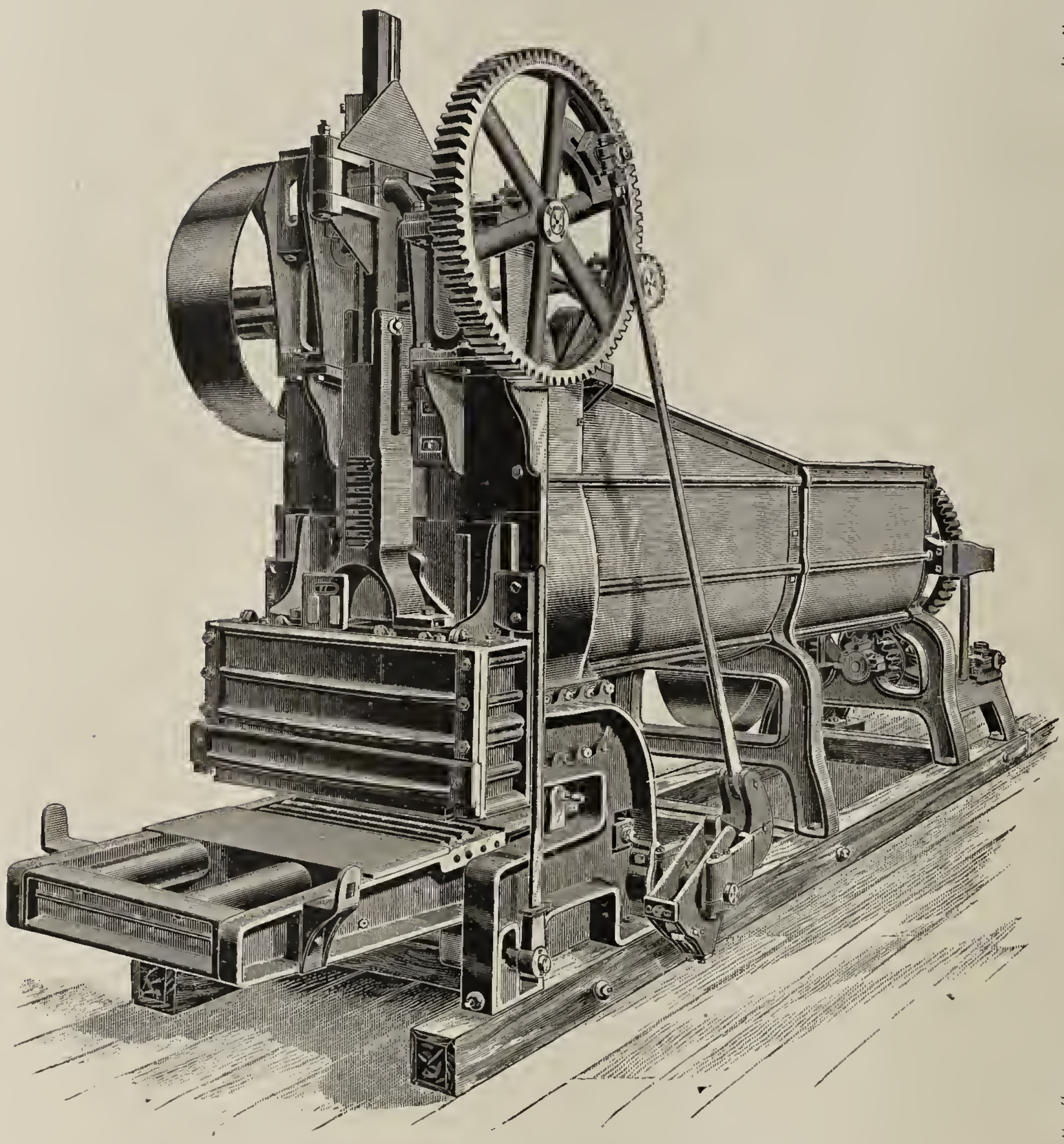
The Wilford Patent Kiln Company,

W. A. WILFORD, Manager,
ROCHESTER, N. Y.

BYRON BECHTEL,
Waterloo, Ont., Canadian Agt.

WANTED:—

Every Brickmaker to read this letter, and write us giving his opinion of a Machine that will make 40 M good brick every day in the year.



All Iron Horizontal Stock.

Geo. B. Parry, Pres. A. D. Cady, Treas.

MECHANICVILLE BRICK COMPANY,

High Grade Building Brick.

Capacity 10 Million.

Mechanicville, N. Y., Sept. 7, 1896.

C. & A. Potts & Co., Indianapolis, Ind.

Gentlemen: — The machines purchased of you two years ago are doing good work, having run every working day since the 10th of April and made its full compliment of 40 M brick every day since that time, having made in all over five million to the present time. **Good Record do you not think?**

Yours truly,
MECHANICVILLE BRICK CO.

WE DON'T THINK, but know, that this machine is a **Record Breaker,** that there is no machine made that will compare with it for Strength, Durability and Workmanship. For Quantity and Quality of brick made it is head and shoulders over all competitors.

We manufacture a complete line of Clayworking Machinery, Disintegrators, Mould Sander, Pug Mills, Elevators, Moulds, Trucks and Barrows.

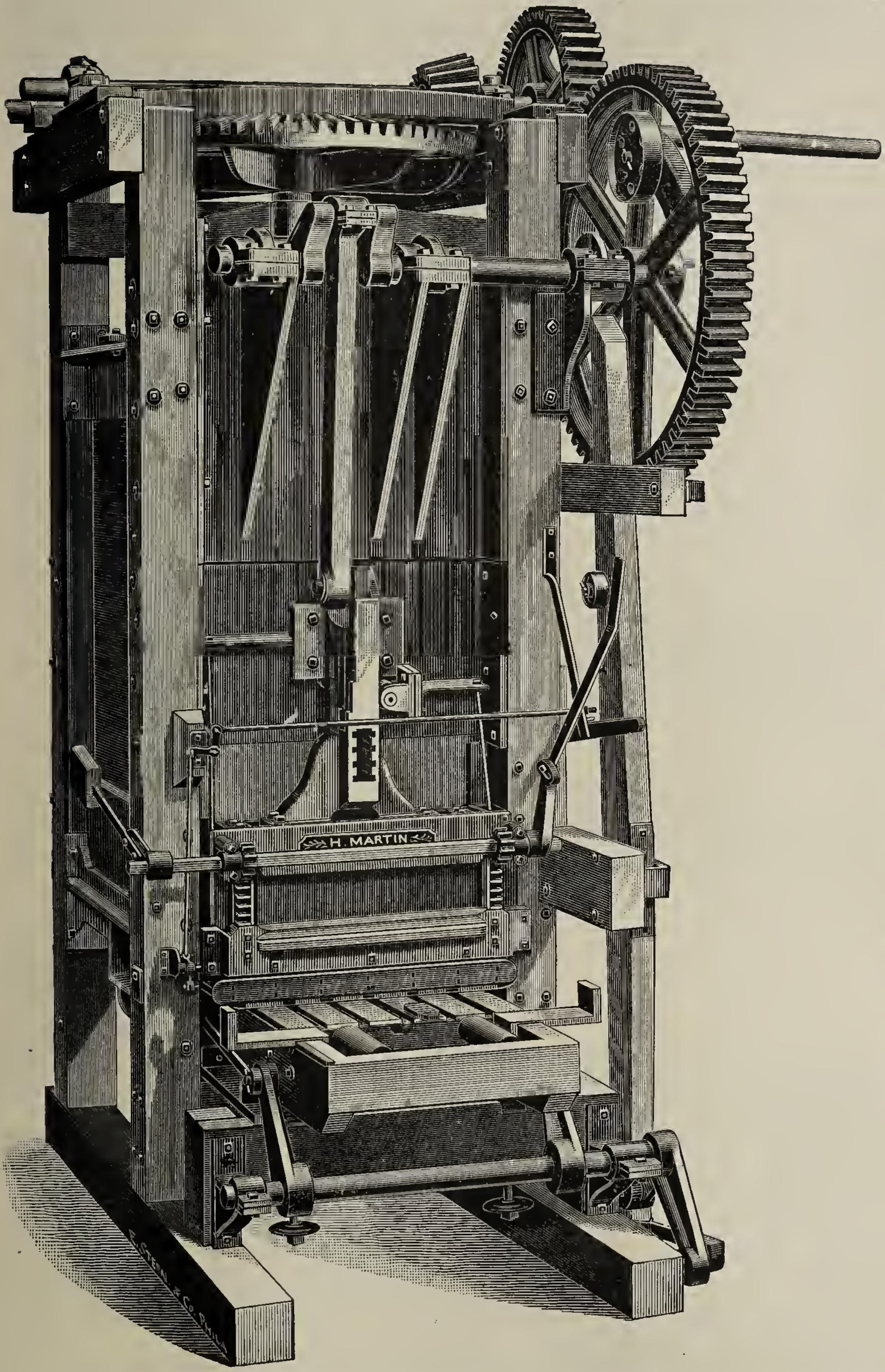
Write us for Prices.

C. & A. POTTS & CO.,

420-428 West Washington St., (Old National Road,) INDIANAPOLIS, IND.

The "Henry Martin"

Letter "A" Machine.



This machine is strong and durable and capable of moulding the clay exceedingly stiff.

It is perfectly AUTOMATIC and SELF-STRIKING.

It has a capacity of from 30,000 to 50,000 brick per day.

It does not require much power.

It is used by many of the largest and best known concerns in the United States.

It works successfully in all kinds of clay.

WHY take chances on others when the merits of the "MARTIN" are so well established.

Plans of complete plants will be furnished, if desired, free of charge.

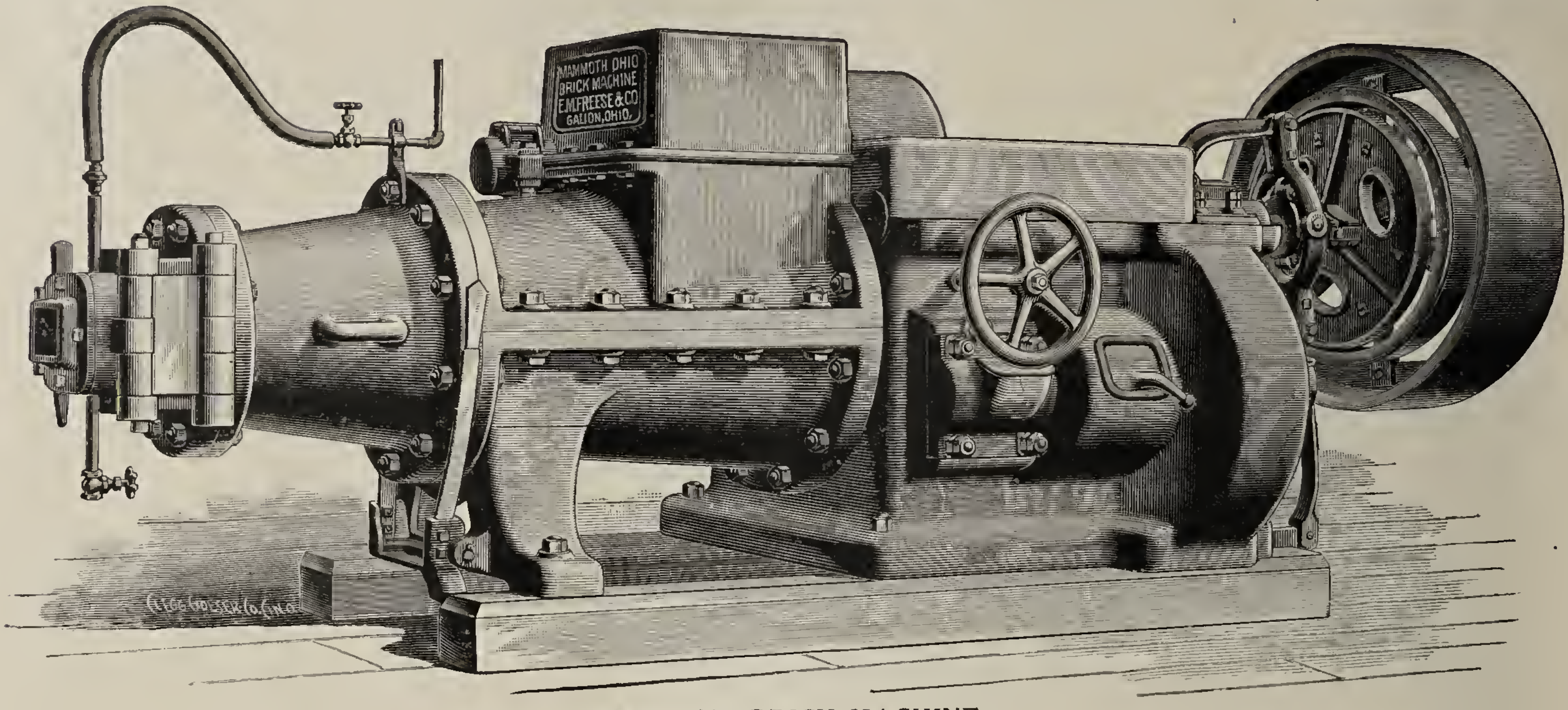
The Henry Martin Brick Machine Mfg. Co.,

Incorporated.

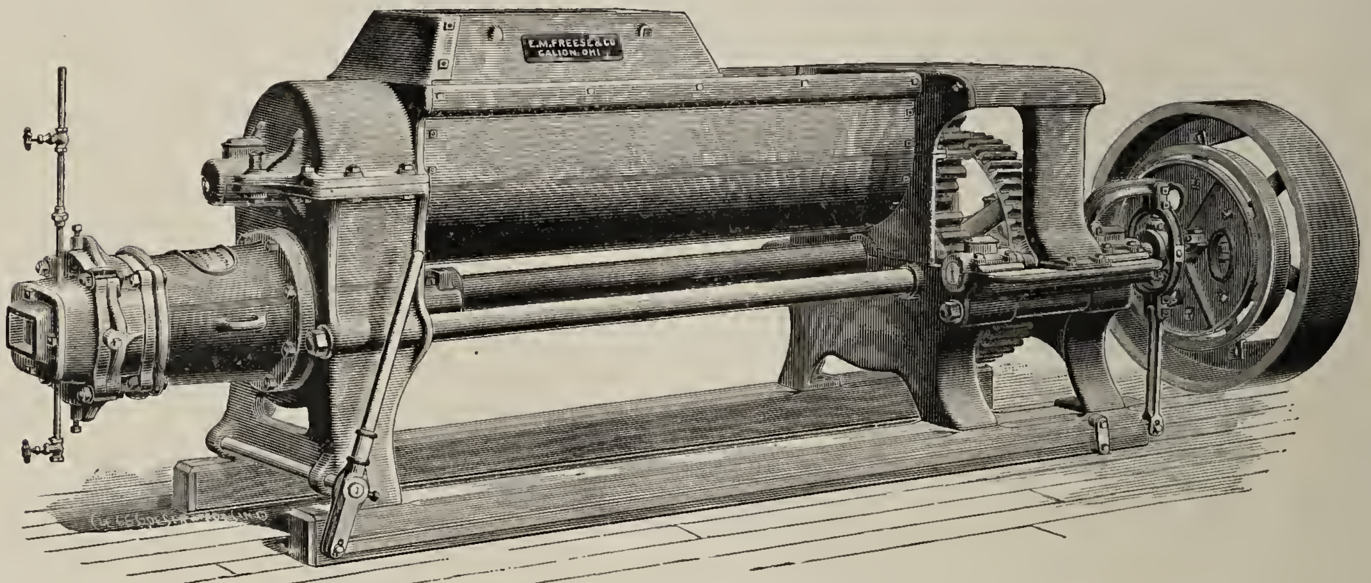
Mention the Clay-Worker.

Lancaster, Penna., U. S. A.

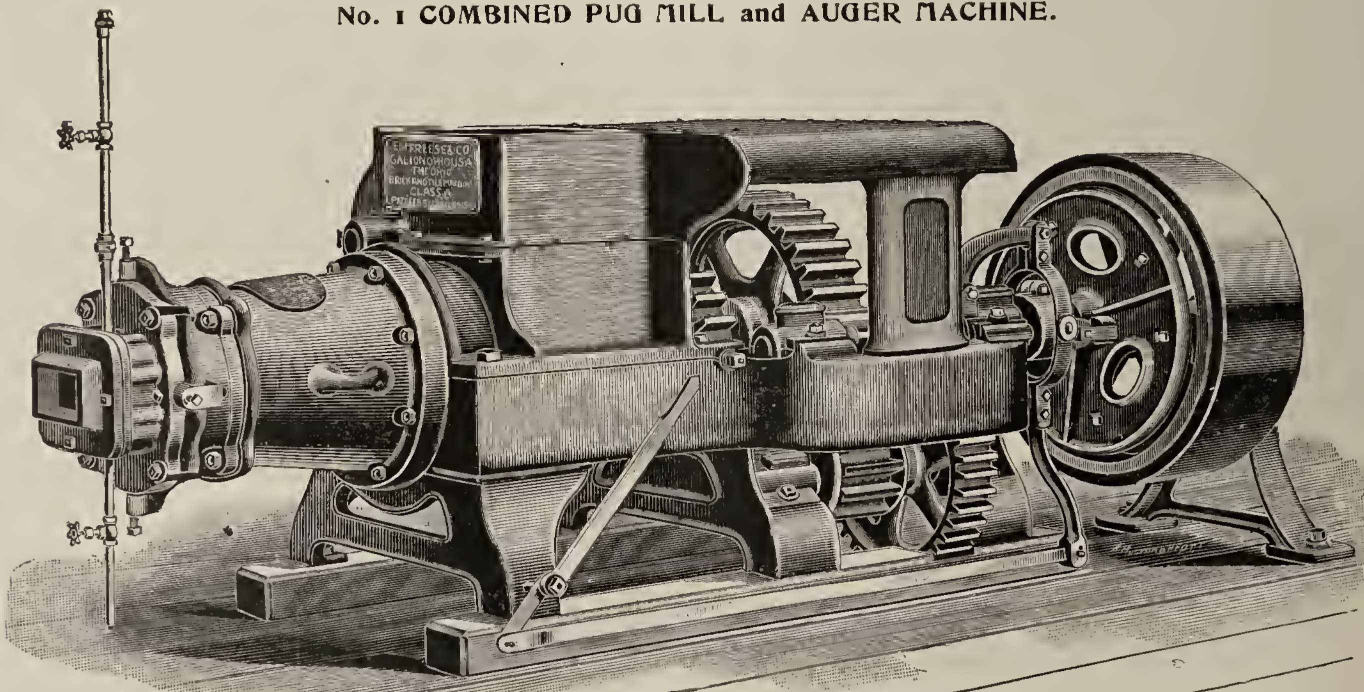
E. M. FREESE & CO., GALION, OHIO.


MAMMOTH OHIO
BRICK MACHINE
E.M.FREESE & CO.
GALION, OHIO.

MAMMOTH BRICK MACHINE.

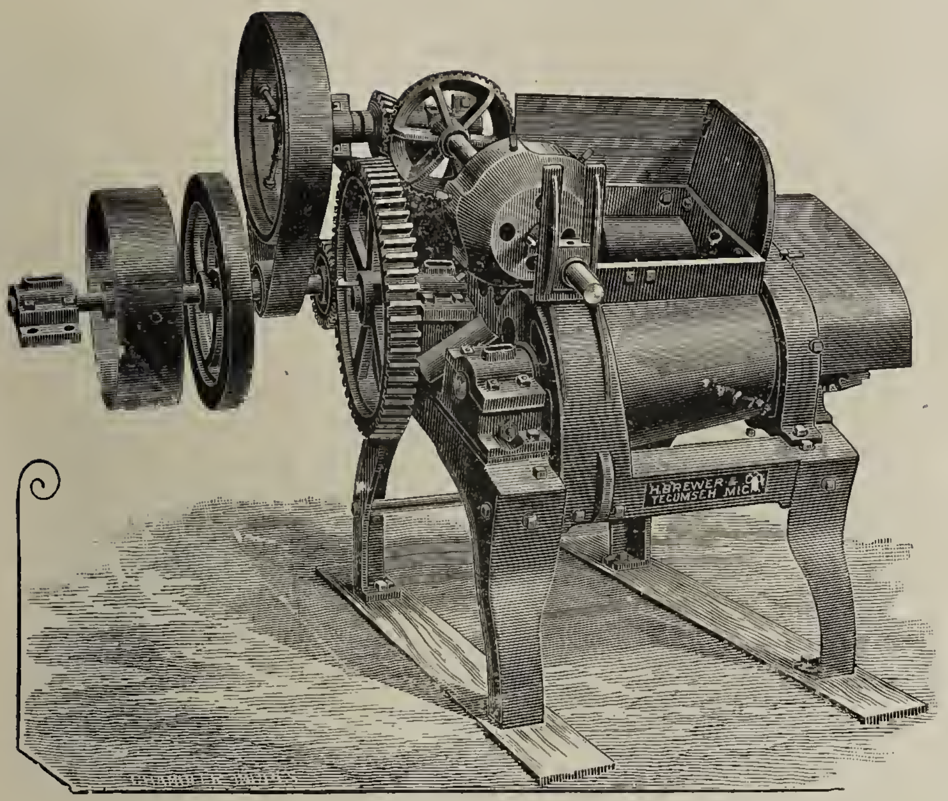


No. 1 COMBINED PUG MILL and AUGER MACHINE.

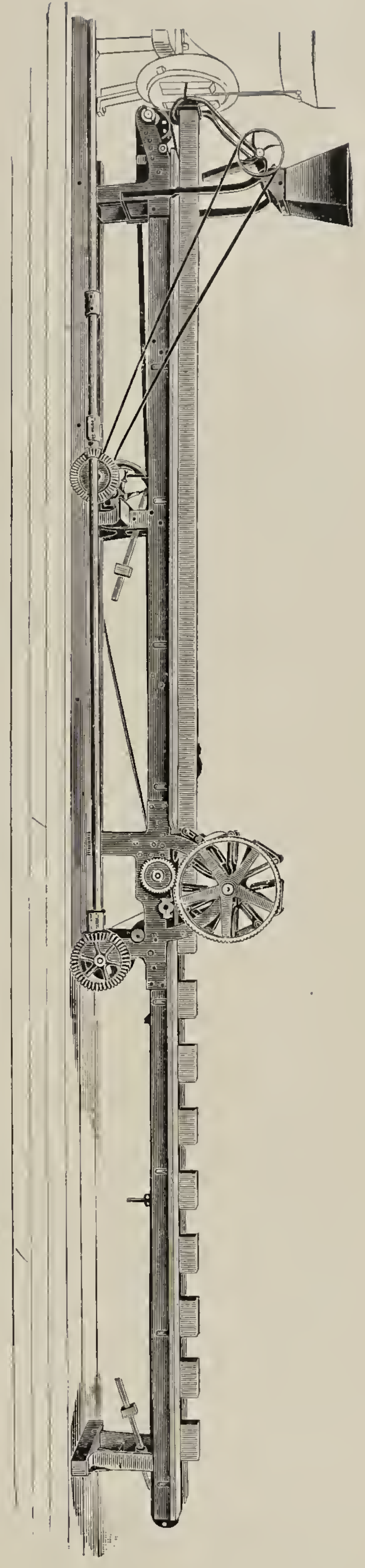


IMPROVED "A" SPECIAL OHIO BRICK MACHINE.

Send for 136 page Catalogue.



STONE EXTRACTING CLAY CRUSHER.

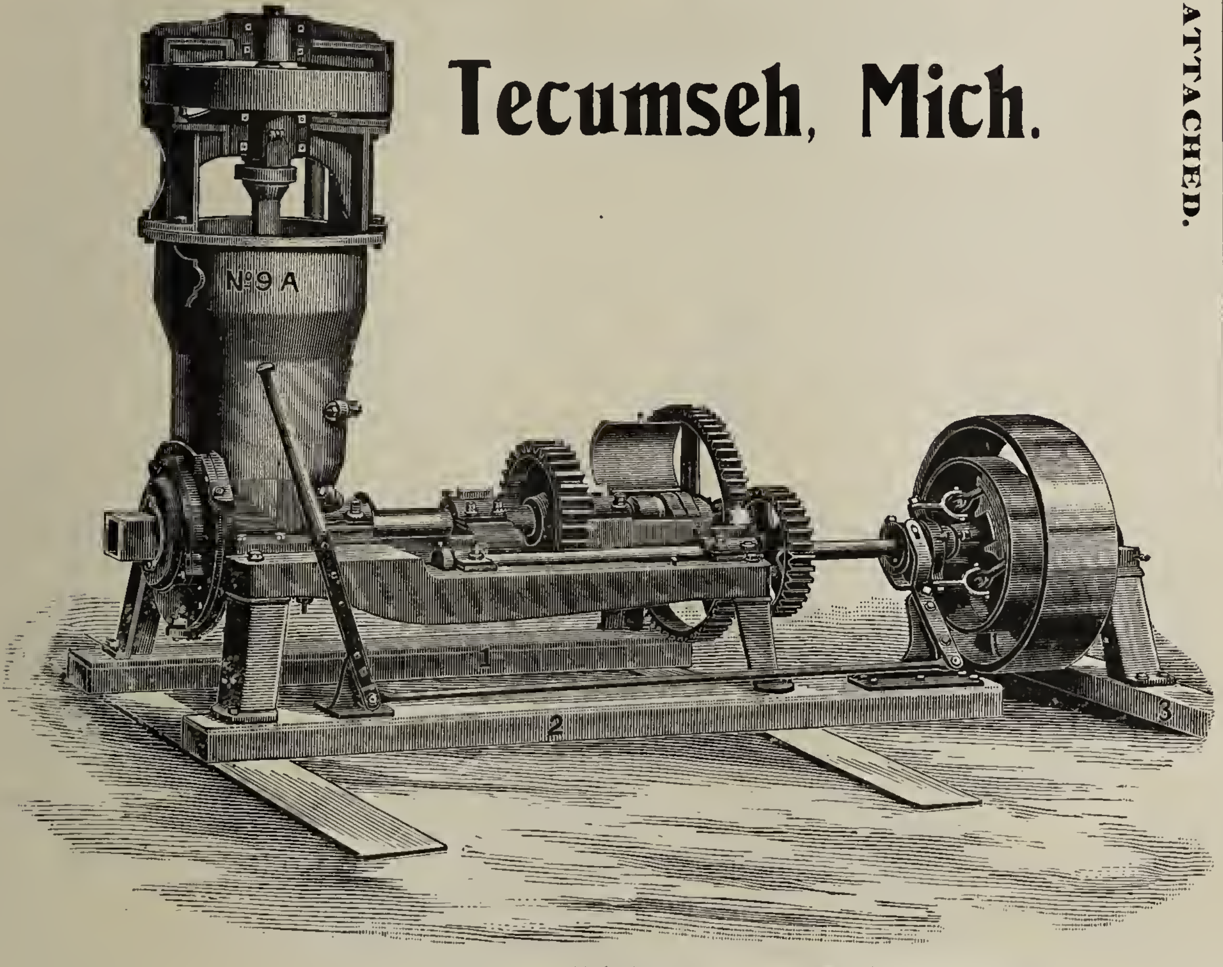


AUTOMATIC END CUT BRICK CUTTER with SANDER ATTACHED.

Manufactured by

H. Brewer & Co.,

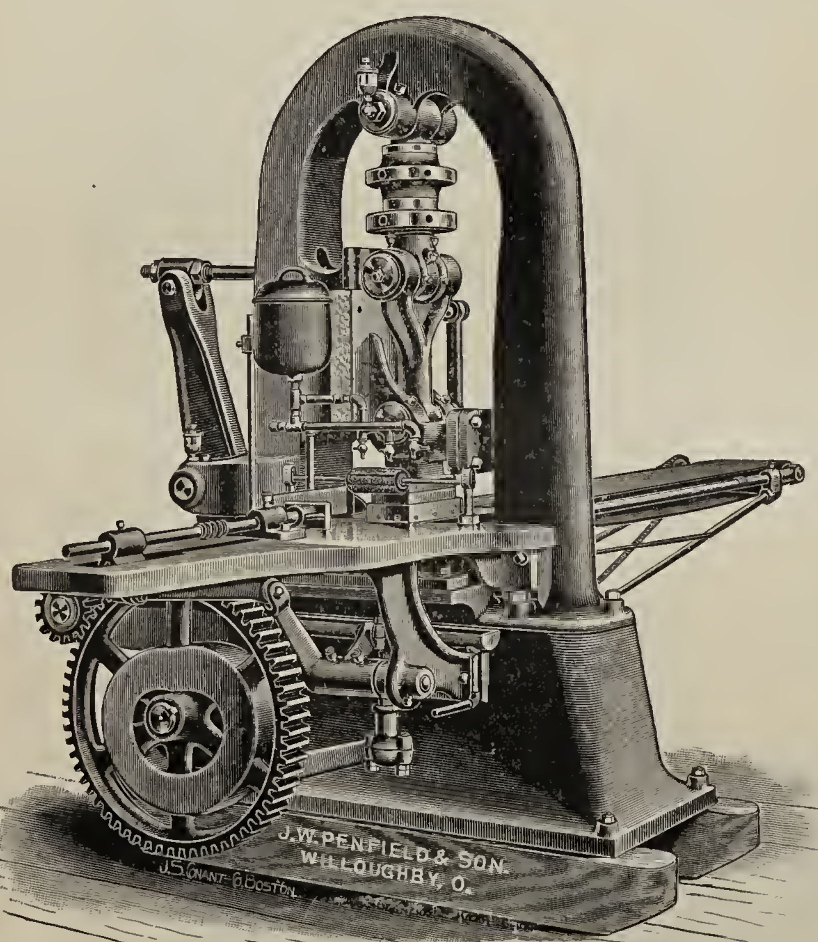
Tecumseh, Mich.

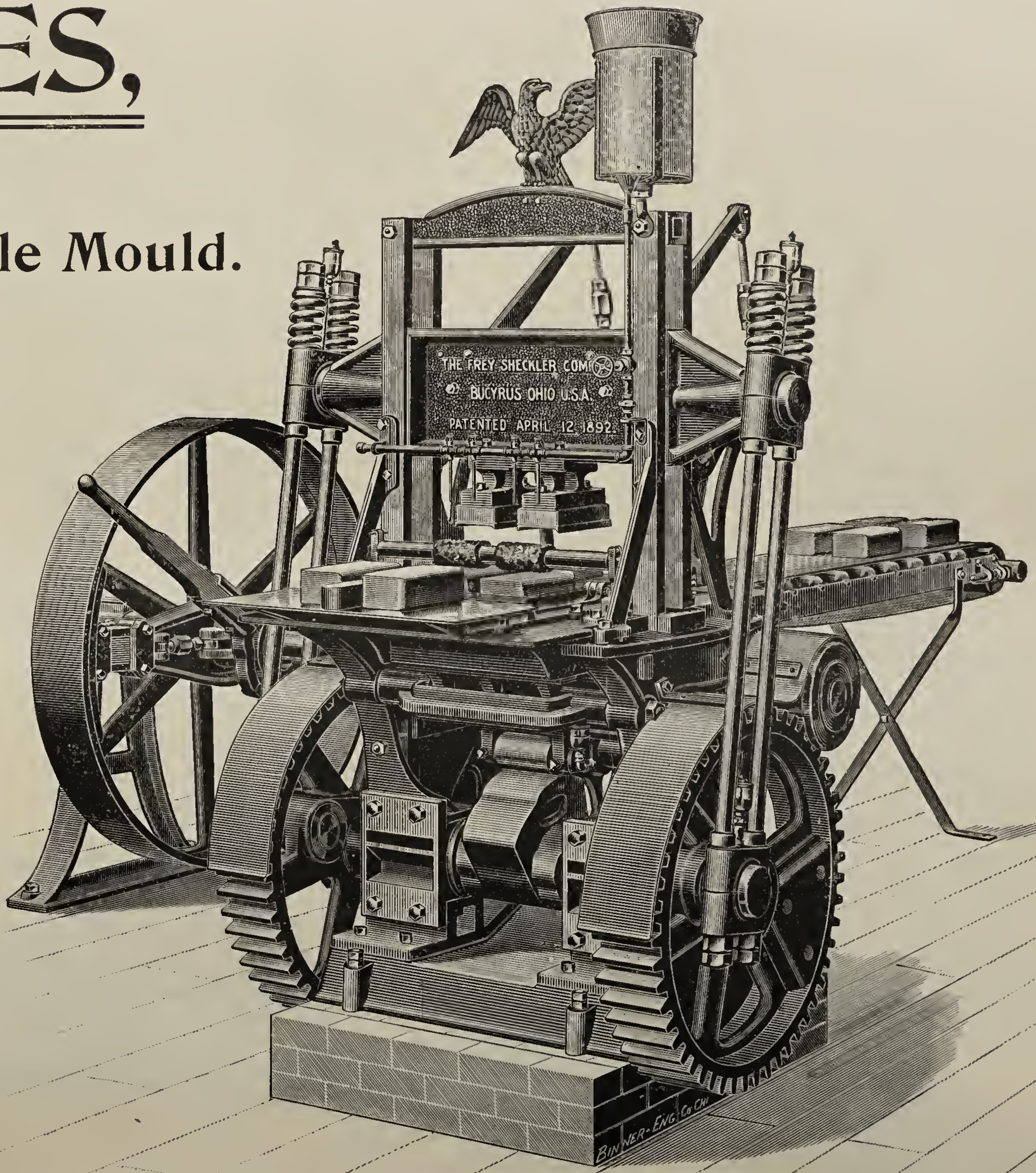


No. 9 "A" BRICK MACHINE.

RE=PRESSES,

For Stiff Mud Brick, With Single or Double Mould.

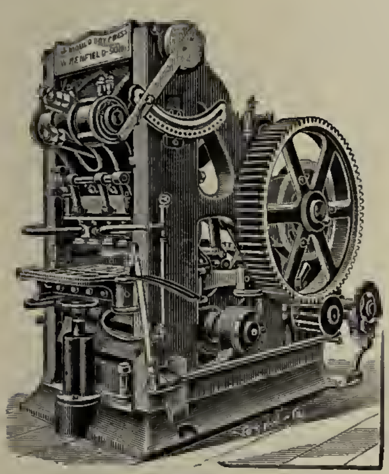

J. W. PENFIELD & SON.
WILLOUGHBY, O.
J.S. GRANT & BOSTON

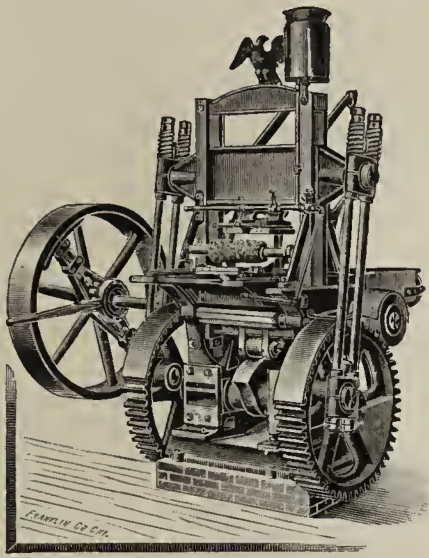

THE FREY SHECKLER COM
BUCYRUS OHIO U.S.A.
PATENTED APRIL 12 1892.
BINNER-ENG. Co CH.

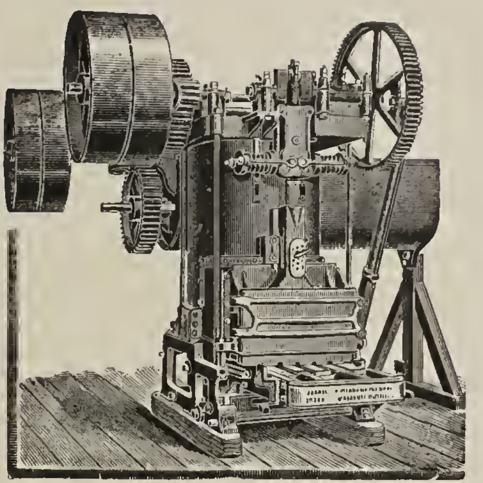
Send for Complete Catalogue.

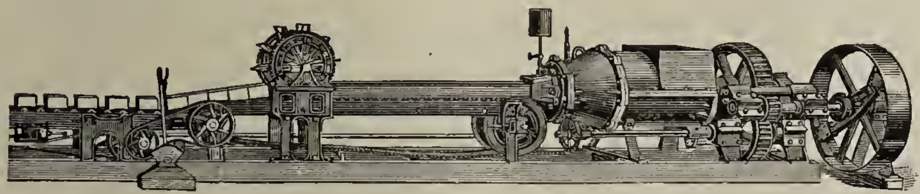
**The American Clay=Working
Machinery Company,
BUCYRUS, OHIO, U. S. A.**

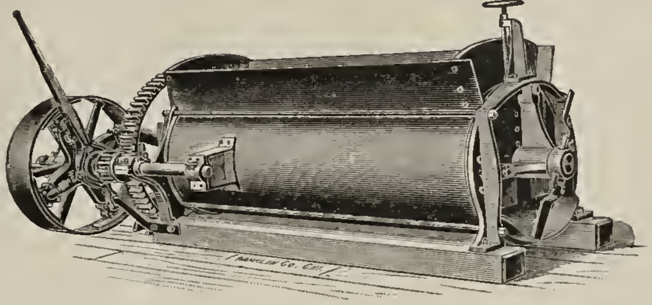
Some of Our Goods.

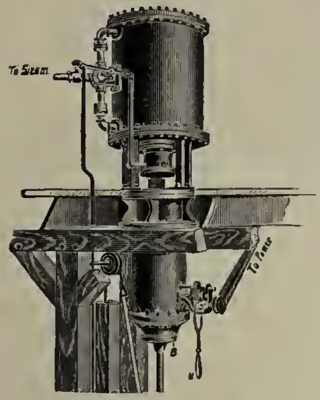

Dry Press Brick Machines.


Brick Re-Presess.

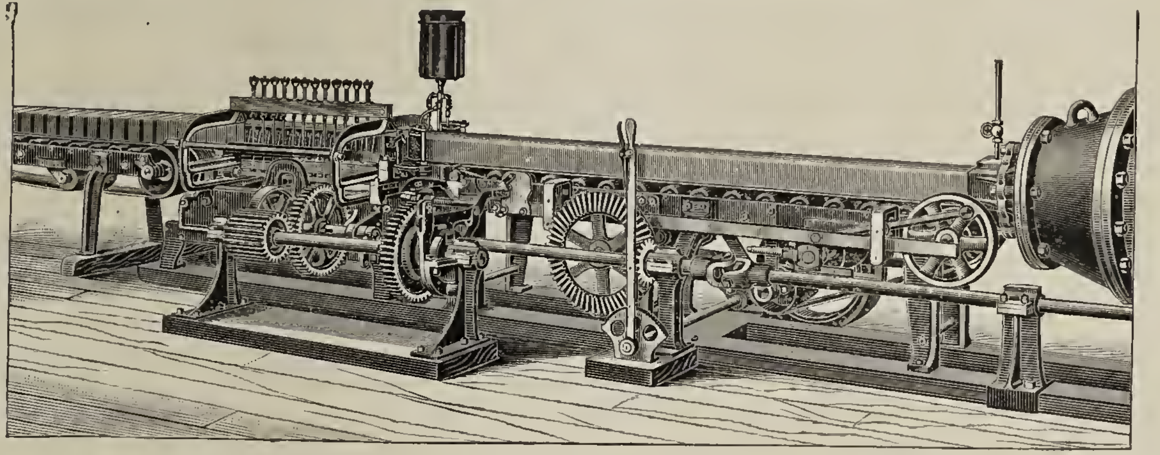

Sand Mold Brick Machines.

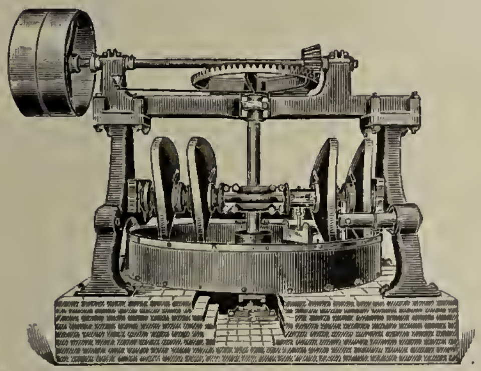

Auger Brick and Tile Machines.

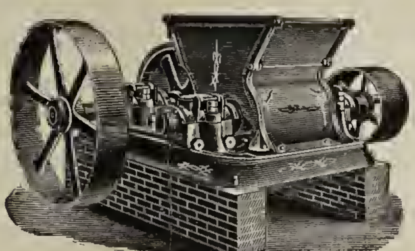

Pug Mills.

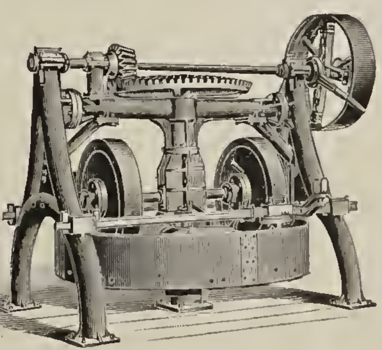


Sewer Pipe Presses.


Automatic and Hand Power Brick Cutters.


Special Clay Grinding Mills.


Disintegrators.


Dry and Wet Pans.

Send for Our Complete Catalogue.

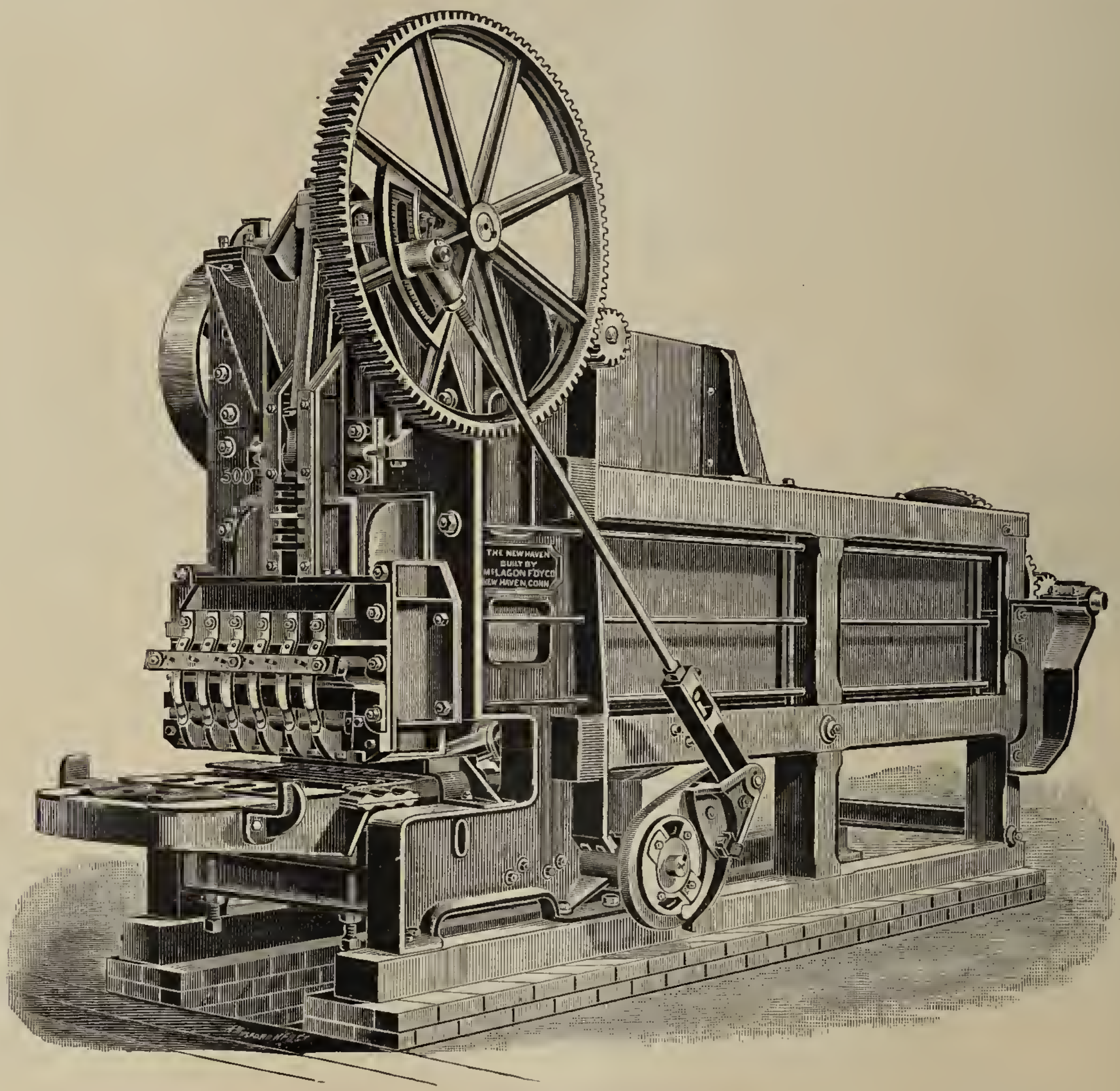
The American Clay-Working Machinery Co.,

BUCYRUS, OHIO, U. S. A.

Four Millions Worth

OF PRAISE FOR

"New Haven" Machines.



Sherbrooke, Quebec, October 2nd, 1896.

The Eastern Machinery Co., New Haven, Conn.

Dear Sirs:—We have your letter of the 25th to hand. In regard to the machinery we can only praise the machine and say that we have made **Four Millions of Brick this Season without a repair or a shut down** on account of the machine.

Yours, D. G. LOOMIS & SONS.

Every reply to our Inquiry is like the Above.

The Eastern Machinery Co.,

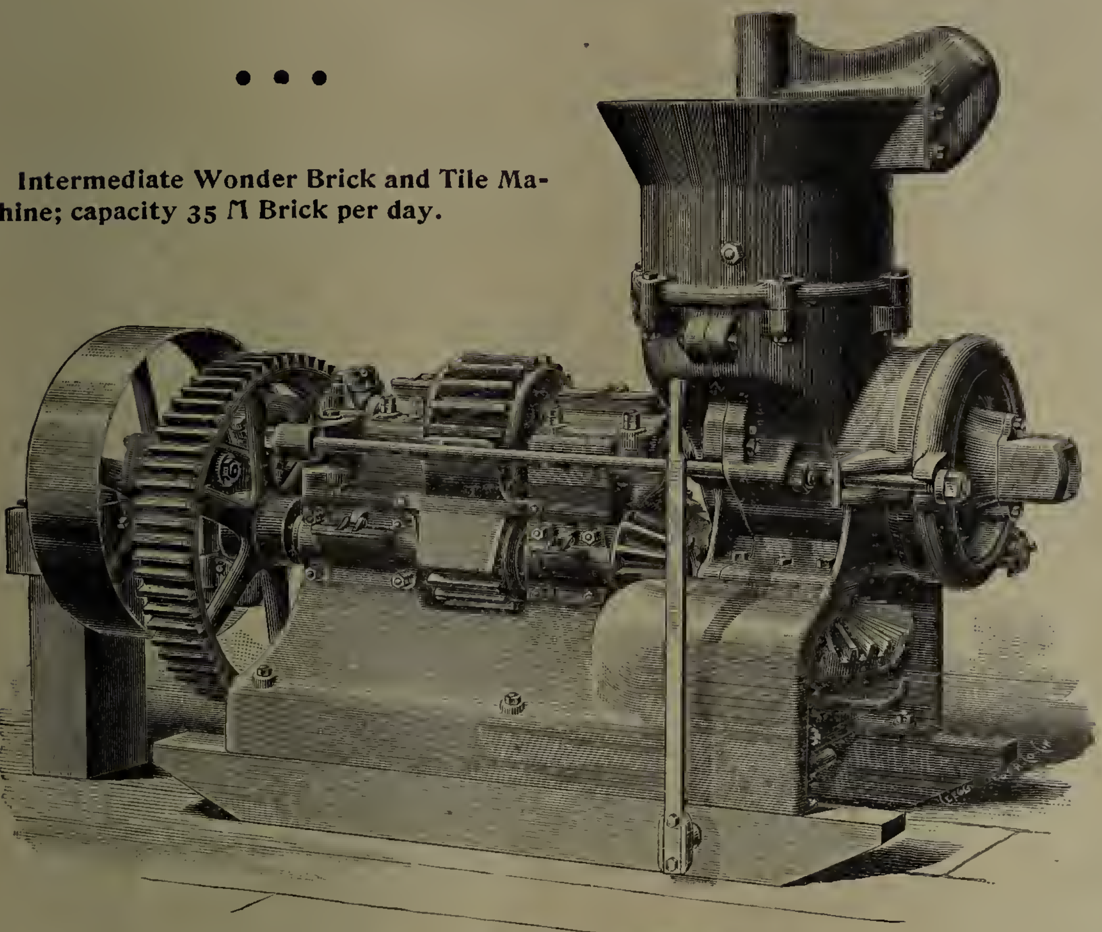
NEW HAVEN, CONN.

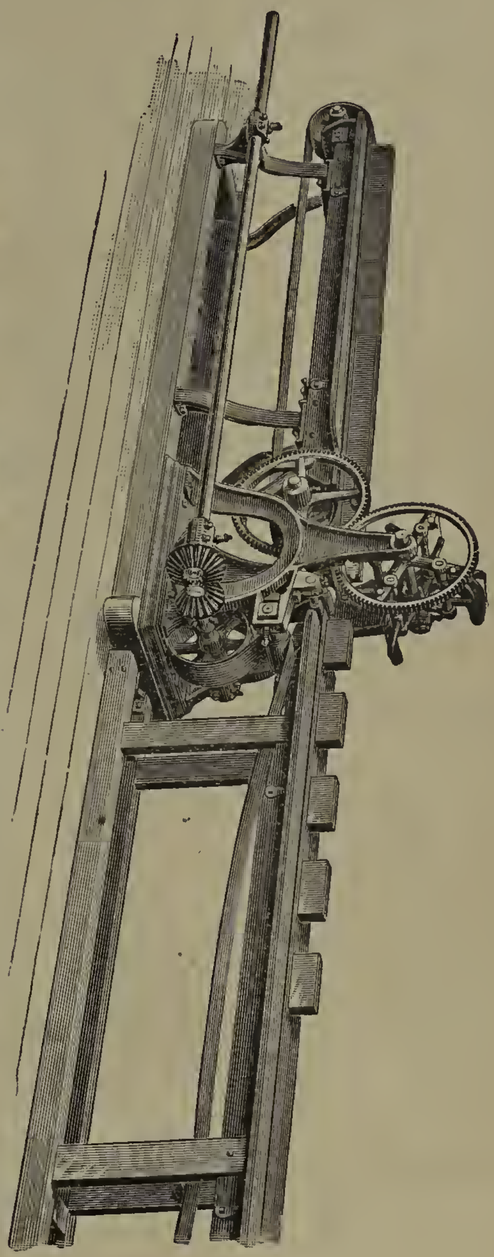
WONDER MACHINERY,

For Brick and Tile.

• • •

Intermediate Wonder Brick and Tile Machine; capacity 35 M Brick per day.



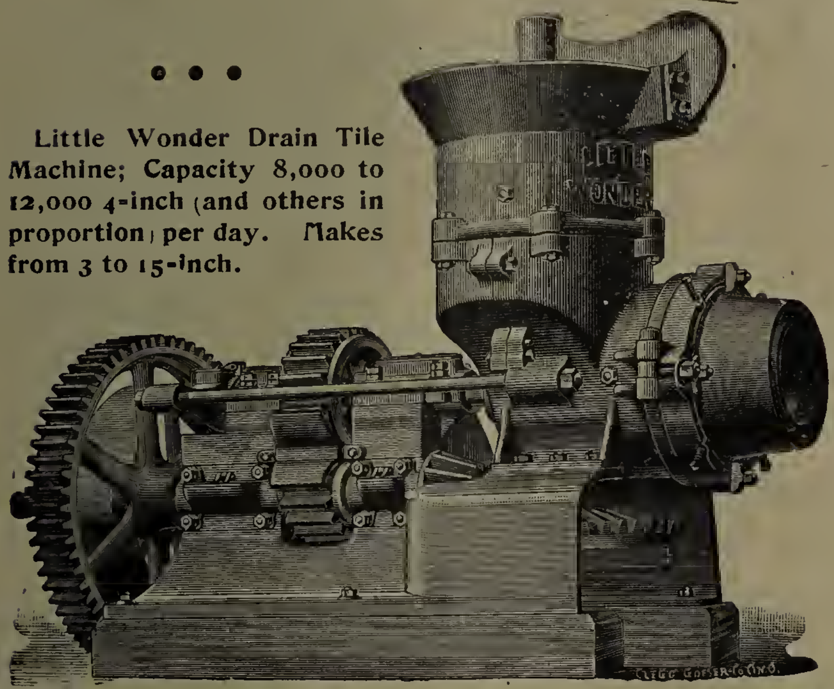


Cunningham's Single Stream Automatic End Cut Brick Cutter.

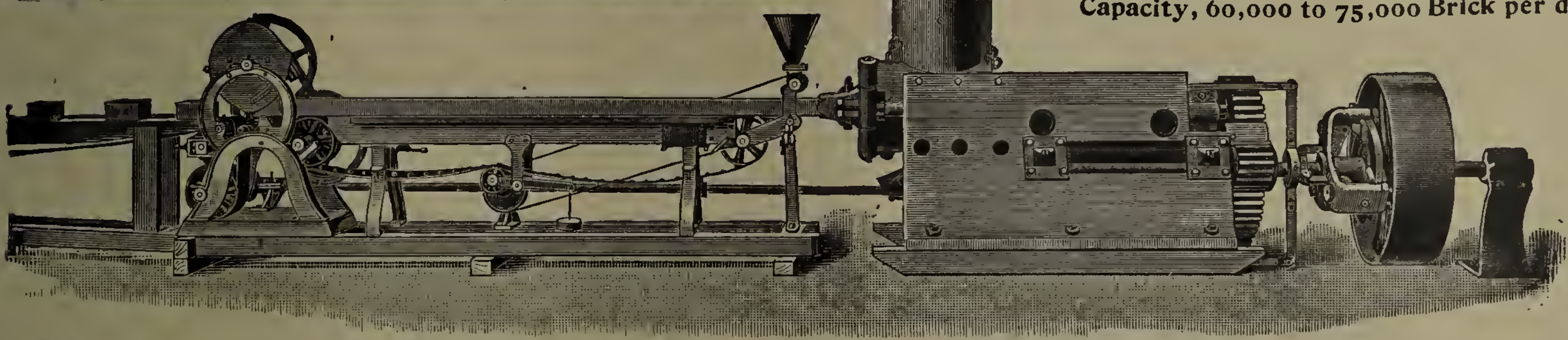
• • •

• • •

Little Wonder Drain Tile Machine; Capacity 8,000 to 12,000 4-inch (and others in proportion) per day. Makes from 3 to 15-inch.



Big Wonder Brick Machine with Cunningham Automatic Brick Cutter and Sander; Capacity, 60,000 to 75,000 Brick per day.



AS MANUFACTURED BY

The Wallace Manufacturing Co.,

☞ Send for No. 14 Catalogue for further particulars.

FRANKFORT, IND.

DRY YOUR

Pressed Brick in the Iron Clad Dryer

F. F. PALMS, PRESIDENT JOHN B. CORLISS, VICE-PRESIDENT. CHARLES L. PALMS, SEC'Y AND TREAS.

The Cayuga Press Brick Company,

MANUFACTURERS OF

PLAIN, MOULDED AND ORNAMENTAL PRESSED BRICK,

BRICK WORKS AT CAYUGA, IND.
OFFICE, 33 CAMPAU BLDG.,
DETROIT, MICH.

Cayuga, Ind., November 10th, 1896.

WOLFF DRYER CO., Chicago, Ill.

GENTLEMEN:—As you have just completed and turned over to us the four track dryer contracted for; consisting of one tunnel 140 feet long by 17 feet wide with four tracks which gives us a drying capacity of 55 M brick every twenty-four hours, we thought the moment opportune to compliment you upon the successful completion of the work, and the satisfactory manner in which it was done. The dryer has been in operation only a few days but it has thus far accomplished all it was promised to do, and we feel confident it can do even more.

We built the dryer to dry our output which consists of two Boyd 4-mould dry presses and one Penfield stiff-mud machine. We have had considerable trouble in the past making ornamental brick, but in putting them through your dryer we can turn out fully 80 per cent. perfect brick against 30 per cent. under the old system of drying them in the kiln. Our buff shale is very tender and the greatest of care has to be exercised in drying off in the kiln, but under this system we have reduced the time of watersmoking from twelve and fourteen days, to three days, thereby getting rid of the tedious period and increasing the capacity of our kilns fully one-half as we can now turn out a kiln in half the time that was formerly required which reduces our fuel expense about 30 per cent. and time of kiln 50 per cent.

In justice to yourselves and your Superintendent, Mr. Green whom you sent to erect the dryer, we would say, that the work was all done in a first class workman-like manner and satisfactory in every respect and we now pride ourselves on having the best and most complete dryer the market affords. It fully merits the reputation it has and deserves the patronage of Brickmakers in general.

Hoping you increased success in the introduction of dryers to the trade, we remain, Very truly yours,

CAYUGA PRESS BRICK CO.,
CHAS. L. PALMS, Man.

Write for prices and illustrated catalogue to

WOLFF DRYER CO., Chicago, Ills.

UNIVERSITY OF ILLINOIS-URBANA
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